

Access Free Steps Towards An
Evolutionary Physics

Steps Towards An Evolutionary Physics

*How did life start? Is the evolution
of life describable by any physics-*

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like laws? Stuart Kauffman's latest book offers an explanation-beyond what the laws of physics can explain-of the progression from a complex chemical environment to molecular reproduction, metabolism and to early protocells, and further

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evolution to what we recognize as life. Among the estimated one hundred billion solar systems in the known universe, evolving life is surely abundant. That evolution is a process of "becoming" in each case. Since Newton, we have turned to

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physics to assess reality. But physics alone cannot tell us where we came from, how we arrived, and why our world has evolved past the point of unicellular organisms to an extremely complex biosphere.

Building on concepts from his work

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as a complex systems researcher at the Santa Fe Institute, Kauffman focuses in particular on the idea of cells constructing themselves and introduces concepts such as "constraint closure." Living systems are defined by the concept of

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"organization" which has not been focused on in enough in previous works. Cells are autopoietic systems that build themselves: they literally construct their own constraints on the release of energy into a few degrees of freedom that constitutes

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the very thermodynamic work by which they build their own self creating constraints. Living cells are "machines" that construct and assemble their own working parts. The emergence of such systems-the origin of life problem-was probably

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a spontaneous phase transition to self-reproduction in complex enough prebiotic systems. The resulting protocells were capable of Darwin's heritable variation, hence open-ended evolution by natural selection. Evolution propagates this

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burgeoning organization. Evolving living creatures, by existing, create new niches into which yet further new creatures can emerge. If life is abundant in the universe, this self-constructing, propagating, exploding diversity takes us beyond

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physics to biospheres everywhere. Containing papers presented at the Sixth International Conference on Ecosystems and Sustainable Development, this book presents research related to different aspects of ecosystems and sustainable

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development, including physical sciences and modelling. A wide list of topics include: Thermodynamics and Ecology; Sustainability indicators; Mathematical and system modelling; Biodiversity; Sustainability development studies;

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Conservation and Management of Ecological Areas; Socio-Economic Factors; Energy Conservation and Generation; Environmental and Ecological Policies; Environmental Management; Environmental Risk; Natural Resources Management;

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*Recovery of Damaged Areas;
Biological Aspects; Complexity;
Remote Sensing; Landscapes and
Forestation Issues; Soil and
agricultural issues; Water
Resources; Sustainable Waste
Management; Air pollution and its*

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Effects on Ecosystems.

"Bartley and Radnitzky have done the philosophy of knowledge a tremendous service. Scholars now have a superb and up-to-date presentation of the fundamental ideas of evolutionary epistemology."

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--Philosophical Books

Gathering the proceedings of the 13th CHAOS2020 International Conference, this book highlights recent developments in nonlinear, dynamical and complex systems. The conference was intended to

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provide an essential forum for Scientists and Engineers to exchange ideas, methods, and techniques in the field of Nonlinear Dynamics, Chaos, Fractals and their applications in General Science and the Engineering

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Sciences. The respective chapters address key methods, empirical data and computer techniques, as well as major theoretical advances in the applied nonlinear field. Beyond showcasing the state of the art, the book will help academic and

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*industrial researchers alike apply
chaotic theory in their studies.*

Mathematical Population Genetics 1

Life and Process

The Unleashing of Evolutionary

Thought

From the Miller Experiment to the

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Search for Life on other Worlds

*Physics of Self-Organization and
Evolution*

*Ecosystems and Sustainable
Development VI*

*First Steps in the Origin of Life in
the Universe*

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Applied mathematical modeling is concerned with solving unsteady problems. Splitting schemes are attributed to the transition from a complex problem to a chain of

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simpler problems. This book shows how to construct additive difference schemes (splitting schemes) to solve approximately unsteady multi-dimensional

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problems for PDEs. Two classes of schemes are highlighted: methods of splitting with respect to spatial variables (alternating direction methods) and schemes of

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splitting into physical processes. Also regionally additive schemes (domain decomposition methods) and unconditionally stable additive schemes of multi-component splitting are

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considered for evolutionary equations of first and second order as well as for systems of equations. The book is written for specialists in computational mathematics

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and mathematical modeling. All topics are presented in a clear and accessible manner.

This book contains extended versions of papers presented at the

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1st International Conference on Lake Sustainability held at the Wessex Institute of Technology (WIT) campus in the New Forest. The meeting is a natural link

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in the chain of sustainability conferences that WIT regularly arranges. A wide spectrum of contributions focusing on lake sustainability and many up-to-date aspects of

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lake management and limnology are covered by the fifteen papers selected for publication. The papers draw an excellent picture of the recent developments in

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lake modelling, limnology of lakes and lake management. Readers will find useful the sustainability image of lakes presented in this volume.

