

## REVIEWS

EDITED BY M. ROSS LEIN

*The following reviews express the opinions of the individual reviewers regarding the strengths, weaknesses, and value of the books they review. As such, they are subjective evaluations and do not necessarily reflect the opinions of the editors or any official policy of the A.O.U.—Eds.*

**Molecular evolutionary genetics.**—Masatoshi Nei. 1987. New York, Columbia University Press. x + 512 pp., numerous figures, tables. ISBN 0-231-06320-2. Cloth. \$50.00.—Ornithologists considering projects in biochemical evolution and systematics or in need of complementary material for evolution or population-biology courses should find this book helpful. Nei is an evolutionary biologist, rather than a biochemist dabbling in evolution, and as a result he discusses topics and issues of primary interest to organismal biologists. By using the large quantity of recently derived DNA and protein-sequence data as a common denominator, he combines segments of the previously disparate subjects of population genetics, systematics, and megaevolution. Even though he is mathematically oriented (and the models, algorithms, and statistics of molecular evolution have grown increasingly complex concomitant with a greater understanding of DNA structure), Nei recognizes that sophisticated mathematics is an obstacle for many biologists. He goes out of his way, therefore, to develop mathematical arguments in a logical, understandable fashion. In most cases, he remarks, sophisticated models are actually based on rather simple assumptions and algebra. When they are not or when his explanations are cursory, he provides appropriate sources for more information.

The organization of the book is a bit peculiar, but most of the important elements are included. It begins with a discussion of the evolutionary history of life. This is not the author's bailiwick, but earth history, continental drift, and so on provide important background for issues he discusses later, particularly subdivision of populations, rates of molecular change, and phylogeny construction. He follows this chapter with an excellent summary of gene structure. Unfortunately, after this introduction, the sequence of chapters loses some of its logic. The fourth and fifth chapters describe some mathematics of protein and DNA evolution, including calculations of the differences in rates of amino acid substitution among proteins and synonymous and nonsynonymous base-pair changes in DNA. These chapters might more appropriately follow Chapter 6, "Genomic Evolution," which is an introduction to the basic phenomena of genomic change (e.g. duplication, concerted evolution, transposons, retroviruses). Similarly, Chapters 12 and 13, on population-genetics theory (stochastic and deterministic), would have been better placed had they come earlier, thereby providing a bit of

perspective for the detailed descriptions of various aspects of population molecular genetics in Chapters 7–10. The material contained in the latter four chapters is so mixed up that it is often necessary when reading about something in one spot to move forward or backward a chapter to locate related topics. By digging, however, the reader can find a great deal of information on fundamental population genetics, polymorphism, and measurement of genetic variation and distance. The chapter on phylogenetic trees stands alone and provides the basic mathematics of the most commonly used algorithms for constructing phylogenies from character and distance data.

Uninformed readers need to keep in mind that the author has several axes to grind. In some cases he is forthright in explaining why he takes a stand and how that stand differs from other perspectives. For example, he believes that selection, while important, is secondary to mutation as the driving force of evolution, and he states clearly that his opinion differs from the prevailing view. (The opposing view is that genetic variability is adaptive and, thus, "stored" for the future when selective forces change.) In other cases the motivation behind his arguments is not stated so clearly. For example, Nei developed a well-known genetic distance measure (Nei's distance) for protein-electrophoretic data and has an obvious reason to be biased in favor of distance measures. Cladists, on the other hand, are uncomfortable with distance data, and several papers on the presumed shortcomings of such data have been published. Without discussing this background (but at least acknowledging the existence of different philosophies), Nei states forcefully in the chapter on constructing phylogenetic trees that parsimony methods (the tree-building methods preferred by cladists) are not necessarily better than distance methods and, in many cases, worse.

