with solutions easily understood by the masses would have benefited influential readers to consider these options.

In short, this is a good text reviewing the past, present, and future of biodiversity and the loss thereof. The reader will gain insight into the life and death of biodiversity, from microbes to entire ecosystems. Although extinction is a natural part of evolution, this book clearly defends its thesis that we are in the middle of a man-made mass extinction.

The only question the reader is left with is are we too late?

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The current paradigm for a career in science is to conduct PhD-level research in the field of your advisor, extend this work by learning new tools as a postdoctoral fellow, and then further develop the system as a faculty member. This paradigm maximizes publication productivity in preparation for the move to the next career phase. Its advantage is that one can quickly become an expert in a specific field of research. Such specialization ensures that particular fields of inquiry will advance rapidly.

The disadvantage, however, is that you quickly become an expert in your field, one in which you typically read papers from, and submit manuscripts to, a very narrow suite of journals. The usual consequence is that it becomes remarkably difficult to develop an ability to move between fields or to work in multiple fields in parallel. I am sure that almost everyone reading this review has experienced discussions with colleagues from other fields during which the participants feel they are speaking different languages to describe the same idea.

It is clear, however, that the scientific community has shifted in emphasis from specialized science to an integrative approach. Many universities now have programs in interdisciplinary science or have established departments of integrative biology. The use of the words “integration” and “multidisciplinary” have increased dramatically over the past decade and now appear regularly in research papers [a sample of 92,144 papers from 1998–2008 pulled from the Web of Science database with the keyword “integration” show a significant linear increase during this decade ($r^2 = 0.95$, slope >1)]. In more recent years, scientific research has moved even further to a systems-level approach. The Directorate for Biological Sciences at the US National Science Foundation has created a division, Integrative Organismal Systems, whose mission “…supports research aimed at an integrative understanding of organisms as units of biological organization, with particular emphasis on systems-level approaches…” (http://www.nsf.gov/bio/about.jsp). The “omics” fields of research (genomics, metabolomics, and transcriptomics) are examples of partial system-level approaches. Even though the whole organism is sampled, the resulting data are rarely put in an ecological or evolutionary framework—although that too is changing.

Developing a single framework to understand how an organism develops by bringing together numerous disciplines and integrating across multiple levels of organization is a very daunting task to say the least. Differences in language, methodologies, levels of organization, and ways of thinking present significant barriers. Ecological Developmental Biology: Integrating Epigenetics, Medicine and Evolution is a superb step toward overcoming the barriers that have prevented this goal from being reached. This book, written by the developmental biologists Scott Gilbert (Swarthmore) and David Epel (Stanford), integrates molecular and developmental biology with ecology and evolutionary biology in a framework in which all disciplines feed from and support each other. Such a framework makes the result much more than the sum of its parts. The general framework is deceptively simple: the development of an organism is influenced both by genetics and the environment. Although this has been known for many, many years, ecological development (“Eco-Devo”) provides the context in which to address this via a systems-level approach: integrating the system of the organism within the system of ecological and evolutionary selection.
The book is divided into three parts. Part 1, Environmental Signals and Normal Development, sets up the framework of development in an ecological context. It describes how environmental and anthropogenic agents alter the course of development. Some of these agents have detrimental effects, but others simply adjust development to match local conditions. Part 2, Ecological Developmental Biology and Disease States, is more medical/pharmacological in orientation. It focuses upon how (mostly artificial) toxins in the environment affect development, generally for the worse. Part 3, Towards a Developmental Evolutionary Synthesis, is the central component of the book. It instructs readers on how developmental biology can clarify and contribute to concepts in ecology and evolutionary biology, and how ecology and evolution influence the developmental program.

Gilbert and Epel's writing style is engaging, with some of the early examples presented as mini-detective stories. The figures are superb, characteristic of books from Sinauer Press: they are esthetically pleasing, with just enough information to get the point across without seeming cluttered. This book will be accessible to both graduate students and postgraduate researchers. The authors state that an undergraduate, with no more background than a course in introductory biology, will be sufficiently prepared to use this book. However, the heavy use of (unexplained) jargon, particularly in the sections on developmental genetics, as well as the relatively sparse background accompanying many of the examples, will elude most students with insufficient background to appreciate the context.

The book is remarkable in its scope, drawing from a dizzying array of research areas: developmental biology (obviously), embryology, genetics, biochemistry, stress biology, endocrinology, behavior, genomics, physiology, life history, phenotypic plasticity, nutrition, thermal biology, ecology, evolutionary biology, toxicology, molecular biology, cellular biology, pharmacology, and medicine. The scope of the book is one of its strengths. All of these fields (and probably a few more as well) contribute to the development of an organism. Only by integrating these fields in a systems-level framework can one understand how organisms develop in response to ecological and evolutionary selection. This book offers such a framework.