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Building from foundations of modern science and cosmic evolution, as well as psychological and philosophical perspectives of value and meaning, this book explores some of

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humanity's biggest questions: · Is the Universe "about something"? · What might be roles for life and intelligence in cosmic evolution? · How might we

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think about value, meaning, purpose, and ethics in a cosmic evolutionary context? The author explores how the sciences of relativity and quantum theory, combined

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with cosmic evolution and philosophical traditions such as process philosophy, contribute to the development of a broad “relationalist framework”. That framework helps

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inform perspectives such as “scientific minimalism” and “cosmological theories of value”. Cosmological Reverence, Cosmocultural Evolution, and the Connection-Action

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Principle are explored as examples of cosmological theories of value, all of which help inform how we might think about ethics, value, and meaning in a cosmic context – including

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application to the search for extraterrestrial life and the future of intelligence in the universe. This book will benefit a diverse range of practitioners in

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philosophy, science, and policy, including interdisciplinary fields such as Science and Society and cultural evolution studies. From the Foreword: "This volume

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ranges from the sciences of cosmic evolution, relativity, and quantum mechanics, to value theory and process philosophy, all with the goal of exploring how they relate

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to humanity in the sense of worldviews and meaning. With his three cosmological theories of value, Lupisella goes beyond the bounds of most books on naturalism, and

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into fundamental questions about the nature of the universe and our relation to it. To read Lupisella is to have a mind-boggling experience, to want to race to references, to

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want to know more.” Steven J. Dick Former Baruch S. Blumberg NASA/ Library of Congress Chair in Astrobiology Former NASA Chief Historian
"The layman does not often

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have the opportunity of reading a simple exposition of advanced scientific thought written by a man who did the actual creative thinking. In this book, which is the

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result of a happy collaboration between the author of the Theory of Relativity and one of his own co-workers in research, the story they have to tell of this

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evolutionary development is one of the most fascinating that the human mind can meet with - the story of mankind's attempt to comprehend through inventive thought its own

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relationship to the external world. In simple, straightforward language, avoiding all the technical terms and mathematical formulae, the authors have traced with beautiful

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clarity the steps from the mechanical view of the universe invented by the classical physicists to the more satisfactory explanations evolved by modern science. Here is

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the story of man's conquest of his own ignorance. To read it is to participate in one of the greatest adventures of all time - the adventure of expanding the horizon

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of knowledge, the adventure of man's magnificent struggle to understand the laws governing the universe in which he lives." --
Amazon.com

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Splitting Schemes
Introduction to the Theory
of Complex Systems
Nature and History
Molecular Evolution of
Life
A New Ecology

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A Study of Man'S Place in Evolution

The author, Duncan Ferguson, draws upon his years as chaplain and professor in university settings, where seeking answers to hard and perplexing questions are the order of the day. One

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that continually surfaces is whether there is any evidence of divine transcendence in the natural world, in history, or in the human experience. Is there a God who might provide universal values, guidance to those seeking solutions to the overwhelming problems we face, and a measure of

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inner peace for troubled souls? This question is considered one of the most difficult to answer in a definitive way, and in a university setting, it is often answered by a clear no or simple neglect in that the question is not generally viewed as within the domain of the goals of the university. Dr. Ferguson

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believes that it is, and that it should be explored by our best minds in our universities and indeed the best minds in the world, by those with game-changing power, and by committed and passionate seekers. It is especially not the exclusive domain of cultic preachers. He explores what might be

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interpreted as evidence of a divine Transcendence, looking within the natural world, human history, the history of religious thought in the great religions, and the need for divine guidance as the human family faces the critical crisis of the survival of planet Earth. Universal values, compassion,

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justice, and peace, often rooted in the great religious traditions, should guide us.

Excerpt from Biological Physics, Vol. 2: Physic Metaphysics On the progress of Medicine and Surgery. One of the pathological and histological results of the acceptance of the foregoing views

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(see Vol I.), modified by the application of criticism and subjection to everyday clinical experience, we hope, and we think, will be the removal of a large part of the diseases hitherto attributed to blood influences, to the continually increasing class of acknowledged nervine diseases - such, for instance, as

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a large proportion of the exanthemata, rheumatism, and gout, and to a considerable extent metallic poisoning and many of the bacterial diseases, including influenza, to which may be added tetanus, hydrophobia, we might almost say, et hoc genus omne, with many local as well as general ailments,

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which have hitherto not been specially localised or located, and a corresponding practical modification in the application of medical and surgical curative and ameliorative procedure, in accordance with the changed standpoint from which these diseases will then be regarded, and the increased possibilities

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of treatment which will in consequence be placed within available reach of the clinical pioneer. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at www.forgottenbooks.com This book is a reproduction of an important historical work. Forgotten

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Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do,

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however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works.

