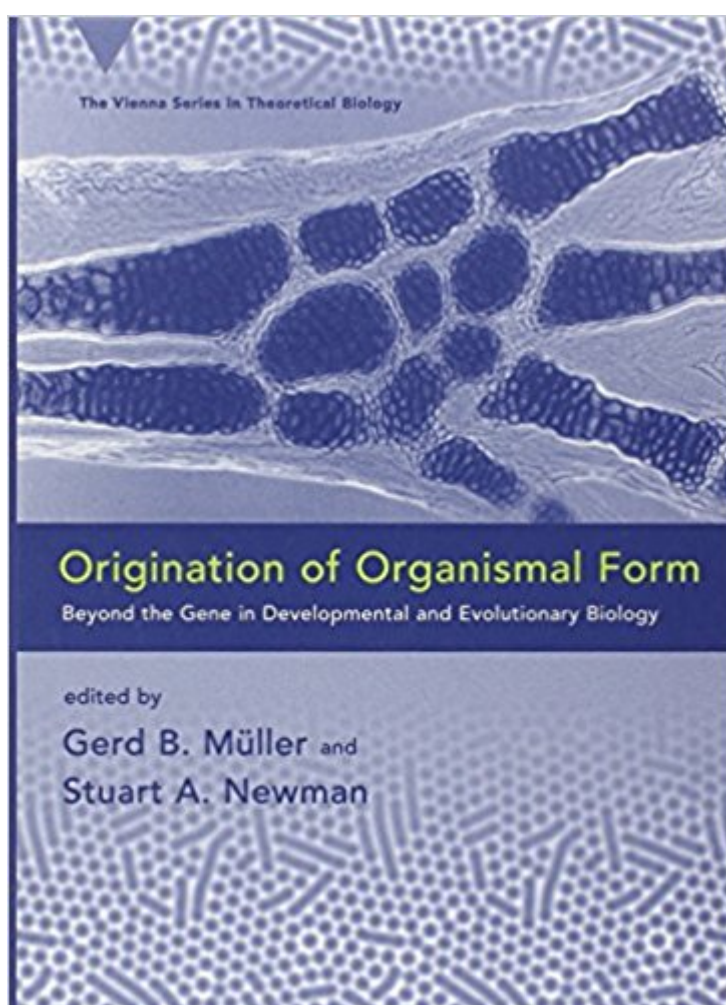


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Origination Of Organismal Form: Beyond The Gene In Developmental And Evolutionary Biology (Vienna Series In Theoretical Biology)



Synopsis

The field of evolutionary biology arose from the desire to understand the origin and diversity of biological forms. In recent years, however, evolutionary genetics, with its focus on the modification and inheritance of presumed genetic programs, has all but overwhelmed other aspects of evolutionary biology. This has led to the neglect of the study of the generative origins of biological form. Drawing on work from developmental biology, paleontology, developmental and population genetics, cancer research, physics, and theoretical biology, this book explores the multiple factors responsible for the origination of biological form. It examines the essential problems of morphological evolution -- why, for example, the basic body plans of nearly all metazoans arose within a relatively short time span, why similar morphological design motifs appear in phylogenetically independent lineages, and how new structural elements are added to the body plan of a given phylogenetic lineage. It also examines discordances between genetic and phenotypic change, the physical determinants of morphogenesis, and the role of epigenetic processes in evolution. The book discusses these and other topics within the framework of evolutionary developmental biology, a new research agenda that concerns the interaction of development and evolution in the generation of biological form. By placing epigenetic processes, rather than gene sequence and gene expression changes, at the center of morphological origination, this book points the way to a more comprehensive theory of evolution.

Book Information

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Customer Reviews

This volume challenges the primacy of both neo-Darwinian evolutionary theory and developmental genetics as complete explanations for the phenomena of evolutionary developmental biology. The contributors take a refreshing variety of approaches to classic problems such as homology, developmental constraints, modules, and roles for environmental factors in development. This is an original and well-argued contribution that is essential reading for anyone interested in the evolution-development synthesis. (Rudolf A. Raff, Distinguished Professor of Biology, Indiana University)

Gerd B. Müller, is Professor of Zoology and Head of the Department of Theoretical Biology at the University of Vienna and President of the Konrad Lorenz Institute for Evolution and Cognition Research. Stuart Newman is Professor of Cell Biology and Anatomy at New York Medical College.

The public Darwin debate doesn't really match the progress of biological research. And experts in the field seem reticent to point to the limits of the standard theories. Here we are told plainly, Darwinism has no theory of the generative. And the breakthroughs in developmental genetics fail to explicate the sources of organismic form. The text acknowledges that concern with the gene has overshadowed all other aspects of the discussion. This highly interesting, not too technical, work explores the work being done on evolutionary innovation. A theory of evolution should explicate both innovation and diversification. But natural selection can only explain how what already exists is maintained or transformed in the process of ecological survival. The standard explanations of variation and natural selection do not really explain this 'source of form' aspect of evolution, and we are presented with ambiguous statements about an evolutionary toolkit, in the developmental version, whose origins could not spring from the processes described in the Neo-Darwinian Synthesis. It seems an advance that a technical work by experts in the field would point this out. This is a very useful glimpse of the real work needed in biology, and should prove a useful refuge from the confusing public discourse on evolution that is generally less than helpful.

Origination of Organismal Form: Beyond The Gene In Developmental And Evolutionary Biology is a collection of excellent essays by scientists who assume Darwinian evolution, but whose work reveals various major evidential and conceptual problems with the theory. They are part of a growing number of scientists who find major problems with Darwinism but are not any type of creationist. The problems with Darwinism are usually buried deep in technical publications but they

are there if one looks. Anyone with the training and inclination to read this book could benefit greatly from it. I strongly recommend it to anyone interested in evolutionary biology. We can no longer ignore these problems. They are too great and must be dealt with. This book is an excellent introduction to these problems. A must read book!!!

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