

EVOLUTION—THE EXTENDED SYNTHESIS

edited by Massimo Pigliucci and Gerd B. Müller

The MIT Press
Cambridge, Massachusetts
London, England

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This book was set in Times Roman by Toppan Best-set Premedia Limited. Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Evolution—the extended synthesis / edited by Massimo Pigliucci and Gerd B. Müller.
p. cm.

Includes bibliographical references and index.

ISBN 978-0-262-51367-8 (pbk. : alk. paper) 1. Evolution (Biology) 2. Evolutionary genetics. 3. Developmental biology. I. Pigliucci, Massimo, 1964– II. Müller, Gerd B. QH366.2.E8627 2010
576.8—dc22

2009024587

10 9 8 7 6 5 4 3 2 1

Preface

The biological sciences evolve at a perplexing pace. Since the mid-twentieth century we have witnessed the molecular revolution, a dramatic technical turn in all fields of biology, and the rise and spread of computation, jointly leading to vast amounts of new data, concepts, and models about the organic world. Fundamentally different kinds of information are now available as compared with the time of the last major conceptual integration in the biosciences, the Modern Synthesis of the 1930s and 1940s—memorably summarized by Julian Huxley and newly accessible in the companion to this volume. As a consequence, but less noted than many of the spectacular empirical advances, the core theoretical framework underlying the biological sciences is undergoing ferment. Evolutionary theory, as practiced today, includes a considerable number of concepts that were not part of the foundational structure of the Modern Synthesis. Which of these will actually coalesce into a new kind of synthesis, augmenting the traditional framework in a substantial fashion, is a major challenge for the theorists of today.

To begin to meet that challenge, a group of 16 prominent evolutionary biologists and philosophers of science convened at the Konrad Lorenz Institute for Evolution and Cognition Research in Altenberg, Austria, in July 2008. The “Altenberg 16,” as the group was labeled by the media, met over three days to discuss the new information, both empirical and theoretical, from a large number of different fields. Conceptual change was seen to emerge from traditional domains of evolutionary biology, such as quantitative genetics, as well as from entirely new fields of research, such as genomics or EvoDevo. The structure of the present volume reflects the areas in which the conceptual progress was perceived to be most significant.

The modifications and additions to the Modern Synthesis presented in this volume are combined under the term Extended Synthesis, not

because anyone calls for a radically new theory, but because the current scope and practice of evolutionary biology clearly extend beyond the boundaries of the classical framework. The Altenberg group jointly concluded that by incorporating the new results and insights into our understanding of evolution, the explanatory power of evolutionary theory is greatly expanded within biology and beyond. As is the nature of science, some of the new ideas will stand the test of time, while others will be substantially modified over the course of the next few years. Nonetheless, the authors agree that there is much justified excitement in evolutionary biology today. This is a propitious time to engage the scientific community in a vast interdisciplinary effort to further our understanding of how life evolves. An extended evolutionary framework will be key for this endeavor.

The editors wish to thank all those who made this work possible. Foremost, we express our gratitude to the workshop participants and authors who contributed their expertise in so many areas of evolutionary biology. We are grateful to the staff of the KLI for their dedicated assistance in preparing and running the workshop, and we are equally grateful to the devoted editors at the MIT Press—Katherine Almeida, Susan Buckley, and Bob Prior—without whose experience, patience, and encouragement this volume and its companion would not have happened.