The purpose of this review volume is to present the opinions of a number of distinguished individuals who have

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given careful thought as to why mathematics is so “unreasonably effective” when applied to the analysis of the natural sciences. Contents: On the Effectiveness and Limits of Mathematics in Physics (A O Barut) Why is the Universe Knowable? (P C W Davies) Mathematics in

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**Sociology: Cinderella's Carriage or
Pumpkin? (P Doreian) Fundamental
Roles of Mathematics in Science (D
Greenspan) Inner Vision, Outer Truth
(R Hersh) Mathematics and the Natural
Order (W G Holladay) A Few Systems-
Colored Views of the World (Yi
Lin) The Reasonable Effectiveness of**

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Mathematical Reasoning (S Mac Lane)
Three Aspects of the Effectiveness of Mathematics in Science (L Narens & R D Luce)
Mathematics and Natural Philosophy (R L Oldershaw)
Mathematics and the Language of Nature (F David Peat)
The Reason Within and the Reason Without

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(J Polkinghorne)The Modelling Relation and Natural Law (R Rosen)Structure and Effectiveness (L V Shelton)Psychology and Mathematics (J T Townsend & H Kadlec)Ariadne's Thread: The Role of Mathematics in Physics (H C von Baeyer)The Disproportionate Response (B J

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West)The Unreasonable Effectiveness of Mathematics in the Natural Sciences (E P Wigner)The Effectiveness of Mathematics in Fundamental Physics (A Zee) Readership: Mathematicians, natural and social scientists, philosophers, and historians of science.

Keywords:Philosophy of

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Mathematics; Relationship of Mathematics to the Sciences; Mathematical Modeling; Natural Philosophy; Effectiveness of Mathematics; Structure of Mathematics; History of Mathematics; What is

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**Knowledge;Limits of Mathematics
Revised and translated into English,
Rosaluna takes Enzo Tiezzi's previous
book, 'Beauty and Science, ' to the next
level. It contains categories that have
long been separated and demonstrates a
unity that is expressed in narrative
form by Rosaluna. The reader steps into**

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the life of Rosaluna armed with scientific knowledge of nature, environmental harmony and modern theories of evolutionary physics. The tale stimulates the imagination and shows the infinite paths the future might hold.

Second International Conference,

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**SIMPAR 2010, Darmstadt, Germany,
November 15-18, 2010, Proceedings
How the Constructal Law Governs
Evolution in Biology, Physics,
Technology, and Social Organizations
Systems Perspective
Philosophical Perspectives of Time in
Natural Sciences**

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**13th Chaotic Modeling and Simulation
International Conference**

**Process Theology: A Guide for the
Perplexed**

How the World Became Complex

The growth of evolutionary thinking
has had a profound impact on
economic theory and related fields

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such as strategy and technological innovation. An important paradigm that underlies the evolutionary theory of innovation is neo-Darwinian evolution. According to this paradigm, evolution is gradualist and based on the

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mechanisms of variation, selection, and retention. Since the 1970s, theoretical advancements in evolutionary biology have recognised the central role of punctuated equilibrium, speciation, and exaptation. However, despite

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their significant influence in evolutionary biology, these advancements have been reflected only partially in evolutionary approaches to economics, strategy, and innovation. The aim of this book is to review these

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advancements and explore their implications, with a particular emphasis on the role of serendipity and unprestatability in innovation and novelty creation.

Why are the many highly capable autonomous robots that have been

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promised for novel applications driven by society, industry, and research not available - day despite the tremendous progress in robotics science and systems achieved during the last decades? Unfortunately, steady

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improvements in specific robot abilities and robot hardware have not been matched by corresponding robot performance in real world environments. This is mainly due to the lack of advancements in robot software that

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master the development of robotic systems of ever increasing complexity. In addition, fundamental open problems are still awaiting sound answers while the development of new robotics applications suffers from the lack of wide

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elyusedtools,libraries,andalgorithms thataredesigned in a modular and performant manner with standardized interfaces. Simulation environments are playing a major role not only in reducing development time and cost, e. g. ,

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by systematic software- or hardware-in-the-loop testing of robot performance, but also in exploring new types of robots and applications. However, their use may still be regarded with skepticism. Seamless migration of code using

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robot simulators to real-world systems is still a rare circumstance, due to the complexity of robot, world, sensor, and actuator modeling. These challenges drive the quest for the next generation of methodologies and tools for robot

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development. The objective of the International Conference on Simulation, Modeling, and Programming for Autonomous Robots (SIMPAR) is to offer a unique forum for these topics and to bring together researchers from

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academia and industry to identify and solve the key issues necessary to ease the development of increasingly complex robot software.

