

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 AOU.—Eds.

Toward a New Philosophy of Biology: Observations of an Evolutionist.—Ernst Mayr. 1988. Cambridge, Massachusetts, Harvard University Press. xi + 564 pp. ISBN 0-674-89665-3. \$35.00.—As most readers of *Auk* are aware, Ernst Mayr is one of the great ornithologists of this century, and he is one of the foremost evolutionary biologists of our time as well. So when he writes, it behooves us to read. Moreover, the present book was issued in Mayr's ninth decade of life, reminding us of how long his contributions have provided a guiding light of modern evolutionary thought.

Does biology need a new philosophy? Mayr begins by arguing that it does, or perhaps that those who are not evolutionary biologists need to recognize more fully that organic evolution is the central theme of the biological sciences. So he embarks on a voyage through natural selection, adaptation, Darwin's thinking, biological diversity, species and speciation, and macroevolution, and he concludes with two essays of historical perspective in order to show the way. This is not a new book, in the sense of his 1982 opus, "The Growth of Biological Thought," but rather a collection of previously published articles, book reviews, and essays that have been edited to update them and to remove redundancy. The works are arranged carefully and integrated with new bridge material to provide the volume with a coherence too rarely found in this genre, so even those who have read some of this material when it appeared will want to consider it again within the new context. California produces high quality wines year after year; the date on the label tells us the age of the wine, but the vintage year is not so important. So let it be with Mayr.

Every essay in this book (there are nearly thirty) could easily be the subject of its own review, as each deals with one or more issues of real substance in evolutionary biology. There is no woodland without its individual oaks, maples, pines and their ilk, but the trick is to see the forest despite the trees. Whether those of us who are evolutionary biologists like it or not, our science is not fully accepted in the community of scholars for much the same reasons that we find it an absorbing life's endeavor. Why is it that evolutionary biology is "different," and how well has Mayr identified and dealt with the global issues? I shall ignore largely historical problems such as vitalism, which Mayr considers just at the start, and also the many smaller issues that do not pierce the core.

Forgive necessary oversimplification in the attempt to treat the problem under just four rubrics: empiricism, reductionism, historical load, and operationism.

In discussing evolution with biologists and other scientists who profess reservations about our science, I have found that they ask first after the evidence that selection is the driving force of evolutionary change. Mayr asserts (p. 3) that "The Darwinian mechanism of natural selection with its chance aspects and constraints is fully sufficient" to explain teleological-like aspects of evolution in particular, and indeed all the results of evolution in general. A major stumbling block to understanding selection processes is the unit of selection or, as Mayr prefers, selection's target. Episodically through the book, Mayr hammers home the point that the individual is the target, and he has strong but deserved words about "the silent assumption of the mathematical population geneticists that the gene is the unit of selection" (p. 119). I find essay 7 on group selection somewhat tangential in focusing on different kinds of "groups" while losing track of the "selection" part. The vagueness of the notion of "competition among species" lies at heart here, for unless the species has a heritable emergent property of its own that potentiates its continuance at the expense of another species, "competition among species" is no more than competition among individuals of different species. Still, logical problems aside, Mayr nowhere confronts head-on the philosophical need in science for direct empirical evidence. He cites (p. 96) Endler's 1986 book as providing the "abundant evidence for the occurrence of natural selection in nature" but that ambitious compilation reviews the works of true believers. What we need is a philosophy for *empirically testing* the existence of selection in such a way that one possible outcome of the test is outright rejection of our beloved hypothesis.

Mentioning emergent properties brings me to the second of four rubrics, for which we can use the term *reductionism*. As Mayr rightly points out, many mechanistically inclined biologists see as a guiding principle the reduction of life to "understood" mechanisms of physics and chemistry. These colleagues fail to realize that the interactions among parts provides the whole with properties that "emerge" with its existence. As someone, perhaps Sir Arthur Eddington, said: we think we understand "two" after making a thorough study of "one" because one and one are two, but we forget that we must also make a thorough study of "and." Mayr does not devote a lot of space

to the reductionist problem per se, but he treats it implicitly throughout the book.

The third major issue that makes evolutionary biology different from most sciences, although not uniquely so, is its pervasive historical underpinning. There is a bridge in New York state unlike any over which you have driven a vehicle. It is impossible to understand the design of this bridge until you know that it was originally built as an aqueduct to carry the Erie Canal, and later modified as a roadbed. And so it is with every organism on earth today: its ancestors were different, functional organisms. Mayr confronts the historical constraints of evolution throughout the book, although perhaps not with the verve and evidence I would have desired. Essay 4, on the "Probability of Extraterrestrial Intelligent Life," is a particular gem. It shows us, as no other comparable section of the book, how the evolutionary biologist arrives at vastly different predictions from those of the physical scientist. The problem with most science fiction movies is that they have the mindset of astronomer Donald Menzel rather than that of biologist Ernst Mayr.