Despite some biases and odd organization, this book is to be recommended. It is full of the latest information on gene structure, population genetics, and molecular systematics. This, combined with the author's common-sense approach to evolution and clearly presented mathematics, makes it a good reference.—  
FREDERICK H. SHELDON

**The birds of Hawaii and the tropical Pacific**—H. D. Pratt, P. L. Bruner, and D. G. Berrett. 1987. Princeton, New Jersey, Princeton University Press. 409 pp.,

6 tables, 15 maps, 48 figures, 45 color plates. ISBN 0-691-08402-5, cloth, \$50.00. ISBN 0-691-02399-9, paper, \$19.95.—This excellent field guide covers a vast area of the Pacific Ocean, from the Hawaiian Islands in the north to Fiji in the south, and to Guam, Yap, and Palau in the west: that is, Polynesia, Micronesia, and Fiji. More than 40 years ago, Ernst Mayr published "Birds of the Southwest Pacific" (1945, New York, Macmillan), which covered some areas surrounding the geographical region of the present guide. Before now, however, there has been no single field guide for the many islands and atolls of the Pacific Ocean.

The species accounts (more than 500 species) follow a standardized format: description of the birds, habits, voice, distinguishing characters, distribution, references, and synonyms. There is a short section on the pronunciation of various Polynesian languages and a table that shows recent changes in the names of certain islands; for example, Eniwetok becomes Enewetak, and Washington Island becomes Teraina.

Chapter II discusses the differences between continental and oceanic islands, the different kinds of oceanic islands (high islands and atolls, old and recent volcanic islands), and the great need for conservation of habitats and their plant and animal life. Of special interest is the discussion of tropical Pacific habitats, including open seas, sheltered waters, wetlands, beach strand and atoll vegetation, littoral forest, mangrove forest, grasslands ("usually the result of deforestation followed by periodic burning"), savannahs, exotic forests and plantations, lowland dry forests, urban habitats (e.g. Honolulu, Suva, Agana), primary rain forests and cloud forests, and barren lands (alpine zones on the higher mountains or recent lava flows). Table 5 gives the common and scientific names for plants found on Pacific islands. Some of these plants are introduced or alien forms, as are a number of bird species. Some 50 species of alien birds have become established in the Hawaiian Islands.

Tables list the size (square miles) of the larger islands, the highest elevations of the islands (e.g. 13,796 feet for Mauna Kea on the island of Hawaii), 23 extinct birds of the tropical Pacific, and endangered and threatened species. The latter (Table 6) includes 81 endangered and threatened species, of which 32 are Hawaiian birds. The authors suggest (p. 36) that "Hunting on islands where firearms are permitted is now virtually uncontrolled, and probably is the major factor in the declines of many pigeons, fruit-doves, and other large edible species. . . . But bird protection laws, even when enforced, can do little to help species threatened by ecological disasters."

In the Hawaiian Islands, where at least 80% of the endemic birds are either extinct or endangered, "the mysterious declines of forest birds are now believed to have been caused by mosquito-borne diseases. . . . Today, other ecological threats to Hawaiian native birds are equally significant. Logging and grazing are

rapidly reducing and fragmenting available highland habitat, particularly in the important koa forest belt. Native forests are progressively being degraded by feral mammals, particularly pigs and sheep, whose destructive habits open up pristine areas to invasion by alien plants and increase the frequency of standing water where mosquitoes breed. The future for native Hawaiian birds . . . is not bright" (p. 41).

There are three appendices: hypothetical, enigmatic, and temporarily established species; regional checklists; and regional maps. A glossary, bibliography, and index complete the book. The regional checklists will be of special interest to anyone who plans a birding trip in the Pacific. These lists include information on the resident species, nesting birds that migrate after the breeding season, visitors, winter residents, and the extinct species. The black-and-white figures and the color plates by H. Douglas Pratt are excellent.

This book will be of great value to anyone with an interest in the birds of the Pacific Ocean and to all who are concerned with endangered and threatened species.—ANDREW J. BERGER.