This book explores the role of exaptation in diverse areas of life,

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with examples ranging from biology to economics, social sciences and architecture. The concept of exaptation, introduced in evolutionary biology by Gould and Vrba in 1982, describes the possibility that already existing

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traits can be exploited for new purposes throughout the evolutionary process. Edited by three active scholars in the fields of biology, physics and economics, the book presents an interdisciplinary collection of expert

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viewpoints illustrating the importance of exaptation for interpreting current reality in various fields of investigation. Using the lenses of exaptation, the contributing authors show how to view the overall macroscopic

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landscape as comprising many disciplines, all working in unity within a single complex system. This book is the first to discuss exaptation in both hard and soft disciplines and highlights the role of this concept in understanding the

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birth of innovation by identifying key elements and ideas. It also offers a comprehensive guide to the emerging interdisciplinary field of exaptation, provides didactic explanations of the basic concepts, and avoids excessive jargon and

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heavy formalism. Its target audience includes graduate students in physics, biology, mathematics, economics, psychology and architecture; it will also appeal to established researchers in the humanities who

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wish to explore or enter this new science-driven interdisciplinary field.

In this groundbreaking book, Adrian Bejan takes the recurring patterns in nature—trees, tributaries, air passages, neural networks, and

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lightning bolts—and reveals how a single principle of physics, the constructal law, accounts for the evolution of these and many other designs in our world.

Everything—from biological life to inanimate systems—generates

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shape and structure and evolves in a sequence of ever-improving designs in order to facilitate flow. River basins, cardiovascular systems, and bolts of lightning are very efficient flow systems to move a current—of water, blood, or

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electricity. Likewise, the more complex architecture of animals evolve to cover greater distance per unit of useful energy, or increase their flow across the land. Such designs also appear in human organizations, like the hierarchical

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“flowcharts” or reporting structures in corporations and political bodies. All are governed by the same principle, known as the constructal law, and configure and reconfigure themselves over time to flow more efficiently. Written in an easy style

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that achieves clarity without sacrificing complexity, Design in Nature is a paradigm-shifting book that will fundamentally transform our understanding of the world around us.

A World Beyond Physics

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New Developments in Evolutionary
Innovation

Towards a New Biophilosophy

Novelty Creation in a Serendipitous
Economy

Theoretical Introduction

Life in the Universe

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From Darwinian Metaphysics
Towards Understanding the
Evolution of Evolutionary
Mechanisms

*Our planet is crowded with a
spectacular diversity of living
creatures. As a most peculiar fact, the*

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oldest of these are in general the most primitive whereas the most recent are the most advanced. How can evolution be working in order to bring about such a counterintuitive result? This raises the challenging question of a direction of evolution. Is it

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proceeding in a certain direction, is it improving, is it even accelerating? By introducing the concept of complexity, the author suggests a new way of describing the process of evolution. In this conception, the human cultural evolution is found to be a continuous

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extension of biological evolution in a common process of ever increasing complexity, characterized as a stepwise, cumulative progression.

What is mans place in this process? Is it meaningful to reflect upon this at all? In fact, in asking this very

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question we have at the same time answered it. No other creature would. Our brains provide us with a fantastic range of exclusive cognitive abilities and in this respect we are unique. In this book, we embark on an innovative, exploratory and inter-

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disciplinary adventure, step by step following the author towards his quest of investigating evolution, its direction and the place of ourselves in it.

This book is a comprehensive introduction to quantitative

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approaches to complex adaptive systems. Practically all areas of life on this planet are constantly confronted with complex systems, be it ecosystems, societies, traffic, financial markets, opinion formation and spreading, or the internet and

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social media. Complex systems are systems composed of many elements that interact strongly with each other, which makes them extremely rich dynamical systems showing a huge range of phenomena. Properties of complex systems that are of particular

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importance are their efficiency, robustness, resilience, and proneness to collapse. The quantitative tools and concepts needed to understand the co-evolutionary nature of networked systems and their properties are challenging. The book gives a self-

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contained introduction to these concepts, so that the reader will be equipped with a toolset that allows them to engage in the science of complex systems. Topics covered include random processes of path-dependent processes, co-evolutionary

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dynamics, dynamics of networks, the theory of scaling, and approaches from statistical mechanics and information theory. The book extends beyond the early classical literature in the field of complex systems and summarizes the methodological

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progress made over the past 20 years in a clear, structured, and comprehensive way.

