

BOOK REVIEWS

Marcy F. Lawton, Editor

Ecology and evolution of Darwin's finches.—Peter R. Grant. 1986. Princeton University Press, Princeton, NJ. xiv + 458 p. \$55.00 cloth, \$22.50 paper.

Visionaries need islands. Patterns in our everyday world are too complex for us to see past the complications and focus on the truly important. The Pacific and its islands have been particularly attractive in attempts to escape the extraneous; Dana, Melville, and Gauguin all made pilgrimages and sought larger truths there. The Galápagos have been the favorite retreat for biologists; Darwin and Lack both made brief but formative journeys to the "Enchanted Isles." As a result of their stays, they created new, widely influential world views that are still with us today. Consequently, these islands occupy a large, almost mystical place in the history of biological ideas. With this cachet, though, come several difficulties. First, one's expectations are heightened when the Galápagos are involved. Second, the ecological world of these islands, while perhaps simple by continental standards, also includes some difficult challenges. The finches, especially, pose problems of variability and species limits not found elsewhere.

Peter Grant began working on the Galápagos in 1973. Since then he has conducted extensive studies on the islands with colleagues and a singularly gifted succession of graduate students. The research has been concentrated on the ground finches of the genus *Geospiza*. *Ecology and evolution of Darwin's finches* is a summary of this research program.

Grant's purpose in writing this book was to explain the diversity of Darwin's finches in terms of evolutionary processes and ecological contingencies. This is not a restricted undertaking; Grant's vision of the pattern to be accounted for encompasses not only the current ecology of the various species, but also their morphology, intra- and interspecific variation, plumage coloration, patterns of sexual dimorphism, mechanisms of speciation, species recognition, and phylogeny. Thus, nearly all aspects of the radiation are to be explained. This is approximately the same synthesis that Lack attempted, but, 40 years later, standards and expectations are higher. Nevertheless, Lack was on the Galápagos for only 4 months; Grant and his colleagues have worked there for approximately 15 years. The research has resulted in several dozen published papers involving an array of field observations, technical and analytic procedures, and assorted field experiments. An overview is welcome.

The best developed topic in the book concerns the relationships among the morphologies of the species, the size distributions of food supplies on the various islands, competition, and the different compositions of the finch communities on various islands. Major space is also devoted to growth and development, species recognition and reproductive isolation, and the recon-

struction of phylogeny. Additional topics covered include background information on the islands and previous research performed there, a discussion of the finches' coloration, and a discussion of the Galápagos radiation in comparison to other adaptive radiations. Almost all of this material has previously been published in papers in journals.

The bill morphology/seed resource/competition argument is by far the best part of the book. Grant has concentrated enough field effort on the topic over a sufficient period of time that the story appears to be quite tight. An association of seed size with bill size has been found, different seed size distributions have been documented on different islands, and an association of finch biomass with seed biomass has been shown. Predictive models have been developed relating observed seed size distributions to expected density of birds on various islands. These and other models do a reasonable job of predicting the actual species composition and mean sizes of beaks on those islands.

The role of competition in structuring communities is one of the hotly debated issues in ecology today. Grant is a proponent of the camp that believes competition is of primary importance, and this work can be viewed as a piece of advocacy for that position. What makes it occupy a special place in that argument is the long-term nature of the study and, consequently, the different seasons and conditions observed (Lack's 4-month study occurred during an El Niño event), and the attention to detail, especially the documentation of the resource base. Of course, this documentation and the causal models are specific to the system, but they allow the analysis to rise above the everyday mediocrity of description of an overall pattern and demonstration of *consistency* with theory. Grant's work is not kitsch, it is a real contribution to knowledge and will have to be taken seriously by Simberloff and his colleagues.

The material in the rest of the book is not of as high an overall quality; the topics involve more unresolved issues and lack syntheses. The chapter on development, for example, includes comparisons of growth trajectories of weight and bill dimensions of several species of the finches. It is the best such documentation available for birds (excluding domestic fowl), but ought to be integrated with the information available on phylogeny in order to get at the developmental mechanisms of size and shape change.