I have saved for last the bone that I am willing to contend. Early in this century, physicists grappling with things that they could not see came to realize this: an entity or process had communicable meaning to fellow physicists only within the context of the operations by which it was measured. From this origin, Nobel laureate Percy Bridgman developed the philosophy of operationalism which today pervades most of science. Evolutionary biology stands out like a very sore thumb. Most of contemporary biology is so thoroughly operational that modern students take it as a fact of life without realizing that things were not always this way. Barely a generation ago, one could define the home range of an animal as where it spent its time, but today one specifies the methods of recording where it was and when, and then makes explicit how home range was calculated from the data, say, by connecting spatial points to form the largest possible polygon. What a philosophy of evolutionary biology needs, above all else in my view, is operational approaches. We stake a difficult claim for a legitimate science among peers when adaptedness is defined (p. 135) as "the morphological, physiological, and behavioral equipment of a species or of a member of a species that permits it to compete successfully with other members of its own species or with individuals of other species and that permits it to tolerate the extant physical environment." (For the curious, an operational alternative may be found in my 1988 essay in "Evolutionary Processes and Metaphors," edited by M-W. Ho and S. W. Fox.) Evolutionary biology is so immensely complex that it has moved at a snail's pace toward operational thinking. My complaint is not that Mayr himself has a conceptual rather than operational intellect, for he was exactly appropriate to his time, namely most of this

century. My complaint is that this book shows not the slightest hint that lack of operationism stands today as the largest philosophical impediment to new advances in evolutionary biology.

To summarize the summary, "Towards a New Philosophy of Biology" rates high in three of the four general issues I have dissected out as being particularly crucial. It is, as the overworked closing sentiment goes, "must" reading for anyone interested in evolutionary biology. And that, I hope, includes us all.—JACK P. HAILMAN.

The Birds of Africa. Volume 3, Parrots to Woodpeckers.—C. Hilary Fry, Stuart Keith, and Emil K. Urban (Eds.). 1988. London, Academic Press. xiv + 611 pp., full-page color plates by Martin W. Woodcock, numerous line drawings by Ian Willis (and others), and distribution maps. ISBN 0-12-137303-7. \$129.—Like Volume 2 (see Auk 105: 219, 1986, for review), this is a well-produced, sturdy, folio-sized book with 550 pages of text and 32 color plates. Volume 3 completes the nonpasserines, covering Psittaciformes through Piciformes, in essentially the same fashion as the earlier volumes. The text is the product of 18 different authors, including each of the three editors.

Although heavy to hold, the book is easily read, with good-sized print and a binding which permits it to remain open at any page. Space is somewhat more economically used than in volumes 1 and 2, though the excessively wide margins might better have been reduced in favor of fewer pages or less frequent use of annoying abbreviations. Typographical errors are few. Some symbols (e.g. %, δ, and ♀) are faintly reproduced throughout and are incompatible with the style of type otherwise used. Beginning sentences with sex symbols or numerals is poor form as well as unnecessary; surely the space saved is inconsequential.

The introduction briefly mentions several of the numerous new taxonomic approaches presented during the past few years (e.g. that of Sibley and Ahlquist), but the editors have declined to depart radically from conventional treatment of higher categories because "broad consensus seems unlikely to be achieved soon." At the lower levels, however, they have introduced "a few modest changes." As in Volume 2, delineation of superspecies continues to undergo modification from the generally followed treatment of Snow (1978, "An Atlas of Speciation in African Non-passerine Birds," London), with recognition of some new superspecies but abandonment of the concept for various other pairs of similar species. At the species level, there are numerous changes

among the turacos and hornbills. Asian and Madagascar lesser cuckoos (*Cuculus poliocephalus* and *C. rochii*) are separated mainly on the basis of very different voices. Surprisingly, *Otus scops senegalensis* remains as a subspecies in spite of vocal (and other) distinctions from the northern Scops Owl. *Otus pambaensis* is given specific status although its voice apparently is much like that of the Madagascan *O. rutilus*. *Trochophonus usambiro* is again treated as a race of *T. darnaudii*; *Indicator narokensis* is, at long last, considered a synonym of *I. meliphilus*.

Most information seems up to date, but the feral populations of Rose-ringed Parakeets (*Psittacula krameri*), stated to be present in Kenya, all died out some years ago. A few minor errors and some discrepancies between different parts of the text are evident in a somewhat cursory perusal of the book. Birds of the genus *Megaceryle* are said (p. 196) to prey on a "variety of large invertebrates and (except African species) fish," but subsequent pages clearly reflect piscine prey in the African Giant Kingfisher's diet. Colliiformes is not "the only order of birds endemic to Africa" (p. 243) if the editors' treatment of the turacos as the order Musophagiformes is followed. The African Palm Swift (*Cypsiurus parvus*) properly is referred to as "grey" on p. 222, but is termed "plain pallid brown" on p. 209. *Apus niansae* shows a pale area in the wing, not when viewed against the light (as stated on p. 220), but dorsally, when seen flying against a dark background. The forehead of *A. b. berliozii* is not "slightly paler" than the crown but decidedly so, appearing white.

There is much welcome information on bird voices, with references to tape recordings where these exist. Under each piciform family (but for no others) appears an odd statement that all questions concerning vocalizations of the included species be directed to certain named recordists, an inappropriate inclusion in a book destined to remain an authoritative reference far beyond a single human lifespan.