One of the main difficulties of applying an evolutionary algorithm (or, as a matter of fact, any heuristic method) to a given problem is to

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decide on an appropriate set of parameter values. Typically these are specified before the algorithm is run and include population size, selection rate, operator probabilities, not to mention the representation and the operators themselves. This book gives

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the reader a solid perspective on the different approaches that have been proposed to automate control of these parameters as well as understanding their interactions. The book covers a broad area of evolutionary computation, including genetic

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algorithms, evolution strategies, genetic programming, estimation of distribution algorithms, and also discusses the issues of specific parameters used in parallel implementations, multi-objective evolutionary algorithms, and

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practical consideration for real-world applications. It is a recommended read for researchers and practitioners of evolutionary computation and heuristic methods.

close to Stockholm, Stanley Miller gave the opening lecture of a conference on the M

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*ol- ular Evolution of Life. On a picture It
ook, as a co-
arranger of these events, Stanley is seen a
pproaching in his usual, modest way, mor
e focussed on scienti?c discussion than on
the camera. Last but not least, I shall
tell you the true story about when we*

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learned that Stanley is an enthusiastic environmentalist, in the best sense of the word. About 25 years ago, in Stockholm, Stanley, my wife and I strolled in the King's Garden. Its elm trees were full

7 J. Seckbach et al. (eds.), Life in the Universe, 7–8. © 2004 Kluwer

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Academic Publishers. Printed in the Netherlands. 8 of young people who, some even spending nights in the trees, prevented the authorities from removing the elmtrees, by ax and saw. Also Stanley signed a petition to save the elmtrees—andtheyweresaved!

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Stanley, I believe that your greatness as a scientist and as a friend must be linked to the many facets of your wonderful personality. We much look forward to your lecture. THE BEGINNING OF CHEMICAL EVOLUTION EXPERIMENTS

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Recollections and Perspectives 1 2 3

S. L. MILLER , J. L. BADA , and A.

Fast Radial Basis Functions for

Engineering Applications

The Prigogine Legacy

Evolutionary Epistemology,

Rationality, and the Sociology of

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Knowledge

Design in Nature

*Evolutionary Trends, Aspects, and
Patterns*

*The Evolutionary Approach for
Social Scientists*

Science, Philosophy, and Meaning in

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Cosmic Evolution

Alfred North Whitehead is arguably the most original 20th-century philosopher of nature and metaphysics. In recent decades a number

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of physicists have produced ground-breaking new theories in fundamental physics influenced by his process philosophy. In contrast, few biologists

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are even aware that Whitehead's radical rethinking of the Cartesian assumptions implicit in 19th-century sciences might be relevant to their

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enterprise. This book seeks to fill this gap by exploring how Whitehead's process ontology might provide a new philosophical foundation for the

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biosciences of the 21st century. The central premise shared by all of the volume's authors is the idea that all living processes are irreducible processes.

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Each chapter focuses on assumptions implicit in some of the core concepts of biology—such as organism, evolution, information, and teleology – that

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play crucial explanatory roles in the biosciences, but as metaphysical concepts fall outside its purview. The authors each identify important

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shortcomings implicit in contemporary biological paradigms and show how an approach grounded in a process-oriented metaphysics can avoid them.

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Proceedings of the Sixth
Trieste Conference on
Chemical Evolution,
Trieste, Italy, 18-22
September 2000
Eigen shows that life on
Earth is the inevitable

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result of certain chance events that took place in the unique history of our planet. He introduces how to interpret the molecular 'fossil record'. Part

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one are ideas that are justified scientifically. Part two shows important biological ideas and the final section summarizes developments in

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molecular biology.

This volume addresses the question of time from the perspective of the time of nature. Its aim is to provide some insights about the

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nature of time on the basis of the different uses of the concept of time in natural sciences. Presenting a dialogue between philosophy and science,

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it features a collection of papers that investigate the representation, modeling and understanding of time as they appear in physics, biology,

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geology and paleontology. It asks questions such as: whether or not the notions of time in the various sciences are reducible to the same

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physical time, what status should be given to timescale differences, or what are the specific epistemic issues raised by past facts in natural

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sciences. The book first explores the experience of time and its relation to time in nature in a set of chapters that bring together what human experience and

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physics enable metaphysicians, logicians and scientists to say about time. Next, it studies time in physics, including some puzzling paradoxes about

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time raised by the theory of relativity and quantum mechanics. The volume then goes on to examine the distinctive problems and conceptions of time in the life

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sciences. It explores the concept of deep time in paleontology and geology, time in the epistemology of evolutionary biology, and time in

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developmental biology.
Each scientific
discipline features a
specific approach to
time and uses
distinctive
methodologies for

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implementing time in its models. This volume seeks to define a common language to conceive of the distinct ways different scientific disciplines view time.