**Forest bird communities of the Hawaiian Islands: their dynamics, ecology and conservation.**—J. Michael Scott, Stephen Mountainspring, Fred L. Ramsey, and Cameron Kepler. 1986. *Studies in Avian Biology* No. 9, Cooper Ornithological Society. xi + 431 pp., 6 plates, 341 figures. \$26.50.—I had the fortune

to be in Hawaii when Michael Scott and his colleagues began the Hawaii Forest Bird Survey for the U.S. Fish and Wildlife Service. The project struck me as both very difficult and potentially unrewarding. The results would be a mere catalogue of what species occurred where. And to get those results would involve solving three kinds of problems. First, many of the forest areas are remote: the site of the discovery of a new genus of honeycreeper just over a decade ago is two days each way from the nearest road, and once there the forest is so thick that walking down the mountain is slow, and deep gullies make walking across the mountain impossible. The second problem involved identifying the birds, most of which are extremely rare. Field-guide identifications were lacking or misleading, and, in any case, most identifications would be by call. Finally, Scott et al. needed to estimate the densities of all the species in a wide variety of habitats.

Scott et al. overcame all these difficulties. What they accomplished is biological exploration of a high order, an excellent demonstration of applied statistics, and, despite my gloomy predictions, ecology of a high standard. Moreover, they have produced a classic in conservation biology that should be a model for other Federal agencies charged with conservation projects.

The Hawaii Forest Bird Survey (HFBS) was moti-

vated by the extremely sad state of the Hawaiian avifauna. Perhaps half the Hawaiian birds were exterminated following the arrival of the Polynesians 1,500 years ago. About half of the remainder have become extinct since they were described, and half of the surviving species are now endangered. Before the surveys the only good news was that some populations of apparently extinct species might still be found in remote areas.

HFBS started in 1975 and ended in 1983. It had the objectives of determining the distribution, density, and habitat choices of all Hawaii's native land birds. Lowland forests (<1,000 m) are so extensively modified that nearly all the species encountered there are introduced. The survey covered the upland forests of the islands of Hawaii, Maui, Molokai, Lanai, and Kauai. Hawaii, by far the largest island, was divided into 7 regions. Transects were established from tree line to the bottom of the native forest at intervals of approximately 3 km. Then sampling stations were established 100–250 m apart, giving a total of nearly 10,000 stations. Observers were trained carefully before the surveys after various problems of species identification were sorted out. Observations were taken during a 4-h period after dawn. This meant that most transects took at least 5 days, and one took 12. The survey methods are a tribute to the collaborative efforts of both ornithologists and applied statisticians, and the early and detailed involvement of Fred Ramsey provides an important lesson for future studies of this kind. The technique—the variable circular plot—was carefully tailored to the needs of this study. The numbers of birds seen, or usually heard, were corrected for the distance over which they were likely to be detected in a given habitat, yielding estimates of absolute density. The survey simultaneously measured vegetation parameters.

The results of the survey are presented as species accounts of first native, and then introduced, species. For each species there is a drawing, distribution maps indicating density, a figure of the species' choice of habitat, tables of densities over elevation and habitat type, and a narrative account. The book, therefore, is a compilation of detailed information on each species. There is some excellent biology in these descriptions, and they are invaluable for any ornithologist visiting the islands. What I found particularly exciting was the results of putting all the material together and considering the pattern of the entire communities, and the implications for conservation biology.

The majority of the native species are an endemic subfamily, Hawaiian honeycreepers (Drepanidinae). They provide an impressive avian example of adaptive radiation. Less often appreciated is that the communities on each island have developed in different ways even though they are built from much the same set of species and occur in habitats that are superficially similar.

For example, a major habitat type is a wet forest

dominated by the Ohia tree (*Metrosideros collina*), with an understory layer of tree ferns and a ground cover of ferns. It is present over all the large islands and supports bird communities dominated by the Apanane (*Himatione sanguinea*). But what else is present differs greatly from island to island. Thus, on Maui, the creeper (*Paroreomyza montana*) is the second most common species in this habitat, but on Hawaii and Kauai the ecological equivalents (*Oreomystis mana* and *O. bairdi*) are only the sixth most common species. The Omao (*Myadestes obscurus*), a thrush, is common on Hawaii, and similar species occur on Molokai and Kauai, where they are severely threatened. A similar species is known only from fossils on Maui. The Elepaio (*Chasiempis sandwichensis*), a monarchine flycatcher, occupies a unique niche and is common on Hawaii, Oahu, and Kauai. It is absent from the intermediate islands of Maui, Molokai, and Lanai, and there is no fossil evidence that it ever occurred there.