The data on species recognition is interesting; both beak dimensions and song appear to be important factors for intraspecific recognition among the ground finches. In the case of song, it is not yet clear which particular characteristics are used by the birds to distinguish conspecifics within islands. More could be done with this, and especially with regards to species recognition and species limits among islands. With regard

to mechanisms of speciation in the finches, Grant believes that initial differences in bill morphology, evolved in allopatry, are reinforced in sympatry due to ecological competition. Because species recognition is in part determined by bill size, this is a case in which ecological competition can drive speciation by enhancing recognition. Although fascinating, this phenomenon cannot be of particularly general importance outside of these finches. Species recognition and isolating factors are not often associated with morphological structures adapted for feeding, at least in birds.

Details of the systematics of these finches remain poorly known in spite of a lot of effort by a number of prominent researchers over the last 150 years. It is unfortunate that Grant has not spent more time on this aspect of the birds. For example, no one has yet analyzed these birds in a modern fashion to demonstrate their monophyly; that remains an assumption based primarily on biogeography. Likewise, if the birds are monophyletic (as is *probably* true), their phylogeny is a bit of a problem. In three different chapters, alternative branching diagrams are presented for the finches. Each of these does maintain the ground, tree, and warbler finches as distinct major branches, but within each genus the consistency of the three diagrams is not very great. Finally, species limits remain a large problem. The molecular and morphometric data that are available strongly indicate that these birds have been overlumped. For example, protein data suggest the existence of several species of warbler finch. Grant alludes only briefly to these problems.

Darwin's finches are bizarre in many ways. The extent of hybridization among different species, the problem of species limits across islands, the lack of clear vocal or plumage distinctions among species, and the degree of morphological variation within single populations are all unusual by avian standards. Thus, while all information concerning these birds is of interest, the generalizations that actually will influence the thinking of organismal biologists are those concerning competition and community structure. In this regard, however, David Lack was there first.

Some of the greatest scientists, like artists, are visionaries who create new worlds. Out of experiences with the finches of the Galápagos, Lack came to see a world largely shaped by competition and natural selection. That view, later analytically and quantitatively enhanced by MacArthur and his school, still dominates today. Grant's contribution has been to document the details and add nuance to Lack's story. Grant's book is well-documented, but less encompassing, where Lack's was loosely supported, but broad in scope. The two studies represent different styles and different eras; both may well be considered classics. Nevertheless, I do not think that Grant's book will achieve the historical stature of Lack's; it fits too easily within current orthodoxy and does not force readers to reassess their views of the structure of communities or the nature of species. Grant's genius lies in the energy, intensity, and concentration of his fieldwork. That is of the highest quality and for it he has been justly honored.—GEORGE F. BARROWCLOUGH, Department of Ornithology, American Museum of Natural History, New York, NY 10024.

The tanagers: natural history, distribution, and identification. Morton L. Isler and Phyllis R. Isler. 1987. Smithsonian Institution Press, Washington, DC. 404 p. ISBN 0-87474-552-7. \$70 cloth, \$49.95 paper.

What is a tanager? Robert W. Storer posed this difficult question in 1969 in a short paper (*Living Bird* 8: 127-136) recalling taxonomic ambiguities noted in Philip Lutley Sclater's 19th century list of tanagers. Although the question is nearly as perplexing today as it was a century ago, Isler and Isler have given us a thorough, descriptive answer with their excellent monograph on this complex neotropical family.

The timing of this book is propitious, as current biochemical, behavioral, and traditional taxonomic studies are providing new clues about tanager taxonomy (see Bock, Schulenberg, Morony, Braun and Parker, p. 865-897, in Buckley et al. [eds.], *Neotropical ornithology*, Ornithological Monographs 36, American Ornithologists' Union, Washington, DC.). It summarizes and clarifies what is now known about tanagers, shows those areas where knowledge is lacking, and provides an exhaustive primary resource for field ornithologists. As T. A. Parker points out in the foreword, only a handful of the tanagers have been adequately studied in nature. Indeed, some tanager species, particularly in South America, have only been seen by a very few diligent ornithologists.