The distribution maps appear to have been prepared with greater accuracy than those in volumes 1 and 2, but they must be considered along with distribution statements in the text to avoid misinterpretation. For example, *Cuculus rochii* is mapped across all of Tanzania, where there are only two records. Presumably the solid mapping is employed to suggest a movement of this migratory species across a broad front to its presumed main wintering grounds farther west. Most of the superspecies maps contribute rather little as they duplicate ranges otherwise shown (more clearly) on the separate species maps. More useful would be enlarged maps of portions of Africa for species with very restricted ranges (shown here on largely vacant maps of the entire continent).

Most of the text illustrations, apparently based on photographs in most cases, are decidedly decorative as well as useful. However, there are several inadequate drawings (fewer than in the previous volumes),

not by Willis, which detract from the generally high quality of the book. The carelessly stippled swift "silhouettes" and that of the nightjar on p. 194 add little. The trogon drawing on p. 260 does not show the bare throat nearly as well as did the original photograph. The Palm Swifts on p. 209 essentially duplicate positions shown on Plate 13.

The color plates are a major contribution. Martin Woodcock makes an increasing effort to study Africa's birds in the field and this is reflected in his artwork. Some of his currently published plates were painted several years ago, so a few errors are not unexpected. Still, there should have been sufficient time for authors or editors to have checked the finished plates with care. This seems not to have been done in every case. All trogons (Plate 15) are shown with three forward-directed, sturdy-looking toes. Working only from skins in which the weak feet typically are obscured by belly feathers and label string, an artist might easily remain unaware that trogons are heterodactyl (Woodcock is not the first to show them incorrectly), but those who prepared the accurate text should not have overlooked the illustrator's mistake. Other discrepancies between plates and text: *Tauraco p. chalcophus* is said (p. 30) to have blue- or green-tipped crest feathers, but Plate 4 shows these white-tipped as in *schalowi*. The breast bands (referred to as "gorgets") of *Merops variegatus* are shown as brilliant blue (Plate 18), not blackish or dull purple as described in the text. The underparts of *M. nubicus*, stated to be bright pink, are shown as nearly blood red (Plate 19). In addition, the colors of some turaco heads are too bright and the crest of *Corythaixoides personata* (Plate 3) appears too long and dense. Iris color of the male *Cuculus poliocephalus* is given as brown (p. 77), but Plate 5 shows the bird with a yellow eye.

The difficult swifts (plates 12 and 13) are, as a group, perhaps the least satisfactory. Most of them appear too brown. *Apus barbatus*, for example, is really blackish, and more clearly white-throated. The figures here do not permit distinguishing that species from *A. niansae*. Forbes-Watson's Swift (*A. berliozii*) is unrecognizable, lacking the characteristic whitish forehead. (Alec Forbes-Watson has suggested the bird be called "Pale-faced Swift.") The *Neafrapus* and *Rhapidura* spinetails are too long-tailed, and there are lesser morphological problems with some others. Among the nightjars (plates 10 and 11), *Caprimulgus donaldsoni* should be shorter and not so slender; *C. climacurus* does not fork its long central rectrices in flight as shown. Differences between *C. clarus* and *C. fossii* are greatly exaggerated.

Obviously not every distinctive plumage could be included, but I was disappointed not to see the bright rufous phase of the Sokoke Scops Owl (*Otus ireneae*) or the black-headed young White-headed Wood-hoopoe (*Phoeniculus bollei*)—sometimes a perplexing field-identification problem.

Commenting on the few errors and what I perceive

as shortcomings leaves too little space to stress the many good features of this publication. As in my earlier reviews, I mention negative points in some detail hoping that such criticism may assist the editors in their preparation of the more challenging volumes yet to come. Like its predecessors, Volume 3 is a handsome book and is an essential reference for anyone working with, or seriously interested in, African birds. It represents continued improvement over the earlier volumes. Preparation of "The Birds of Africa" is a formidable undertaking that requires uncommon dedication. In producing Volume 3, authors, artists, and editors have distilled another enormous mass of information into concise presentations of the many taxa covered. Unlike some costly bird books on today's market, this one is worth the price.—DALE A. ZIMMERMAN.

Biographies for Birdwatchers.—Barbara and Richard Mearns. 1988. London, Academic Press. xv + 490 pp., 76 text figures, 14 maps. ISBN 0-12-487422-3. £17.50.—This attractive book fulfills two important functions. It is both a useful reference source, and it is an enjoyable, informative book, written with obvious enthusiasm.

The Mearns's write about 88 men and 3 women whose lives are commemorated in western Palearctic bird names, both vernacular and scientific. Some are important people, such as Spencer Fullerton Baird, Peter Simon Pallas and George Wilhelm Steller. Little is known about others, Dupont, Moussier, Neumayer, and Richard, each of whom may have collected only a few specimens, named by someone else.