These patterns are merely one example of the many differences found among the islands and provide a challenge to our understanding of how communities are organized and how they develop. The relationships between introduced and native species are equally interesting. The native communities are penetrated to differing degrees by introduced species (particularly the White-eye, *Zosterops japonica*). It appears that, within a given habitat type, the greater the number of native species, the smaller the ratio of introduced to native individuals recorded.

The book provides many intriguing observations, and it will fascinate a wide variety of ecologists. The observations are intriguing because the Hawaiian avifauna is so special, and the care given to collecting the data allows us confidence that the observations are real and not artifactual.

The conservation implications of this work are also numerous. Scott et al. provide a graphic illustration of how seriously endangered Hawaii's avifauna is (Table 75): 23 populations number fewer than 2,000 individuals, 12 number fewer than 100 individuals. The careful species inventory makes a compelling case for more effort to be devoted to conservation efforts in Hawaii. Individually, most islands have more critically endangered species than the entire U.S. mainland! Scott et al. have already had an impact: some new areas have already been purchased and are being managed to protect the endangered species as a result of the surveys.

Equally important are the lessons for conservation in general. The effects of introduced species of plants, large mammals, or mosquito-borne diseases, and our failure to manage these introductions, are major themes of the book. The book provides an apocalyptic view of the future of all nature reserves, which, because of fragmentation, will eventually lose some or most of their species, and which will become surrounded by man-made habitats full of introduced species. How will the native species survive? What

management techniques will we need to ensure their survival? How can we retain very rare species? How well will native communities resist invasions of introduced species? And what will the effects of those introduced species be? Hawaii is in an advanced state of ecological destruction. Much of the rest of the world may follow suit. Hawaii provides some important lessons and forces us to ask some difficult questions. Conservation biologists will be looking for questions, and answers, from this book for a long time to come.

Finally, I must comment on this book's production. Though a compilation of much potentially dry data, the book is attractive and well laid-out. The editors, Ralph Raitt and Jean Thompson, deserve special credit, and the Cooper Ornithological Society is to be complimented on the book's price—STUART L. PIMM.

**Helpers at birds' nests.**—Alexander F. Skutch. 1987. Iowa City, Iowa, University of Iowa Press. xii + 298 pages, 61 unnumbered line drawings. ISBN 0-87745-150-8. \$25.00.—In 1935 Alexander Skutch alerted ornithologists to a phenomenon that at the time was virtually unknown: the existence of "helpers at the nest" in several bird species (1935, *Auk* 52: 257). A helper, as later defined by Skutch (1961, *Condor* 63: 198), is an individual that "feeds or otherwise attends a bird . . . which is neither its mate nor its dependent offspring." Although ornithologists initially were slow to appreciate the evolutionary significance of helping behavior, important advances in evolutionary theory in the mid-1960's precipitated an explosion of interest in helping and cooperative breeding that continues to the present. And now, half a century after Skutch's initial paper, he has taken on the daunting task of reviewing the rapidly expanding field that he in no small part defined.

Skutch's book is, in fact, one of two full-length reviews of helping and cooperative breeding published in 1987 (see also J. L. Brown, 1987, *Helping and communal breeding in birds*, Princeton, New Jersey, Princeton Univ. Press). Unlike Brown, whose monograph is intended for professional biologists, Skutch has targeted a broader audience that includes naturalists and amateur ornithologists, primarily "to make helpful birds more generally known" (p. x).