The book is largely descriptive. There is no attempt to develop a rigorous or mathematical framework, nor to develop testable hypotheses. At first I considered this to be a weakness. Upon reconsideration, however, I think that the authors were smart in not attempting to do so. The purpose of this book, I believe, is to increase awareness among researchers in these disparate fields as to how their disciplines can be integrated into the big picture of systems biology. After all, most of these fields have been around for many years, and researchers have been doing Eco-Evo-Devo-related research in many of them (although may be not phrased as such). This book shows us how one can fit it all together.

The title of this book could easily have been "The Developmental Basis of Phenotypic Plasticity." Ecological development is all about phenotypic plasticity. Over the past 20 years, hundreds of dissertations, thousands of papers, and numerous books have explored plasticity, both empirically as well as theoretically. It is odd that the authors did not incorporate this literature into their framework except as a source from which to draw examples. Again, however, phenotypic plasticity is not their expertise, and perhaps Gilbert’s and Epel’s book is better for not having incorporated it more explicitly. Integrating Eco-Devo into the well-established theoretical framework of phenotypic plasticity is no small challenge, although it is one that will have far-reaching implications for our understanding of life in the real world. Until relatively recently, the developmental basis of phenotypic plasticity has largely been treated as a “black box” (Scheiner 1993). Opening the systems-level black box of phenotypic plasticity may well prove to be one of the more exciting, enlightening, and challenging areas of research in the coming years.

To end, I would like to note a potential by-product of Ecological Developmental Biology. During the 19th and early 20th centuries, science revolved around organisms: how they worked and how they were put together. Beginning with the recognition of massive allelic variation in the 1960s, molecular biology moved to the forefront of biological research. This is still the case today. To a large extent, this shift has come at the expense of organismal biology. Many universities no longer teach the “ologies”, and when was the last time your undergraduate students dissected a frog? The discipline of Eco-Evo-Devo emphasizes the organism, as it is the whole organism that translates the environment, through its development, into a functional individual. Perhaps now, biological research has come full circle. To paraphrase, nothing in biology makes sense except in the light of the whole organism.
Through much of the last century, conservation of species has focused predominantly on vertebrates. These were the species that, for example, were first listed under the US Endangered Species Act. The early neglect of insects was not due to lack of need. What has become clear from the work of Robert May and others (1995) and, more recently, Rob Dunn (2009), is that insects have remained the known unknown. As an example, the fraction of insects known to have gone extinct is two orders of magnitude lower than, say, the vertebrates. Certainly, this rate is an artifact of already extinct insects never having been discovered. Insect Species Conservation fills a great need in conservation biology by synthesizing an increasing set of case studies and pointing the way forward to protect the most diverse group of animals.

The strength of this book is its detailed elaboration of case studies. These case studies are described in detail within the text, and also provide an excellent literature to draw from when conservationists are faced with protecting a rare species for which little is known. Many of these are on butterflies. This is a good place to start because butterflies have long been popular both among the public and within science. For this reason, the largest number of protected insects is butterflies. This said, I was pleasantly surprised to find many examples that extend beyond butterflies, from Hungerford’s crawling water beetle to Hine’s emerald dragonfly. Many of the challenges and techniques developed for butterflies can easily be drawn on in conservation of other insect groups and, more generally, it is promising to see that the attention historically afforded butterflies is now expanding to other insect taxa.

This book could be described as a “Book of Lists.” For everything from Plans for Insect Species Conservation (Chapter 2) to Roles of Monitoring in Conservation Management (Chapter 8), there are step-by-step lists of procedures that others have used to accomplish conservation goals for insects. Especially for a conservation biologist or manager who is not familiar specifically with insect conservation, this book provides a how-to guide that will take one well beyond the first stages of getting started with planning conservation for insects, and lead into the development of a full conservation program. In my reading of the book cover-to-cover, there were times when the frequent lists impeded the narrative. Yet, as a reference guide for a practitioner that is facing the imminent challenge of one phase of insect conservation, these lists would provide immediate structure.

Insect Species Conservation comes full circle, from the beginning when it assesses existing needs and plans for insect conservation in Chapters 1 and 2 to the final, forward-looking chapter “Insect Management Plans for The Future.” In between, this book covers a great deal of ground, from how to determine threats, doing the actual monitoring, and promoting rare species to an often skeptical public. The chapter on adaptive management shows how habitat restoration and re-creation can be done in experimental ways for insects that are often not possible for wider ranging animals, thus accelerating the acquisition of knowledge for science and management. Some of the technical recommendations regarding population monitoring and analysis could have been brought up-to-date with current developments in mark-recapture analysis for insects (Williams et al. 2002, Haddad et al. 2008), distance sampling (which is gaining ground relative to other methods, but receives no mention), and population viability analysis (Morris and Doak 2002). The final chapter was terrific, including its emphasis on getting buy-in from multiple stakeholders outside of science, and creating a sense of ownership among private landholders, on whom insect conservation ultimately depends.

This book’s strength and its failing is that its subject seems to defy generality. The numerous case studies