Of the 91 subjects, 29 were British, 25 German or Polish, 14 French, 7 Italian, 5 American, 3 Danish, and 2 Dutch. It is somewhat arbitrary to assign occupations to men with wide-ranging interests, but 29 could be classified as having natural history as their primary profession: botanist, entomologist, ornithologist, zoologist, museum curator, collector. Another 21 began as medical doctors, but many gave up the practice of medicine to use their training in botany or zoology. Ten were in the military, and six were theologians. Some naturalists, such as Bonaparte, became important politicians; other high-ranking civil servants, such as Hume, became important ornithologists. Friedrich Hermann Otto Finsch became Bismarck's Imperial Commissioner for the German protectorate of New Guinea; the capital, Finschhafen, still bears his name. There were explorers who collected, and naturalists who explored new regions for the first time. There are even biographies of two men of recent years. Christian Jouanin described the

Jouanin's Petrel from the Indian Ocean in 1955 whereas Jean Paul Ledant collected the Kabylie Nuthatch, *Sitta ledanti*, described from a 3,500-acre mountain in Algeria in 1976.

Of the three women, the most important was Eleonora (1350–1404), Sardinia's national heroine, for whom Gene named a beautiful falcon in 1839. When Lady Amherst returned to England after Lord Amherst's eight years as Governor-General of India, she brought with her two beautiful pheasants from Burma, which were later named *Phasianus amherstiae* by Benjamin Leadbeater. The third woman in the book is Mrs. A. O. Hume, for whom a pheasant, *Callophaps humiae* (now *Syrmaticus humiae*), was named.

One appendix gives short biographical notes on 24 additional naturalists whose names are associated with birds of uncertain status, or with subspecies. A second appendix gives brief biographies of 71 naturalists mentioned incidentally in the main text. Although the latter list is incomplete, with Holboell perhaps the most serious omission, these two annotated lists add greatly to the value of the book. There are 14 useful maps.

The naturalist who described the bird sometimes receives only a sentence or two of mention, while several pages are devoted to the naturalist's commanding officer for whom he named a bird. For example, naval surgeon and zoologist Dr. T. R. H. Thomson described the gallinule named for William Allen, who rose to be a Rear Admiral; Dr. John Richardson described the gull named for his chief, Captain John Franklin, later Sir John Franklin.

Joseph Sabine named a new species of gull, collected by his brother, Edward Sabine, Sabine's Gull; Levaillant named the Narina Trogan for his "romantic attachment," a lovely Hottentot girl; Brehm named the Thekla Lark, *Galerida theklae*, for his daughter, Thekla. Levaillant, however, was a nationalist who gave only French names to the birds he discovered, forfeiting the priority rightfully his to give binomial Latin names as well.

Preparation of this book required a prodigious amount of reading in many standard sources, and an occasional venture into primary and unpublished sources. The Mearns's got off to a good start when they gained access to the unpublished biographical notes of Sir Hugh Gladstone, who died in 1949.

One learns from their studies a great deal of biography and zoology, together with a generous dose of history. An almost infinite number of other topics, from art through zoogeography, are presented incidentally. One gains an understanding of scientific education in earlier times. People and places in one account recur in others, yet skillful interweaving of the stories generally avoids repetition. Many left their names attached to geographical features, as well as to birds.

For two centuries after the landmark 10th edition of Linnaeus' "Systema Naturae" in 1758, a number of

scientists were possessed by an unquenchable drive, an almost pathologic degree of single-minded, unflinching dedication, to collect and classify the natural history of the entire world. Their quest led them into *terra incognita*, whether frozen Arctic wastes or tropical jungles where they were stricken with malaria, typhus and dysentery. Many, including forty of William Allen's party of 145, lost their lives. A number died very young: Carl Heinrich Bergius in South Africa at age 28, Friedrich Wilhelm Hemprich in northeastern Ethiopia at 29, Edward Adams in Sierra Leone at 32, Michael Hey in Egypt at 34, and Georg Wilhelm Steller in the Siberian Lowlands at 37. Boyd Alexander was clubbed to death in French Equatorial Africa at 37 and John Whitehead died in Hainan, south China, at 38. Other naturalists fared better: Brian Houghton Hodgson outlived two wives, remarried at age 69 and lived to celebrate, at 94, the silver wedding anniversary of his third marriage. There were other kinds of tragedies: Hume retired to work on his magnum opus of the birds of India, but before it could be published, his servants sold several hundred pounds of his manuscript and correspondence for waste paper at a bazaar, destroying 25 years of work and his interest in ornithology.

Some naturalists did not live to describe their findings while others were so inundated by the volume of their collections that they failed to publish their results. Publication often occurred in obscure journals of limited distribution; for a century historically-minded ornithologists repeatedly found an earlier scientific name that then took priority and resulted in a change in the scientific name, although the original name sometimes persisted in the vernacular.

This book contains considerable detail about people's travels and achievements not readily available in any other single source. We learn how John Barrow, Second Secretary of the British Admiralty through thirteen naval administrations, was chiefly responsible for the selection and placement of civilian naturalists on virtually every Royal Navy expedition, a useful scheme soon imitated by the Americans. Anecdotes of human interest contain some nice touches: George Lyon came straight from the desert to arctic exploration; Dr. John Richardson performed the medical examination necessary to certify John Franklin fit for his fatal third arctic expedition.

