

BOOK REVIEWS

Marcy F. Lawton, Editor

Analyses in behavioral ecology: a manual for lab and field.—Luther Brown and Jerry F. Downhower. 1988. Sinauer Associates, Sunderland, MA. 194 pp.

Several years ago Sinauer Associates sent out a questionnaire to determine the academic market's demand for a laboratory manual in behavioral ecology and to solicit suggestions about study organisms and areas of interest. The result, *Analyses in behavioral ecology: a manual for lab and field*, meets this demand with a taxonomically and topically balanced compilation of 27 laboratory exercises appropriate for courses in ethology, ecology, or introductory biology. Although only four involve birds (one exercise on homing in pigeons, two on foraging by seed-eating birds, and one on the effect of egg color and dispersion on predation), this book has several features that make it noteworthy for ornithologists.

The tight organization of the exercises is one of the book's chief assets and an excellent model for lab write-ups in general. The exercises fall under one of four general subjects: sensory capabilities, feeding patterns, spacing patterns, and reproduction. Each exercise begins with an abstract summarizing the lab's aims and protocol, followed by an introduction to the broad theoretical question to be addressed, background information on the natural history of the study organism, a description of specific hypotheses and experimental designs, and recommended statistical analyses of the data. A brief list of references directs students to the primary literature relevant to each lab, and concluding notes advise where to find study organisms.

About half the exercises focus on insects, but the authors suggest alternative species, and many of the labs could be easily modified to explore avian behavior (e.g., assortative mating in pigeons rather than soldier beetles, or sexual differences in habitat use in woodpeckers rather than evergreen bagworms). Exercises are evenly divided between the field and laboratory; all but five are experimental in approach.

Although the labs are diverse and interesting, a few seem rather impractical. Not many ecologists, for example, will bother securing state and federal permits to hold bats collected the previous summer in order to test bats' perceptual abilities flying in an elaborately constructed plastic tunnel. Other exercises, especially those demanding numerous replicates, may not be possible to carry out with small classes. I was somewhat disappointed by the number of exercises that required animals mail-ordered from biological supply houses. Perhaps they were included for those of us at northern universities and colleges who would find it difficult to conduct certain seasonal exercises during the normal school year, such as those on butterfly oviposition preferences or assortative mating in beetles.

An unusual and welcome feature of this book is that nearly half of it is devoted to data analysis. Nineteen commonly used parametric and nonparametric statistical tests are explained fully, each with a section on

appropriate uses of the test, "cookbook" calculations illustrated by a specific biological example, and statistical tables. Students are shown how to present data in the form of readable figures and sensible tables. Despite the manual's emphasis on statistics, surprisingly little attention is paid to the importance of randomization in experimental design.

Brown and Downhower have obviously given serious thought to how a laboratory manual ought to be written for an undergraduate course in animal behavior. This one is rigorous yet understandable and un-intimidating. The labs are designed to work; even if the data fail to yield significant results, the exercises are guaranteed to stimulate new questions and to teach various experimental techniques. Throughout, the authors successfully emphasize the need for a quantitative approach, the power of an evolutionary perspective, and the art and pleasure of asking questions about animal behavior. Anyone interested in teaching a course on the behavior of birds or other animals will be taught something by Brown and Downhower's manual.—NATHANIEL T. WHEELWRIGHT, Department of Biology, Bowdoin College, Brunswick, ME 04011.

Is This Trip Necessary?

Naturalized birds of the world.—Christopher Lever. 1987. Longman Scientific & Technical, Harlow, U.K. (U.S.: Wiley). xx + 615 pp. \$197.

Lever's review (1982) of *Introduced Birds of the World* (Long 1981) said, "This book is encyclopaedic in form, and the text is factual and comprehensive; each species is discussed individually under a number of sub-headings. . . . The sections Notes on Introductions form the main body of the book. They are arranged by country of introduction and give detailed information on the histories of the various introductions concerned. Maps are provided in the text showing the natural distribution, introduced range, extent of migration—if any—and the success or otherwise of national introductions. Attractive and accurate line drawings. . . . of most species enhance the text. . . . Also included are tables showing introductions of individual families and an extensive bibliography containing over 2,000 references."