Following a short preface and introductory chapter, Skutch embarks on an exhaustive, and occasionally exhausting, 238-page, 49-chapter systematic survey of helping behavior and cooperative breeding in birds. Each chapter begins with a brief description of the natural history of the family or other taxonomic group under consideration, followed by species-by-species accounts of helping behavior drawn from the literature. These chapters include accounts of species that live in stable, complex groups within which helping is regular (a situation that Skutch designates as "advanced cooperative breeding"), and species for which rare instances of intraspecific and interspecific help-

ing have been observed only incidentally. The species accounts are nontechnical and vary in length from one or two sentences to a few pages. Most of the chapters are illustrated by Dana Gardner's attractive line drawings, which depict one or more of the species discussed in the text. The systematic survey is followed by three concluding chapters on the significance of interspecific helping, the characteristics of advanced cooperatively breeding species, and the benefits and evolution of cooperative breeding. A bibliography includes over 400 references.

The systematic survey is the heart and soul of the book, and Skutch's deep natural-history roots are evident in his clear, painstakingly written species accounts. These core chapters, however, also have a number of weaknesses. Many readers unfamiliar with the field (and these are the readers for whom the book was written) will be overwhelmed by Skutch's comprehensive treatment. The inclusion of detailed accounts of poorly studied species, or species in which helping occurs rarely, dilutes the impact of accounts of well-studied, more socially sophisticated species where cooperative breeding is regular and better understood. Furthermore, Skutch has eschewed the use of tables or figures that would help newcomers comprehend, organize, and classify the diverse body of information provided.

In the preface Skutch acknowledges the difficulties of writing a review of a young and growing field from his home in Costa Rica, far from an adequate ornithological library. Considering the logistic problems involved, Skutch has done an admirable job. Nonetheless, as a result of either Skutch's isolation or unavoidable publication delays, the book is not up-to-date. Only 12 of the 406 cited references appeared later than 1983, and several important works published in nonornithological sources during 1981-1983 are not included. Perhaps the most unfortunate omission is the research by Kerry Rabenold and his colleagues on the Stripe-backed Wren (*Campylorhynchus nuchalis*) of Venezuela. Although this wren is now one of the most thoroughly studied cooperatively breeding birds, complete accounts of its social organization and behavior were not published until 1984 and 1985, and the species, regrettably, receives no mention in Skutch's book.

An additional, although minor, difficulty with the systematic survey results from Skutch's decision to forgo text citations in favor of a listing of pertinent references (by author and date) at the end of every chapter. This works well enough in most cases, especially when the reference list is short and field researchers are mentioned by name in the text. Readers who wish to learn more about an interesting tidbit reported in the text, however, occasionally will have to wade through a long list of author-and-date citations at the end of the chapter, checking each against the full citation in the bibliography, to find the appropriate reference or references.

Many readers probably will feel that the limited synthesis provided by the three concluding chapters is too little too late. Although the final chapter touches on most of the major issues involved in the evolution of cooperative breeding, a coherent framework to help readers understand the important questions, the possible answers, and the relevant field data is lacking. Instead, the final chapter is primarily a personal essay on the benefits and evolution of cooperative breeding that is occasionally anthropomorphic and frequently group-selectionist. I suspect that the curious naturalists for whom Skutch has written this book will feel that their questions about cooperative breeding have not been addressed satisfactorily, much less answered.

"Helpers at Birds' Nests" is attractively produced and remarkably free of substantive or typographical errors. Nonetheless, I recommend it only for individuals and libraries interested in an exhaustive but somewhat outdated natural-history survey of helping and cooperative breeding. Researchers active in this field will find the book's systematic approach and extensive bibliography occasionally useful in providing access to the older and less familiar literature. For these specialists, however, other recently published reviews of helping behavior and cooperative breeding will be far more useful.—RONALD L. MUMME.