Interesting facts abound. The American Bittern was first described from a stray collected in Piddletown, Dorset, in southern England. The German journal, *Naumannia*, named for a father-and-son team of farmer-ornithologists, became the *Journal für Ornithologie*. Tristram's captive griffons gorged themselves to the point of stupefaction and once ate a half-pound of arsenical soap with no ill-effects other than vomiting. Johann Rheinhold Forster's lavish purchases of natural history books placed him in debt. Seven members of the Gray family were employed at the British Museum. Steller collected and ate anti-scorbutic plants

such as gentians and spoonwort in 1741, and was almost the only member of the Bering expedition to escape the ravages of scurvy.

The Mearns's correct some errors in the literature. The Yellow-billed Loon was named for naval surgeon Edward Adams, not naval surgeon Arthur Adams, who also collected in arctic waters. (But Haslar Hospital is not at Chatham, but at Gosport). Although G. E. Shelley, the poet's nephew, attributed Dunn's Lark to Major W. H. Dunn, this is a misprint for Captain H. N. Dunn, correctly stated on the original specimen label.

I detected evidence of hurried preparation and error chiefly in the accounts of one explorer, John Franklin. Five winter birds were seen at Cumberland House, not Fort Chipewyan, a difference of 800 miles; Franklin lacked supplies because the two major fur companies, the Hudson's Bay Company and North West Company, were virtually at war with one another, not because of any lack of cooperation from Indians and voyageurs; their ocean travel was in fragile birch-bark canoes; the birds and animals killed along the Arctic Ocean were more numerous than represented; Richardson cut his foot on a dagger, not a knife; George Back had not struggled on to Fort Providence to obtain help; in 1825 assistant naturalist Thomas Drummond was left behind at Cumberland House, not at Fort Chipewyan; Drummond did not meet Franklin at Cumberland House on 18 June 1827, since Drummond reached Cumberland only on 19 July; after Franklin's second expedition a second gap of 160 miles remained unexplored on the north coast of Alaska in addition to the large gap to the east mentioned by the Mearns's; the name Richardson's Skua has been obsolete since the 1850s, not the 1950s. The type locality for the Forster's Tern is quoted from the 5th AOU Check-list, without the correction used in the 6th Check-list. In the account of Henry Morris Uper, the insects in clouds at Lake Myvatn were the midges for which the lake was named, not mosquitoes; Myvatn and Akureyri are misspelled. One cannot help wondering whether similar errors may be evident to those with a special interest in some of the other individuals. There are very few typographical errors, although Pontoppidan's name is spelled incorrectly in three places and an entire line is missing from the account of Gustaaf Schlegel.

Barbara and Richard Mearns are right: "The contributions made to the development of ornithology by such men as Charles Bonaparte, George Montagu, Henry Baker Tristram, Georg Steller, and Alexander Wilson deserve to be commemorated by every generation." As Sir Peter Scott says in his foreword, "There are few birdbooks which appeal equally to complete beginners and to ornithologists of long experience, but this must be one of them." This book should be in every museum and university library and anyone even mildly interested in the history of ornithology will wish to have it readily available as a reference.

The chapters are exactly the right length for bedside reading, one each night. I hope the authors will embark on a similar volume dealing with North America.—C. STUART HOUSTON.

Ecology and Management of Gamebirds.—Peter J. Hudson and Michael R. W. Rand (Eds.). 1988. Oxford, Blackwell Scientific Publications, Ltd. 263 pp. ISBN 0-632-01834-8. £14.95.—As avian habitats shrink in size worldwide, the need for effective “management” of those remaining becomes ever more pressing. Consequently, the appearance of this book is timely indeed. In it the authors attempt to clarify the relationship between the ecology and the management of gamebird populations, ultimately in the context of human recreation. In my opinion, they have succeeded admirably. The “gamebirds” in question are those members of the Galliformes now resident in the British Isles. This, however, does not negate the utility of this publication for other taxa living under different conditions. Although partridges and grouse are used most often to demonstrate a point, the principles enunciated in this book apply equally well to any “exploited” population of birds, from ducks to doves.

The first essay discusses the nature of gamebirds, their ecology, and their conservation. As the species concerned live mainly in an environment dominated by agricultural endeavors (the situation in most of the United Kingdom and, incidentally, in a very large part of North America, to say nothing of other parts of the world), these populations are brought automatically into the realm of “managed” species. This situation has come about largely because, relative to previous centuries, man’s ability to modify his environment has increased by orders of magnitude, particularly since the middle of this century.