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In the process, it offers a new approach to the issue of time that will appeal to a wide range of readers: philosophers and historians of science,

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metaphysicians and
natural scientists - be
they scholars, advanced
students or readers from
an educated general
audience.

Rosaluna

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Parameter Setting in
Evolutionary Algorithms
Mathematics and Science
The Emergence and
Evolution of Life
Steps Towards Life
Time of Nature and the

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Nature of Time

Lake Sustainability

This book introduces the elements of a new evolutionary approach to physics. Based on intuition, this concept was originated by the late Chemistry Nobel Prize winner

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Ilya Prigogine. The text will appeal to both technical and graduate audiences as well as general readers. It deals with the following topics: Epistemological Basis of Evolutionary Thermodynamics; Far From Equilibrium -

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Thermodynamics and Irreversibility; The Concept of Negentropy (From Boltzman to Szent-György, Through Schrödinger's "What's Life"); Energy Versus Entropy; Is Entropy Always a Function State?

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The Arrow of Time and the Role of Events in an Evolutionary Physical-Chemistry; First and Second Principles of Thermodynamics Revisited; Introduction to Ecodynamics - Fundamental Principles; A

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Physics for Biosystems and
Ecosystems - Cross-Fertilization
Between Evolutionary
Thermodynamics and Systems
Ecology; The Supramolecular
Structure of Water - A Magnetic
Resonance Approach; Nuclear

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Spin Relaxation Times;
Dissipative Structures in Nature -
The Bat's Case (Biodiversity and
Strange Attractors); Application
of Ecodynamic Models to
Sustainable Development;
Biosphere Global Ecodynamic

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Models; and Dissipative Structures and Design.

This is an introductory guide to Process Theology for undergraduates. As part of Contium's 'Guide for the Perplexed' series, this text

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provides an accessible introduction to process theology, aimed at nurturing the theological imagination of undergraduates, pastors and interested laypersons. It describes the major themes of process theology and relates them

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to the everyday lives and spiritual commitments of people today. In addition to addressing traditional theological issues, Epperly addresses cutting edge issues in theology and ethics such as pluralism and postmodernism,

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matters of life and death, science (technology and genetics), and emerging forms of Christianity. This text is designed for seminary and university classes as well as congregational study. It will help readers to overcome the obstacles

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created by the technical language often employed by process theologians. Continuum's Guides for the Perplexed are clear, concise and accessible introductions to thinkers, writers and subjects that students and

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readers can find especially challenging - or indeed downright bewildering. Concentrating specifically on what it is that makes the subject difficult to grasp, these books explain and explore key themes and ideas,

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guiding the reader towards a thorough understanding of demanding material.

Steps Towards an Evolutionary Physics
WIT Press

This book contains a series of outstanding contributions on

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ecodynamics that appeared in limited editions before the emergence of the International Journal of Design & Nature and Ecodynamics, which has now become the primary focus for this area of research. The aim of

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ecodynamics is to relate ecosystems to evolutionary thermodynamics, which can lead to appropriate solutions for sustainable development. The contributions published in this volume relate to all aspects of

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ecosystems and sustainable development, ranging from physical sciences to economics and epistemology. The world of ecosystems has been dominated by the towering personality of Ilya Prigogine to whom this volume is

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dedicated. The first article is an extract from his autobiography written shortly before he died. Prigogine's ideas are directly reflected in many of the contributions in this volume. He helped set up numerous research

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groups all around the world, including that at Siena University headed by the late Enzo Tiezzi. He also influenced the work of Sven Jorgensen, Bernard Patten, Robert Ulanowicz, Simone Bastianoni, Nadia Marchettini,

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Ricardo Pulselli, T-S Chon, to name just a few amongst the many authors contributing to this volume. This compilation of influential papers currently unavailable in the open literature will make an important

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contribution to the field of
ecodynamics.

The Web of Life

Cosmological Theories of Value
Simulation, Modeling, and
Programming for Autonomous
Robots

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Understanding Innovation
Through Exaptation
Additive Operator-Difference
Schemes
Proceedings of the Sixth Trieste
Conference on Chemical
Evolution Trieste, Italy 18-22

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September, 2000

A New Scientific Understanding of
Living Systems

An interdisciplinary account of
the recent advances made in
understanding fundamental
molecular aspects of the pre-

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biological and biological evolution of life.