**Ecological aspects of social evolution: birds and mammals.**—D. I. Rubinstein and R. W. Wrangham (Eds.). 1986. Princeton, New Jersey, Princeton University Press. x + 551 pp. ISBN 0-691-08439-4, cloth, \$65.00. ISBN 0-691-08440-8, paper, \$23.50.—This volume resulted from a symposium held at the 1983 Philadelphia meeting of the American Society of Zoologists. In the preface the editors declare a laudable goal: to counterbalance the current preoccupation with specific aspects of social behavior by going back to the "big picture," and to reopen the question of "what accounts for species differences in the overall pattern of social organization." We return, in other words, to the issues effectively and inspiringly put to us by John Crook and David Lack in the 1960's: What ecological principles underlie different kinds of social systems among higher vertebrates, and to what extent do comparisons across taxonomic groups advance our understanding of functional and evolutionary aspects of these systems?

By the early 1970's, at the same time that the explanatory power of ecological correlations among vertebrate social systems was being questioned, the work of Crook, Lack, and colleagues helped to trigger the explosion of species- and process-specific studies in behavioral ecology filling journals in the past 15 years. Now, an effort to get back on track with regard to the earlier, bigger questions is timely, but it faces mixed prospects. There is, first of all, the weaker trac-

tability of those larger questions, as mentioned by the editors in their introductory chapter. But additional factors have to be acknowledged, for example, the differing aims and paces of research on sociality of different major taxons. In addition there is a need for more long-term studies that yield crucial demographic data. Perhaps most important are the demands of ecological research so daunting that investigators, cautious about spreading their efforts and perhaps also leary of team research, are easily and understandably seduced by questions of behavioral processes in particular species and in specific settings. These are easier to focus and often yield answers sooner. But, onward ever forward! The degree to which theory outpaces evidence in behavioral ecology today is prompting some investigators to plead for more fieldwork (including experimentation), and so for this additional reason the editors' goal is a timely one. What, then, does this volume offer?

The 18 contributions by the editors and 21 other authors are divided into two sections, "monogamous variations" and "polygynous patterns." Five papers in Section 1 and two in Section 2 are devoted to birds; the remainder are devoted to mammals, including one on human societies. Three avian taxa are reviewed broadly: hornbills (Leighton), migratory ducks (McKinney), and blackbirds (Robinson). The other 4 avian papers deal with specific features of particular species: polyandry in Spotted Sandpipers (Oring and Lank), reproductive strategies of Moorhens (Petrie), sexual asymmetries in Scrub Jay life history (Woolfenden and Fitzpatrick), and mating strategies in Sage Grouse (Gibson and Bradbury). These papers range in scope and focus from a close scrutiny of one aspect of Scrub Jay sociality, resting on the same authors' 1984 monograph on this species, to a first-order survey of hornbills, consistently monogamous but varying in occurrence of cooperatively breeding groups. Collectively, these 7 papers, along with those on mammals, diverse as they are, illustrate the multilevel approach one is obliged to pursue in any effective study of social systems and their ecological backgrounds and evolution. They will serve you well in assessing the state of the art.

The fact is that this collection of papers, each with its own merits, is rather a mixed bag that varies as described above. From the standpoint of the volume's intent, the papers vary also in the degree to which ecological considerations figure significantly in the presentations. At one extreme, some papers take a quick bow to ecology, then lapse heavily into details of behavior. At the other extreme, the ecology treated is at a level little if at all advanced over what Crook gave us in his ploceid work and in the 1970 symposium volume he edited (*Social Behavior in Birds and Mammals*, New York, Academic Press). Still, the Rubinstein/Wrangham volume provides a reasonable sampling of current work that has something to offer on the role of ecological factors. But mainly it pro-

vides the editors a superb opportunity to consolidate their thoughts on the current frontiers in social-system research. The result is a crisp, provocative final chapter that is, for the field as a whole, the best part of the book.

Here they take an overview of behavioral variables, social relationships, and their evolutionary origins, stressing the role of ecological pressures. They provide a summary of general themes that emerge from the symposium papers and contributions from other recent literature, and conclude with a brief attempt to define some general principles of social evolution. There is a lot here to ponder.