Given the "immense value of this important work of reference," one may ask why Lever's book on exactly the same topic should appear 6 years later. The organization of Lever's book is almost identical to that of Long, as are the line drawings and maps (though those in Long are slightly more aesthetically pleasing). Long's book contains more information (its print is smaller). The only conceivable justification would be a significant number of new introductions or much new information on previous introductions. However, neither condition obtains. Lever has slightly over 2,000

references, of which about 14% are post-1979 (the apparent ending date of Long's literature search). Most of these are minor addenda to well known stories. Very few contain either important new information on older introductions or accounts of previously unrecorded introductions. The only significant enhancement of Long's accounts is for introduced birds of the United Kingdom, for which Lever gives many additional details.

There is a serious lacuna in *Naturalized Birds*. Again, from Lever's review of Long: "The inclusion of species which have failed to become established is, perhaps, of doubtful interest and value and tends somewhat to blur the overall picture; it also increases the risk of omissions, since many unsuccessful and unrecorded attempted introductions must have been made throughout the world." Adhering to this view, Lever has greatly de-emphasized unsuccessful introductions in his own book. He appears to have recorded these only for birds that have been introduced successfully somewhere, and to have omitted mention of species all of whose attempted introductions have failed. To my mind, this omission greatly lessens the value of his volume. It is astounding that, in this age of consuming interest in the probability of successful establishment of a novel biological entity (either a genetically engineered organism or an introduced species), an author could consider such information of doubtful interest and value. Exactly what "overall picture" is blurred?

The problem is, in fact, the opposite: without information on failures, a misleading picture of factors predisposing to success may emerge. This problem was more common in the earlier literature, in which lists of characteristics favoring successful introduction were common (e.g., Baker and Stebbins 1965). Lever (p. 7) constructs such a list, including "freedom from predators," "absence of competition from more aggressive native species," "ability to reproduce quickly," and "degree of adaptability." Unless one compares failed introductions to successful ones with respect to such characteristics, it is impossible to determine which characteristics are, in fact, likely to favor success.

Lever is certainly correct that many unsuccessful introductions have been unrecorded, yet bird introductions (even failures) have probably been tracked more closely than those of any other group save insects (used in biological control). Individuals and introduction societies often kept careful notes and, so long as one keeps in mind the limitations of the record, failed introductions are often quite illuminating. For example, the early failure of propagules of subsequently successful introductions (e.g., the House Sparrow, *Passer domesticus*) suggests that current theory on the threats of demographic and environmental stochasticity to small populations (e.g., Soulé 1987) may be on track. Moul-

ton and Pimm (1983, 1986) have erected an elaborate study of species interactions among birds introduced to Hawaii based on failed introductions, while many papers in the various proceedings of the recent spate of conferences on biological introductions sponsored by the Scientific Committee on Problems of the Environment (e.g., Kornberg and Williamson 1986, Mooney and Drake 1986) focus on records of failed introductions. Unfortunately, even after all this recent activity, Lever is correct to argue that, "the only element in species introduction that can be forecast with certainty is that of unpredictability" (p. 7). However, I believe most followers of the recent literature would agree that the scope of unpredictability has been narrowed and the careful consideration of anecdote after anecdote has sharpened focus on what traits of a species and its target location must be understood in order to increase predictability.

The other major debilitating feature of *Naturalized Birds* is its price, \$197. The Foreword (by Sir Peter Scott) says that it "should find a place on every ornithological bookshelf," but I doubt if it will. Fortunately, with a better book (*Introduced Birds*) still in print at \$50, those of us with normal incomes need not be deprived.—DANIEL SIMBERLOFF, Department of Biological Science, Florida State University, Tallahassee, FL 32306.

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