Originally published in 1990, Nature and History examines how Darwin's theory of evolution has been expanded by scholars and researchers

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to include virtually every scientific discipline. The book presents a morphological analysis of historical and social sciences – sciences which have traditionally have been viewed as too random in

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their progressions to conform to a model. Through the evaluation of empirical and factual evidence, the book builds a case for an evolutionary paradigm which encompasses both natural and

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social sciences, and presents the form's adaptiveness in working historical models.

This book presents the first "How To" guide to the use of radial basis functions (RBF). It provides a clear vision of their

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potential, an overview of ready-for-use computational tools and precise guidelines to implement new engineering applications of RBF. Radial basis functions (RBF) are a mathematical tool mature

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enough for useful engineering applications. Their mathematical foundation is well established and the tool has proven to be effective in many fields, as the mathematical framework can

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be adapted in several ways. A candidate application can be faced considering the features of RBF: multidimensional space (including 2D and 3D), numerous radial functions available, global and compact

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support,
interpolation/regression. This
great flexibility makes RBF
attractive – and their great
potential has only been
partially discovered. This is
because of the difficulty in

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taking a first step toward RBF as they are not commonly part of engineers' cultural background, but also due to the numerical complexity of RBF problems that scales up very quickly with the number

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of RBF centers. Fast RBF algorithms are available to alleviate this and high-performance computing (HPC) can provide further aid. Nevertheless, a consolidated tradition in using RBF in

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engineering applications is still missing and the beginner can be confused by the literature, which in many cases is presented with language and symbolisms familiar to mathematicians but

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which can be cryptic for engineers. The book is divided in two main sections. The first covers the foundations of RBF, the tools available for their quick implementation and guidelines for facing new

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challenges; the second part is a collection of practical RBF applications in engineering, covering several topics, including response surface interpolation in n-dimensional spaces, mapping of magnetic

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loads, mapping of pressure loads, up-scaling of flow fields, stress/strain analysis by experimental displacement fields, implicit surfaces, mesh to cad deformation, mesh morphing for crack

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propagation in 3D, ice and snow accretion using computational fluid dynamics (CFD) data, shape optimization for external aerodynamics, and use of adjoint data for surface sculpting. For each

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application, the complete path is clearly and consistently exposed using the systematic approach defined in the first section.

A leading scientist in the study of complexity offers a tour of

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the universe that highlights twenty-eight moments of emergence—significant events that transcended their own causes—covering such developments as the birth of the elements, the appearance

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of the solar system, and the
invention of technology.

(Science & Mathematics)

A Perspective on Evolution

Quantum Evolution

Steps Towards an

Evolutionary Physics

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Physic Metaphysics (Classic
Reprint)

The Evolution of Physics

Ecodynamics

The Emergence of Everything

A New Ecology: Systems

Perspective, Second Edition,

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gives an overview of the commonalities of all ecosystems from a variety of properties, including physical openness, ontic openness, directionality, connectivity, a complex dynamic for growth and

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development, and a complex dynamic response to disturbances. Each chapter details basic and characteristic properties that help the reader understand how they can be applied to explain a wide

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spectrum of current ecological research and environmental management applications. Contains revised, updated or redeveloped chapters that include the most current research and technology

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Reviews universal traits of ecosystems from multiple perspectives, giving the reader a complete overview of the systems perspective of ecology
Offers broad examples of ecology as a systems science,

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from the history of science, to philosophy and the arts Brings together the systems perspective in a framework of four columns for greater understanding, including thermodynamics, network

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theory, hierarchy theory and biochemistry Contains new chapter on the application of the theory to environmental management

"Although Charles Darwin predicted that his theory 'would

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give zest to ... metaphysics, ' even he would be astonished at the variety of paths his theory has in fact taken. This holds with regard to both gene-Darwinism, a purified Darwinian approach biologizing the social

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sciences, and process-Darwinism found in the disciplines of psychology, philosophy of science, and economics. Although Darwinism is often linked to highly confirmed biological theories,

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some of its interpretations seem to profit from tautological claims as well, where scientific reputation cloaks ideological usage. This book discusses central tenets of Darwinism historically as well as

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systematically, for example the history of different Darwinian paradigms, the units-of-selection debate, and the philosophical problem of induction as basis of metaphysical Darwinism.

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Crucially the book addresses the Darwinian claim that evolution is governed by an immutable and unrelentingly cruel law of natural selection. Paradoxically, Darwins theory is a static, non-evolutionary theory of evolution.