In the final chapter, Wrangham and Rubinstein highlight a series of important issues that are scattered or just tangentially treated in recent literature. They are gathered here to provide a sort of agenda of needs for fans of social system *Ursprungsforschung*. I purposely give 5 examples: (1) Details of social organization reveal the inadequacy of social grouping patterns and sex ratios per se as a basis for classifying social systems and explaining competitive and cooperative interactions. (2) There is a paucity of data on resources, in particular resource variation in time and space, as a basis for explaining different levels of sociality in their exploitation. (3) There is a need for a more discriminating selectionist approach: "Intense forms of competition within semi-closed groups [e.g. of primates] are not explicable without an account of the social glue responsible for the existence of the group in the first place." (4) Intraspecific competition is proposed as a parallel partner with resource distribution and predation as "common causes of gregarious life." And coordinately (5), there is a need for details of between-sex relationships and their differing benefits, for both reproduction and individual welfare, to ascertain differences among systems that reveal differences in the relative importance of ecological pressures.

These examples provide foci for what could be, with tighter programming of topics and plenty of time for advance preparation, *landmark* symposia in the development of socioecological theory, which, to say the least, needs some prompting. The Wrangham/Rubinstein final chapter is a strong launching pad for any such effort. It should be read by all students of social behavior. The book itself is an excellent backbone for a lively seminar course.—FRANK A. PITELKA.

#### OTHER ITEMS OF INTEREST

**The development of the chondrocranium of *Melopsittacus undulatus*.**—Johannes M. de Kock. 1987. New York, Springer-Verlag, *Advances in Anatomy Embryology and Cell Biology* Vol. 104. vi + 70 pp., 40 figures. ISBN 0-387-17674-8. Paper. \$40.90.—Since 1946 a group of investigators at the University of Stellenbosch, South Africa, has published a major se-

ries of monographs that describe the cranial development and structure of individual species representing various avian orders. This latest study, thirteenth in the series, covers a parrot, the Budgeriger, and is based on serial sections of nine, unaged, stages from the early appearance of cranial anlagen into the nestling period. Attractive figures illustrate sections and anatomical reconstructions. Interpretations mainly concern ontogenetic origins and homologies of parts of the cranium among birds. Fifty references are cited, and a terminal index of anatomical terms is given. The monograph will interest anatomists, particularly those investigating cranial structure, but the high price per page will tend to discourage potential buyers of personal copies.—GEORGE A. CLARK JR.

**Living with seabirds.**—Bryan Nelson. 1986. Edinburgh, Edinburgh University Press. viii + 253 pp., 63 black-and-white photographs, 2 figures, 3 maps. ISBN 0-85224-523-8. Distributed in North America by Columbia University Press. \$25.00.—This book is the second in Edinburgh University Press' *Island Biology* series, which "aims to give a precise account of scientific results within a biographical work." The first half of the book is an account of Nelson's research on gannets on Bass Island; the second half covers his studies of other sulids on the Galápagos Islands and other sites.

The author provides little new scientific insight into seabird biology. Instead, he offers a lively narrative of his life as a seabird biologist and naturalist in the 1960's. The style is much like Attenborough's in the *Zoo Quest* series: anecdotal and enthusiastic. He shows a flair for describing less tasteful aspects of gannet behavior, though some passages are rather too anthropomorphic. He describes the strengths and limitations of field research, and difficulties of studying animals that spend their nonbreeding lives at sea. This sort of book provides a forum for speculation and opinion that would not be accepted in the scientific literature, and Nelson takes full advantage, particularly in the field of conservation.

Few of the photographs supplement the text, and some are of poor quality. Better photographs are found in Nelson's earlier works and, in fact, in most popular accounts of bird biology. Detailed descriptions of ritualized behaviors and a discussion of their possible descent add nothing to this piece.

This work will be of little value as a reference for university libraries or ornithologists. It would be a worthwhile acquisition for community libraries and those interested in a popular account of natural history, animal behavior, and ecology.—GLEN CHILTON.