According to the authors, management of populations aims to do one of three things: (1) decrease numbers through some form of control program such as those used against pest species, (2) maintain populations at levels permitting an optimal sustained yield (in this case, birds available for harvesting in the autumn), (3) increase the abundance of those species deemed of interest to the public at large for cultural or aesthetic reasons. In this connection, their definition of conservation as “the management of interrelationships between man, other living organisms and the environment” may strike North Americans as a rather long-winded way of saying “wise use.” Nevertheless, this basic theme pervades their entire treatment of this subject. Some of the statistics on postwar changes in farming practices in the United

Kingdom will strike a familiar chord when we consider the same time period on this side of the Atlantic—an eightfold rise in the number of biocides in use between 1957 and 1985, a doubling of the area receiving treatment with these chemicals between 1971–1974 and 1980–1983, etc.

Chapters follow that deal with the documentation of species abundance (spring counts of breeding birds and autumn bag counts), discussed against a backdrop of the various life history “strategies” shown by birds. The emphasis throughout is on the need for long-term studies, to separate natural fluctuations from long-term trends in species abundance, and to determine “how different species maximize their *lifetime* [italics added] reproductive success.” A major question, arising from these discussions and facing managers of exploited populations, is knowing the extent to which the harvest of birds is compensated for by an increased fecundity in the survivors living in a population of reduced density.

Three extrinsic variables (predators, parasites, and habitat) impinging on the welfare of avian populations, exploited by man or not, are each discussed at some length. The chapter on predation, by man in exploited populations, returns to grapple with the critical question in game management: is human predation compensatory or additive? The discussion of predation in the dynamics of bird populations is well done. It is refreshing to read a balanced account of this phenomenon. Because most gamebirds are ground nesters, the potential for egg and chick predation is substantial, but how representative of actual rates are those reported in the literature? Unfortunately, the authors omit any discussion of the potential impact of the researcher on the outcome of such studies, which I suspect is often substantial.

The chapter on parasites, both macro and micro, and their impact on population size of avian species is particularly germane to contemporary discussions of the size and distribution of reserves and sanctuaries. The ever-shrinking habitat base available to birds, the result of man’s activities, necessarily results in increased densities if populations are managed so as to sustain constant numbers over time. Such is a matter of grave concern to waterfowl biologists in North America because of the increased vulnerability of most populations to infection with microparasites, such as fowl cholera, when densities rise.

Habitat, in reality living space and food resources, is discussed from the point of view of its interplay with predation and parasitism and their combined influence on bird numbers.

The last three chapters deal with rather disparate subjects: avian mating systems, harvesting gamebirds, and population simulation models. The first concentrates on the many questions still unanswered on this fascinating topic. The attempt to link mating systems with management of avian populations is, as admitted by the authors, a bit forced and of dubious use. The

discussion of harvesting gamebirds tackles once more the status of hunting mortality. Based on available evidence, the authors opt for middle ground, suggesting that such mortality is partly additive and partly compensatory. In the discussion of population simulation models, the authors consider the inadequacies of most such models but, at the same time, note the value they have in pointing the direction for useful experimentation, the results of which would enable future models to be more useful.

In sum, this book will be a welcome addition to the wildlife manager's library. Its appeal, however, will be much broader—anyone concerned with the welfare of any avian population (and shouldn't all ornithologists be concerned?) will find much to contemplate in this publication.—DAVID A. BOAG.

The Pheasant: Ecology, Management and Conservation.—David Hill and Peter Robertson. 1988. Oxford, Blackwell Scientific Publications. x + 281 pp., 9 color plates, 13 black and white plates, 131 text figures. ISBN 0-632-02011-3. \$50.00.—When asked to review this book, I had visions of the dozens and dozens of theses and dissertations written on the number-one gamebird in North America, as well as hundreds of state game bulletins. I expected this book to be largely a distillation of such studies with little new. How wrong I was.

The book is the joint effort of two professional biologists who have worked a total of 10 years on the study, part in Ireland and part in southern England. Besides their work and that of field assistants, they have drawn upon the extensive data from the National Game Census, gathered since 1961 on 600 estates totaling 800,000 ha by the 4,000 gamekeepers working on these estates.

The first two chapters cover taxonomy, original and current range, and methodology. Chapters 3 through 6 describe the pheasant's life history beginning with winter. Woodland with a scrub understory was a vital habitat especially for hens. Birds preferred the first 20 m of woods edge and would feed out into the open about an equal distance from the edge.

Cocks and hens segregated by sex. The groups of hens were of two sorts. There were stable groups of mostly older hens which changed little from week to week. In contrast "drifters," mostly first-year birds, moved from flock to flock or were by themselves. Foxes were a major cause of mortality in winter.

In spring, the hens dispersed onto nearby fields where they relied on green shoots for nourishment. First-year males and females dispersed farther than adults. Older males established territories at the

boundaries of woods and adjacent fields or brushy areas. Territory size increased with both the age and weight of males. Younger males might hold a territory farther out in the open, but most failed entirely to win a territory. These males fed farther from the woodland edges claimed by older cocks, which placed younger males at greater risk of predation.

Hens selected mates holding a territory in field borders adjacent to woodlands. The authors ruled out food availability as a factor in mate selection, for the green grass shoots that made up a large part of the hen's diet in spring were superabundant even though low in quality. The territorial cock seemed to provide for the hen freedom from disturbance from intruding nonterritorial males. In addition, the cock allowed a hen to feed with little interruption, for territorial cocks spent more time alert and less time feeding than did nonterritorial cocks. Unescorted hens were 10 times as alert and fed for only a third of the time as did escorted hens. In this way a hen could save considerable energy.

