

Preface

In 2009, worldwide celebrations marked the bicentennial anniversary of Darwin's birth and the sesquicentennial of the publication of *The Origin of Species*. But the year also celebrated the flowering of evolutionary biology. The many celebratory meetings and lectures were perhaps the most prolific and visible acknowledgments of a scientist and a science in recent history. They dwarfed the Darwin centennial events of 1959, which transpired only twelve years after the first publication of the journal *Evolution*, and six years after Watson and Crick had proposed the structure of DNA. In the interim, the whole of biology has been transformed, but so has evolutionary science. It has become a self-sustaining field of inquiry, a central focus of at least 15 new periodicals and of numerous university departments. The field has retained allegiance to the big questions posed in the *Origin*, even while incorporating new concepts, biological knowledge, and technology to address questions and explain phenomena that could not be imagined in 1859 or often even in 1959. Ironically—and possibly accounting in part for the extraordinary attention to the subject—in 2009, opposition to the idea and to teaching of evolution (and rejection of the science itself) was at an all-time frenzy in the United States and continues to spread widely, even as evolution has become increasingly integrated into the framework of modern biology and its applications.

As 2009 drew near, the Department of Ecology and Evolution at Stony Brook University worked with Samuel M. Scheiner of the National Science Foundation to develop funding for "Darwin 2009," a symposium that would conspicuously mark the occasion and include public education and outreach. The result was a meeting on November 4–7, 2009 at Stony Brook University, whose format evolved into a workshop with 22 invited speakers, additional invited discussants, and an audience of Stony Brook faculty and students. Informal discussion was encouraged and greatly amplified the value of the formal presentations. We judged that the impact of the public educational effort could be maximized by engaging the experience and outstanding capabilities of the Gottesman Center for Science Teaching

and Learning at the American Museum of Natural History. The result was a separate, well attended, day-long teacher-training workshop on evolutionary biology at the Museum.

The celebrations of Darwin's work in 1959 were commemorated in several books that stand as portraits of evolutionary science at that time. Our planning committee conceived the Stony Brook workshop and this volume as a similar record of our time, which 50 years hence may well be viewed much as we now view the inspiring but less advanced ideas and understanding of 1959. It was challenging to organize a program that could fully encompass a field that has grown so enormously in scope since 1959, but we assembled a slate of speakers that would represent diverse subdisciplines within evolutionary biology, as well as perspectives from the history and philosophy of science and the applications and implications of evolution for society. We explicitly invited a diversity of speakers and discussants, with respect to nationality, age, gender, and sexual orientation.

We are gratified that all the speakers, including two who were prevented at the last minute from attending the Stony Brook workshop, enthusiastically contributed manuscripts for this volume. We did not ask the speakers to use a particular format or prescribed content for their chapters, but we requested that they discuss Darwin and try to trace the history of their subjects from his work. Thus, the chapters of this book are as varied as those in the 1959 symposium records. Therefore, this volume provides an overview of the current state of major research areas in evolutionary biology for experienced investigators, graduate students, and advanced undergraduates. It also places many of the major themes of evolutionary biology in their historical context and attempts to look to the future. We hope that this volume will serve as a milepost by which our intellectual successors can measure how far evolutionary science has come in another 50 years, when they celebrate the 200th anniversary of the publication of *The Origin of Species*.

Because this volume is the product of a workshop, we are indebted both to those who contributed to the organization and execution of the workshop and to production of the book. Massimo Pigliucci was crucial to organizing and bringing the Darwin 2009 workshop to Stony Brook. Ann Brody of the Office of Conferences and Special Events at Stony Brook University provided valuable advice and then executed all the arrangements for housing, meals, local transportation, and facilities. M. Caitlin Fisher-Reid served as the graduate assistant and managed a huge array of tasks for the workshop with truly exceptional commitment, skill, and efficiency. Jessica Gurevitch, Chair, Department of Ecology and Evolution, provided departmental staff support, funding, and resources. James D. Staros, the former Dean of the College of Arts and Sciences and Eric W. Kaler, Provost of Stony Brook University, provided financial support for the workshop, and Lawrence B. Martin, the Dean of the Graduate School, contributed support for graduate

student participation in the workshop. Many graduate students generously served as personal contacts for the visiting speakers and discussants or executed numerous tasks that arose during the workshop. An external advisory board, which included May R. Berenbaum, Sean B. Carroll, Scott F. Gilbert, David M. Hillis, Andrew H. Knoll, Jay Labov, Antonio Lazcano, Michael Lynch, Nancy Moran, Michael Ruse, Johanna Schmitt, Eugenie Scott, George N. Somero, Kim Sterelny, Tim D. White, and David Sloan Wilson, contributed valuable advice in the early stages of the workshop. The workshop would not have been possible without these contributions, and we are grateful for them all.

The public outreach workshop at the American Museum of Natural History was organized and executed by Lisa J. Gugenheim (Senior Vice-President for Education, Government Relations and Strategic Planning) and James Short (Director of the Center) with the aid of curators Joel L. Cracraft, Rob DeSalle, and Susan L. Perkins.

We would like to thank Samuel M. Scheiner for managing our proposal for the workshop and for encouraging production of this volume, and George W. Gilchrist for managing the grant for Darwin 2009 at the National Science Foundation. Ivar Strand and Celeste Radgowski in The Office of Sponsored Programs at Stony Brook University helped revise the grant for Darwin 2009 when it was converted from a large meeting to a more focused workshop. This volume and the workshop on which it is based were supported by National Science Foundation Grant No. 0838101. Any opinions, findings, conclusions, or recommendations expressed in this volume are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Twenty-two speakers and eight additional participants in the workshop quickly produced the articles that constitute this volume. Several participants in Darwin 2009 offered dissenting opinions or amplified elements of the presentations in the workshop, and they were asked to write commentaries that expressed their views. M. Caitlin Fisher-Reid continued to assist us by finding or scanning illustrations for the book, and Peter Park and Fumio Aoki helped convert or transmit large image files. Several external reviewers commented on specific chapters from the perspective of their specialties to help enhance and clarify the contents of this volume. We sincerely thank May R. Berenbaum, Peter J. Bowler, Sean B. Carroll, H. James Cleaves, Michael R. Dietrich, Michael Foote, Charles Fox, David M. Hillis, David Houle, Corbin D. Jones, William L. Jungers, Junhyong Kim, Antonio Lazcano, Scott Lidgard, David P. Mindell, Mohamed A. F. Noor, Robert Richards, Vasiliki Betty Smocovitis, Stephen C. Stearns, Bruce E. Tabashnik, Kevin R. Thornton, John J. Wiens, and Marlene Zuk for their advice. We are especially grateful to Peter J. Bowler and David M. Hillis, who generously reviewed multiple manuscripts. We thank Andy Sinauer

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