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The current book sketches the historical background and provides suggestions that may help to replace this approach by the idea of an evolution of evolutionary mechanisms (see Escher's 'Drawing Hands' on the

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cover). This view even suggests a tendency to overcome the blindness of the knowledge acquisition of primordial Darwinian processes and allows for some freedom from external environments. This book first

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develops a radically Darwinian approach, then criticises this approach from within. Even Darwinism has a tendency to transcend itself. Although the book addresses several empirical issues, it does not

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challenge particular findings. Instead it builds on many insights of Darwinism and provides a proposal for interpreting known empirical evidence in a different light. It should help pave the way for

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further developing an understanding of nature that transcends Darwinian metaphysics" --Publisher's description.

Presents an innovative view of the interrelationships of

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psychological, biological, and social phenomena, synthesizing the latest alternative theories of evolution and physics

The present volume is the sixth issue of the 'Evolution' Yearbook series. Our Yearbooks are

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designed to present to its readers the widest possible spectrum of subjects and issues: from universal evolutionism to the analysis of particular evolutionary regularities in the development of biological,

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abiotic, and social systems, culture, cognition, language, etc. The main objective of our Yearbook is the creation of a unified interdisciplinary field of research, within which scientists specializing in different

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disciplines could work within the framework of unified or similar paradigms, using common terminology and searching for common rules, tendencies and regularities. Global evolution (in connection with the Big History)

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becomes the main subject of our Yearbook. We strive to arrange each issue in such a way that the line from cosmic evolution to the human future is evident. Similar to the previous issues, this Yearbook shows

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some aspects of the evolutionary advance from the earlier phases to the anticipated future of human society. But on the whole, this volume is devoted to different aspects and facts of megaevolution and

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some universal theories in an attempt to find common ground in the diversity of manifestation of evolution and its forms at different stages of development. The title of this issue

'Evolutionary Trends, Aspects,

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and Patterns' is fully justified. The volume consists of four sections: Big History's Phases and Long-Term Trends; Cosmic Evolution; The Aspects of Socio-Cultural and Political Evolution; and Looking from the Past into

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the Future. As before, we strive to arrange every issue in such a way that the line from cosmic evolution to the human future is evident. Megahistory and global evolution still are the main subjects of our Yearbook. This

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Yearbook will be useful both for those who study interdisciplinary macroproblems and for specialists working in focused directions, as well as for those who are interested in evolutionary issues of

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Cosmology, Biology, History, Anthropology, Economics and other areas of study. More than that, this edition will challenge and excite your vision of your own life and the new discoveries going on around us.

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The Pattern of Life

Traces of Transcendence

Biological Physics, Vol. 2

A Survey of Evolutionary and

Complex Phenomena and

Considerations of Their

Interpretation in Whiteheadian

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Terms

Process and Physics

From Early Concepts to

Relativity and Quanta

A Historical and Philosophical

Analysis of Gene-Darwinism and

Universal Darwinism

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This thoroughly updated version of the German authoritative work on self-organization has been completely rewritten by internationally renowned experts and experienced

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book authors to also include a review of more recent literature. It retains the original enthusiasm and fascination surrounding thermodynamic systems far from equilibrium,

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synergetics, and the origin of life, representing an easily readable book and tutorial on this exciting field. The book is unique in covering in detail the experimental and

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theoretical fundamentals of self-organizing systems as well as such selected features as random processes, structural networks and multistable systems, while focusing on

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the physical and theoretical modeling of natural selection and evolution processes. The authors take examples from physics, chemistry, biology and social systems, and include

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results hitherto unpublished in English. The result is a one-stop resource relevant for students and scientists in physics or related interdisciplinary fields, including mathematical

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physics, biophysics, information science and nanotechnology.

The author, a molecular biologist, uses the relatively new science of quantum mechanics to explain how

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life originally evolved on the planet. Reprint.

Ranked as one of the half-dozen top biologists of the U.S. in a 1939 Time

magazine cover story, Dr. Oscar Riddle was one of the

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world's foremost experts on the pituitary gland, biology, and evolution. Riddle's thought-provoking and explosive text examines the tension between evolutionary thought and

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organized religions as he traces the evolutionary process from atoms to man and society.

This is the first of a planned two-volume work discussing the mathematical aspects of

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population genetics with an emphasis on evolutionary theory. This volume draws heavily from the author's 1979 classic, but it has been revised and expanded to include recent topics which

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***follow naturally from the
treatment in the earlier
edition, such as the theory
of molecular population
genetics.***

***The Heart of the Spiritual
Quest***

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EVOLUTION