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Introduction, establishment, and spread: 50 years of invasion ecology since Elton

Richardson, David M., editor. 2011. **Fifty years of invasion ecology: the legacy of Charles Elton**. Wiley-Blackwell, Hoboken, New Jersey. xix + 432 p. \$180.00 (cloth), ISBN: 978-1-4443-3585-9 (alk. paper); \$79.95 (paper), ISBN: 978-1-4443-3586-6 (alk. paper).

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While some may argue that Charles Elton was not a “founder” but rather a “prophet” of invasion ecology (Simberloff, this volume), Elton’s 1958 monograph *The ecology of invasions by animals and plants* (Methuen, London) inspired and informed many of today’s ecologists about the issues and problems of biological invasions. In addition, while many theories Elton proposed in his monograph (e.g., diversity-invasibility) have been questioned and his oversights (e.g., on propagule pressure) have been noted, there is no doubt that he has influenced entire directions of research. Thus, revisiting Elton’s influence on the field of invasion ecology 50 years after his monograph is clearly worthwhile.

This volume emerged from a November 2008 symposium in Stellenbosch, South Africa that explored advances in the field of invasion ecology since Elton’s 1958 book, and was edited by the well-known South African invasion ecologist David Richardson. Contributors to the volume include leading and young scientists, who were all asked by Richardson to describe how their particular areas of expertise have developed over the past 50 years. Where appropriate, they addressed what Elton did or did not explore about their topics. Contributors represent a wide range of fields and were given wide latitude, so there is variation in the structure of the chapters, and they do not necessarily flow from one to the next. However, Richardson did an impressive job selecting appropriate contributors and editing the volume so that there is surprisingly little overlap in the contributions. Contributors were aware of other chapters as they often refer to them in their writings. In summary the essays are often short and thought-provoking, provide differing perspectives, and cover a wide variety of topics that are likely to inform scientists and students alike.

After a foreword by Harold Mooney and an introduction by the editor, the volume has seven sections filled with 30 focused chapters written by 51 contributors. Section 1 provides a historical perspective and has four chapters. The first is a touching contribution by Roger Kitching, who was a graduate student of Elton’s and provided an inspirational piece giving insight into Elton the man, the development of his 1958 book, and his contributions to the field of ecology more generally. The following chapter, by Daniel Simberloff, describes how Elton was more of a “prophet” than “founder” of the field, in part because his monograph was published decades before the field took off. These were followed by a chapter focused on invasions in the ocean, which Elton highlighted, and a chapter on the history of the concept of “nativeness.”

Section 2, on the current dimensions of invasion ecology, has two chapters—one on the pattern and rate of studies over the past 50 years, and one comparing the problem and solution sciences of invasion and restoration ecology. Section 3 also has two chapters on patterns of invasion over the past 50 years—one focused on Europe that highlights the development of a comprehensive database on invasions and another focused on forest pests and pathogens.

Section 4 moves into “The nuts and bolts of invasion ecology” with nine chapters on changes in methods, paradigms, and concepts since Elton’s book. There are chapters on advances in understanding of seed dispersal, mutualisms, species adaptation, plant reproductive systems, and impacts in freshwater systems. Some of these chapters specifically address advances since Elton (two notable chapters are on diversity-invasibility and exotic birds), while others address areas overlooked by Elton that have developed greatly in recent years (plant-microbe interactions, propagule pressure). Section 5 includes two insightful chapters on developments in research of two “Poster-child invaders” described by Elton: exotic ants and cheatgrass.

Section 6 has nine chapters focusing on new research directions and methods. Mark Davis calls for invasion ecologists to move away from niche-based approaches and overstating impacts. Other chapters highlight new directions and technologies: remote sensing, DNA barcoding, modeling of spread, all of which are likely to be informative to readers. Still others highlight challenges: biosecurity, climate change, eco-

nomics, and scientific objectivity. There is a nice closing chapter on a management program in South Africa ("Working for water"). The concluding Section 7 has two chapters, the first by Richardson in which he outlines future research directions, including developing better measures of impacts, understanding the dynamics of introduction pathways, and merging propagule pressure with existing models. The final chapter is a glossary of important conceptual terms.

While most of the 30 chapters are quite readable, even to those who might not be as familiar with particular topics, as with most edited volumes, not all chapters are likely to interest everyone. There are a growing number of books on biological invasions, some of which are in textbook format. Although this volume is not a textbook, particular chapters lend themselves well to upper division or graduate courses, and the companion website with access to downloadable tables and figures assists in making this possible. As instructors of a graduate seminar in invasion ecology, we imagine using certain chapters of the book as well as the glossary of terms and concepts in the classroom. One negative is that much of the cited literature, particularly the quantitative literature reviews (i.e., Chapters 5 and 29), is focused around 2008. While this is in-line with the volume's directive, it leaves a reader in 2011 wanting more recent citations in some areas. Technically, the book is well done, with few typos, high quality illustrations, and a taxonomic and a general index.

The volume left us inspired by the past and excited by the future. It comes at a time when we can answer some of the questions Elton posed, and also at a time when paradigms are shifting and new frameworks and technologies are being developed and tested at an incredible rate. While highlighting the dynamic nature of the field, the volume encourages

scientists and students to see new ways to contribute to this growing field.

In 1958, Elton thought we would be thinking about invasive species in 50 years, and he was right. Will we still be talking about invasive species 50 years from now? Considering what we have learned by studying invasives, it seems we will be. This volume will provide an interesting benchmark for us to revisit then. It is exciting to imagine what a volume like this will highlight 50 years from now.

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