The authors' study of brood movement and survival is perhaps their most significant contribution to pheasant biology. Using radio-tagged hens, they pinpointed where the hen and her brood roosted each night during the first three weeks after hatching. The decline in the total weight of chick feces from day to day gave a measure of mortality or complete loss of a brood. Analysis of fecal samples indicated what the chicks were eating. Food supplies within each brood's home range were measured by sweep or vacuum nets and the size of the home range measured by following the radio-tagged hens.

While home range increased with the age of the broods, arthropod abundance had far greater impact upon home range size. When food was low, broods roamed farther and expended more energy to forage. As a consequence, such broods survived less well. Food shortage, not predation, was the chief cause of chick mortality in their first three weeks of life. This contrasts with the prevalent thinking among North American game managers that predation is the chief cause of loss.

The final chapters of the book deal with the impact upon pheasant welfare of changing farming practices in Britain: removal of hedges, larger fields, more monoculture, woodlots cut down for crops or replaced with conifers, and much greater use of pesticides and herbicides—all detrimental to pheasants. As pheasant numbers decline, landowners have relied more and more upon release of hand-reared birds to maintain the level of shooting to which they were accustomed. The authors propose two main practices that would greatly benefit wild pheasants. The first is maintenance of hardwood woodlots. Because pheasants are an edge species, numerous small woodlots of 0.5-1 ha are better than a single large area. Hardwoods provide far more food than conifers but take longer to produce income. Planting of co-

nifers has been subsidized by the government. Recently, due in part to the stronger conservation movement, there are now inducements to maintain and restore hardwoods. The cutting of "rides" through these woodlots greatly increases the available edge and food.

The second recommendation is to be more selective in the use of herbicides and pesticides. The authors found that their use in cereal crops can cut the survival of pheasant chicks almost in half. They recommend leaving field borders unsprayed, which would reduce crop yield a mere 1%. Some landowners seem willing to do this. How landowners comply to these recommendations will hinge upon how much they value this time-honored sport of the wealthy landed gentry. Landowners get great satisfaction from inviting their friends to participate in a high-quality day of shooting driven pheasants, and in turn being invited to the estates of their friends. The beaters, the gamekeepers, and the sumptuous mid-day luncheon party that make up this ritual date back to the late 1800s. Whether this can survive in the face of high taxes seems dubious. The loss would be not just for the country gentry, but for wildlife enthusiasts in general. For what benefits the pheasant benefits a host of other wildlife, notably birds. In the long run, the welfare of wildlife in Britain will depend on public sentiment for wildlife (currently 35% of British people contribute to one or more conservation organizations), and on the degree of satisfaction landowners get from pheasant shooting.

This book is of special interest for its comparisons of the British and the Americans in their sporting practices, changing land use, and actual management of wildlife. The book is well written. Each chapter begins with a clear statement of its contents and ends with a concise summary. The copious graphs are outstanding for clarity. The book should interest conservationists and wildlife managers. Ornithologists will find the sections on social structure, mate selection, and mortality factors of some theoretical interest. However, because of the book's emphasis upon the British scene, it may be most suitable for university libraries.—ALLEN W. STOKES.

Wildfowl in Great Britain.—Myrfyn Owen, G. L. Atkinson-Willes, and D. G. Salmon. 1986. New York, Cambridge University Press, xiv + 613 pp., numerous figures, tables. ISBN 0-521-30986-7 cloth. \$59.50.—Wildfowling in North America is highly developed as a pastime and recreation, generating annual revenues of millions of dollars to be ploughed back into wildfowl management. The result has been the evolution of a professional infrastructure charged with

research, monitoring, habitat management, and enforcement. It comes as something of a shock to the average North American wildfowler to learn that Britain, a country with a population fully a quarter that of the United States, probably spends less on wildfowl research, monitoring, and management than North American wildfowlers spend on peanuts! The difference is partly cultural—wildfowling in Britain is to some extent a rich man's sport—and partly historical—statutory institutions with responsibility for wildlife are relatively recent inventions of the British legislature. Britain is a densely populated country, with approximately 56 million people crowded into an island the size of Oregon. Intensive land use has therefore shaped public attitudes to wildlife differently from North America, and nature conservation—especially bird conservation—holds far greater public support than any of the hunting or shooting lobbies. It is significant that the major owner of wildfowl and wetland habitats in Britain is the Royal Society for the Protection of Birds and that its preferred policy on its reserves is to ban wildfowling. It is against this background that the achievements documented in this book must be measured.

The Wildfowl Trust was created in 1946 by Sir Peter Scott to provide a focus for research into British wildfowl. One of its early successes was to publish the 1963 edition of this book, the first comprehensive review of the numbers, habitats, and likely fortunes of wildfowl in Britain. With the passage of time the information in the original volume naturally went out of date, but other factors, notably the development of annual surveys of wildfowl and an increase in the intensity of changes in land use in Britain, have made this latest edition particularly valuable.