The tanagers deserves a prominent place on the neotropical ornithologist's bookshelf. While this volume looks superficially like a field guide, it synthesizes a broader spectrum of tanager-related information from the neotropical literature. Included are information on habitat, geographic and elevational range, breeding and social behavior, and a literature cited section for each species. Tanager subspecies are handled especially well; clear maps delineate the ranges of the sometimes confusing array of races.

This book draws on the work of several generations of temperate and neotropical scientists, from F. M. Chapman to the outstanding field biologists currently associated with L.S.U.M.Z. The extensive bibliography provides a wealth of valuable information not only for students of tanager biology, but for students of ornithology in general. Since the amount of information in the species accounts varies with the level of current knowledge, the species account approach works well to highlight the authors' two stated objectives, "to stimulate field study that will contribute to the understanding and ultimately the conservation of tanagers and the ecosystems of which they are part . . . [and] to provide an up-to-date data base for scientists engaged in ecological, zoogeographic, and taxonomic research." The book is both suitable for and useful to the novice as well. From this primary statement of objectives, through a list of abbreviations, a glossary of terms, and a schematic of a species account, the authors prepare the reader well for effective utilization of the material contained in the species accounts comprising the body of the book.

An introductory section on the nature of tanagers provides both a sketch of a "typical" tanager — no mean feat — and a brief explanation of why it is so difficult to typify this family of birds. In a book purporting to be a definitive descriptive document, it is

quite proper for the authors to have refrained from making taxonomic proposals beyond accepted standards. However, the taxonomy of tanagers has long been controversial. The authors suggest in their introduction that tanagers may be a polyphyletic group, but restrict their discussion of the taxonomic affinities of genera to the introductions of those genera; consequently, such discussion is scattered throughout the book. Given the stated objectives, a brief historical perspective on the taxonomy of the family Thraupidae would have been appropriate.

The 32 color plates, painted for this monograph by Morton Isler, aid greatly in field identification. They are attractive, well-spaced, and the facing text describes the habitat, range and plumage features for species and genera. The placement of this information is well-appreciated, since it saves much page turning between plate and text. The plates differ in style from those prepared by John A. Gwynne, Jr. for R. S. Ridgely's *A guide to the birds of Panama* (1976, Princeton University Press, NJ), those prepared by Guy Tudor for S. L. Hilty's *Birds of Colombia* (1986, Princeton University Press, NJ), or indeed Roger Tory Peterson's illustrations. Mr. Isler's illustrations have a distinctively painterly quality; brushstrokes are apparent, yet do not detract from the plates as aids to identification.

This monograph cannot and does not purport to replace a regional field guide such as *Birds of Colombia*. It will be of primary interest to those studying tanagers, but the inclusion of so much information on the natural history and diversity of the tanager complex makes this book of interest to the wider ornithological community.—LISA K. VALBURG, Department of Zoology, Washington State University, Pullman, WA 99164.

One man's owl.—Bernd, Heinrich. 1987. Princeton University Press, Princeton, NJ. x + 224 p. \$19.50.

"This book is not meant to be a scientific treatise," writes Bernd Heinrich in the preface of his mesmerizing volume, *One man's owl*. The book certainly doesn't read like a scientific treatise, which may be more an indictment of stylistic constraints imposed on the technical literature than on the genre represented by Heinrich's second foray into "popular" science. This book reads like a thriller, presenting not only an enormous amount of scientific information, but doing so in a manner that captures the personal wonder that lures people into the sciences in the first place.

One man's owl is a personal account of the author's 3-year relationship with one of North America's most impressive predators, a Great Horned Owl (*Bubo virginianus*). The relationship began by accident. One March, shortly after arriving at his field site, Camp Kafilunk, Vermont, Heinrich succumbed to what E. O. Wilson has aptly termed an attack of "biophilia" and rescued a nestling owlet from premature burial in a snowdrift. Fully aware that rescuing the "soggy, sorry-looking bundle of misery" was against State and Federal laws, Heinrich, a consummate student of hymenopteran foraging behavior, rationalized that a study of the ontogeny of owl hunting behavior would justify "saving this owlet in the eyes of the law."