**One man's owl.**—Bernd Heinrich. 1987. Princeton, New Jersey, Princeton University Press. x + 224 pp.,

unnumbered drawings and photographs by the author. ISBN 0-691-08470-X. \$19.50.—Bernd Heinrich is a first-rate biologist, author, and observer. He writes well about natural history. This is his most personal book and covers three summers he shared with a Great-horned Owl named Bubo. The book documents the growth of the owl but, perhaps more importantly, reflects the curiosity, feelings, and thoughts of the author. The text is a way for Heinrich to share his experiences with the reader, and it works very well.

The discourse ranges widely, and Heinrich believes that "Biology teaches one broadmindedness, because often a number of entirely different hypotheses are simultaneously true, to varying degrees, in each species . . . and it is precisely because each is a unique adaptation that makes it possible for us to see patterns and to understand in what ways and why we are all alike."

Although primarily concerned with one owl, other species are involved. Heinrich is disciplined intellectually, and writes sparsely. He is also disciplined physically and once held a running record at 100 miles. It all shows in his writing, which reflects a deep sensitivity to all the life that surrounds him.—A.H.B.

**World birds.**—Brian R. Martin. 1987. Endfield, Middlesex, U.K., Guinness Superlatives Ltd. 192 pp., 16 color plates, numerous black-and-white photographs. ISBN 0-85112-891-2. \$19.95.—This book is like eating popcorn: not much substance, but totally irresistible. Once you get started, it is practically impossible to quit. Like the Guinness Book of World Records from the same publisher, it is full of "wow's" and "gee-whiz's." You want to share it with the person in the next office, students, the kids—anyone curious about nature. It would be ideal for the local library and a good way to settle a lot of arguments. It is the *sine qua non* of one-upmanship.

Like the Guinness Book of World Records, the coverage is broad. Martin supplements many of the facts with some passable natural history, but the emphasis is on the United Kingdom. There is a small glossary and an index. The acknowledgments are lengthy, but it is not clear what this august body actually contributed.

Just about everything is in this book: largest, smallest, rarest, most numerous, distributions, behavior, performance. Even the champion bird spotters and listers are included (most birds in a day, most in a year, longest list, etc.). It is a lot of fun.—A.H.B.

**Australian parrots in bush and aviary.**—Ian Harman. 1981. Melbourne, Australia, Inkata Press, Ltd. vii + 200 pp., 62 color plates, several diagrams. ISBN 0-909605-22-X. Available from ISBS, Portland, Oregon 97213-3640 USA. \$29.95.—This small volume has a good bit of information for aviculturists. The description of each species includes notes on nomenclature (first description and often definition of Latin terms), descriptions of the bird, sexing, distribution, field notes, aviary notes, and information on breeding. The section entitled "Variants and hybrids" includes recognized subspecies and known hybrids. Unlike some of the North American literature, the hybrids are not named. The information here would be valuable to individuals considering these birds as pets. Its delayed release in the United States is not explained.

Harman is sensitive to the fact that many of these birds have great commercial value, but are generally protected in Australia. The exceptions are the Galah and other species destructive to crops. Because of their scarcity in the wild and international trade agreements, most of the cage birds must be bred in captivity. Techniques for keeping and breeding these birds are the strengths of the book. It is implied that the commercially, and privately, available birds are obtained legally. Who knows?—A.H.B.

**Handbook of the birds of India and Pakistan. Vol. 5, Larks to the Grey Hypocolius.**—Salim Ali and S. Dillon Ripley. 1987. New York, Oxford University Press. xvi + 277 pp., 7 color plates. ISBN 0-19-561857-2. \$37.50.—This is the second edition of the volume first published in 1972. The major change is the 7 new plates by John Henry Dick. They illustrate 120 forms (species and subspecies). The original contained 10 plates, by 7 artists, that illustrated 85 forms. These plates are not entirely new, however, but appeared in the 1983 publication "A Pictorial Guide to the Birds of the Indian Subcontinent" (Oxford Univ. Press).

There are numerous minor changes in the text. These reflect distributional information and about a half-dozen changes in subspecies status. Second editions of the first four volumes in this series have appeared previously (1978–1983). Oxford apparently still plans revised versions of the remaining five.—A.H.B.