What follows is a thoughtful, thought-provoking, sometimes comic description of owl development and the ingenious ways by which an incorrigible experimentalist investigates that development. Although presented in journal form, the daily accounts are frequently enriched with information gleaned from the primary literature. Sources are faithfully acknowledged and cited in the text, making *One man's owl* a good basic introduction to the literature on owl behavior and ecology.

Nonetheless, however faithful to his sources, Heinrich is surely more fun to read than most primary literature. Simply put, this man can write. Take, for example, Heinrich's account of owl bathing behavior:

July 3

It is raining. After a long rain *Bubo* usually sits quietly, pulling his wings tightly against his body like an overcoat. But today, despite the rain, he perches out in the open, fluffs out his feathers and opens his wings wide and shakes them while hopping excitedly. He is either doing a fair rendition of a rain dance, or he is taking a shower (p. 73).

The author's wit and affection frequently color his accounts of *Bubo*'s development as a predator. They do not, however, infuse the book with naive anthropomorphism or maudlin sentimentality. Heinrich is aware that the attribution of human characteristics to animals has often and justly caused "dreadful outrage" in scientific circles, and is perfectly conscious of committing the occasional anthropomorphism in his dealings with *Bubo*. Thus, when he writes that a caged *Bubo* "is no joy at all . . . [but] reminds me of a starving prisoner shackled by the ankles" (p. 34), Heinrich admits that "It is very likely that I am projecting my own feelings" (p. 34).

Heinrich does not, however, allow his own feelings to interfere with the accuracy of behavioral description, even when the temptation to do so must have been enormous. For instance, after spending his first winter at a raptor rehabilitation center, *Bubo* was pronounced "incorrigible," deemed unsuitable for reintroduction to the wild and returned to Heinrich. The animal that was sent back to Heinrich behaved very differently from the animal that Heinrich delivered to the rehabilitation center. However, the author resisted the temptation to describe *Bubo* as catatonic or miserable. Instead, he described behavior:

[*Bubo*] perches immobile in the darkest corner, and his huge pale-yellow eyes are always open. . . . He looks like a beautiful owl, all right—a stuffed owl. He acts lifeless. . . . His gaze shifts blankly into the distance. . . (p. 103).

Despite the bird's apparent lack of interest in live prey, Heinrich was successful in rekindling its interest in hunting. The way in which he did so, introducing live prey repeatedly into the owl's cage, one mouse here, one there, is typical of the author's ingenious and experimental approach to the study of behavior.

The book and the author/animal relationship are full of imaginative experiments. Clearly, Heinrich is the kind of person Vincent Dethier had in mind when he

wrote in *To know a fly*, that children who pull the wings off flies either “come to a bad end or become scientists.” Heinrich doesn’t pull wings off flies—at least not in this book—but he does pull the wool over Bubo’s eyes.

For instance, in a series of experiments in which Heinrich explored Bubo’s criteria for deciding what made a desirable prey item, the author offered the owl a raw clam:

He takes the slimy mollusk reluctantly, then holds it immobile in his bill, as if wondering what to do next. Eventually he swallows it. So far so good. I offer him a second one. This one he refuses. He learns quickly—too quickly to suit me. Maybe I can fool him. [I wrap clams] in cat fur—now that’s more like it. More roughage. Bubo gulps several furry clams with gusto. Apparently he is more concerned with texture than with taste (p. 63).

Just as the texture of the fur-covered clams attracted Bubo, so too should the texture of this volume attract the attention of all students of ornithology—professional and amateur alike. Nontechnical in the sense that it does not recount a rigorously quantitative investigation of the ontogeny of behavior, it is nonetheless carefully scientific. The ideas, experiments and questions presented are worth anyone’s time. This volume stands as the epitome of what “popular” science should be and should do much to remove such efforts from what Sarah Blaffer Hrdy once sadly referred to as the not very respectable “demi-monde” of popular science writing. There is nothing demi- or semirespectable about this volume. It is entirely respectable; I liked *One man’s owl*. I liked it a lot.—MARCY F. LAWTON, Department of Biological Sciences, University of Alabama in Huntsville, Huntsville, AL 35899.