Part 1 is an introduction to the data sources and methodology used for the book. Wildfowl counts have been attempted in Britain annually since 1947 (and formed a major resource for the 1963 edition), but the establishment by the International Waterfowl Research Bureau (itself housed at the Wildfowl Trust in Slimbridge) of an International Wildfowl Count scheme for the western Palearctic in 1967 gave major impetus to the British census. The International Counts—a coordinated effort to census the whole of the western Palearctic in January each year (and in November or March, as well, in some years) evoked a major response within Britain. By 1982 monthly counts provided data for more than 4,000 localities and a network of some 1,100 observers were involved. Impressive enough even by North American standards for wetland coverage, these figures become spectacular when one appreciates that all but perhaps a few dozen of these counts were undertaken by unpaid volunteers in their own time and at their own expense, with the effort coordinated by just a handful of Wildfowl Trust staff operating on a shoestring budget. Most wildfowl in Britain breed elsewhere and the importance of the British wetlands is as wintering

grounds and migratory stopovers. The relatively comprehensive coverage achieved for this book is particularly important for realistic assessment of the international significance of the birds in Britain. The detailed data for individual sites are critical for input into land use planning (far more developed in Britain than in North America).

Part 1 also details some of the inaccuracies associated with reliance on monthly counts by volunteers. Most errors detected in the various checks conducted to date have proved unbiased and the authors suggest that a precision of perhaps 10% was typical of individual counts. More worrisome may be the variation in daily counts at sample sites. Counts made on the standard count dates deviated by up to 50% from the daily average for the whole month. Deviations were highest for mobile species such as the Pochard (*Aythya ferina*) and lowest for more sedentary species such as Tufted Duck (*A. fuligula*; 25%) and Mute Swan (*Cygnus olor*; 13%). However, these effects averaged out over the multi-month and year sequences of data available for most sites. Coverage of geese and of sea ducks was particularly problematical on account of their habits. Finally, most effort was devoted to work outside the breeding season and the sizes of breeding populations are less well-documented. Part 1 also describes the use of banding data to identify populations that were involved in various counts. A final chapter in this section describes the use of information from shot birds as measures of annual duck production and harvest effort, and as research material for studies of poisoning by lead shot and of diet. It will come as a surprise to North Americans to find that annual surveys of the shooting kill in Britain (in the form of a questionnaire sent to a sample of its members by the British Association for Shooting and Conservation) began only in 1979–1980!

Part 2 of the book devotes some 310 pages to a region by region survey of major habitats and their wildfowl numbers in Britain. The treatment is essentially narrative, tracing the coast, river, and wetland systems through each county in turn. The general nature and size of the populations are described. A map providing a general indication of the location of major sites is usually the sole illustration within each region's treatment, although some vignettes and occasional trend diagrams are also found. Most major sites or systems of sites have their population sizes listed in a summary table, but the time span of these tables is highly variable. Many refer to averages over 1970–1982, but other time periods are used frequently. When species are changing markedly in average numbers—a stated *raison d'être* for the book—this makes it difficult or even impossible to extract fully comparable regional data for a species. On the other hand, where local changes are known to have occurred, these are mentioned in the text and are often documented with a separate data table or, less frequently, with a graph.

Part 3 of the book consists of 124 pages of species accounts, inevitably duplicating some of the material in the regional treatment. Thirty-one species are treated fully and an additional 17 are discussed at shorter length. The treatment adopted for each species varies somewhat, reflecting, for example, differences in breeding status. A distributional map, based on the 10-km squares of the United Kingdom's Ordnance Survey grid, provides a valuable summary of winter distribution, usually based on data from the winters of 1975–1976 to 1979–1980 but updated if "obvious changes" occurred in 1981–1982 and 1982–1983. These maps differ from those of the 1963 edition, which plotted the numbers at individual sites, subject to a threshold cut-off. The use of 10-km squares better portrays the cumulative effect of many small sites within a region and also comes into line with the *de facto* standard for biological mapping in Britain.

A wide variety of other data are presented (though not uniformly) within the species accounts. These range from line diagrams of monthly variations in national numbers or of trends in annual population sizes through maps of flyways or banding recoveries to data on the relative size of the British (wintering) population within the western Palearctic total, on time trends within major sites in Britain, or on breeding population sizes. The temporal base of these presentations again varies widely, with data from the 1976–1977 winter onwards (to 1982–1983) most frequently used. Fairly close reading of the introductory pages to this section is needed to understand some of the presentations. I also have some reservations about the basis of the trend diagrams presented for several species. The problem the authors faced is that some monthly counts were missed at some sites. Hence national totals could not be computed for that month. To restrict the trend analysis to totals based on absolutely comprehensive counts, however, would be to use only a small fraction of the available data. One statistical procedure widely used in such circumstances is to model the structure of the data matrix and estimate the missing data. Instead, Owen and his colleagues have adopted an index approach based on pairing data from sites surveyed in adjacent years and estimating the percentage change in population for the country as a whole from these sites. In effect, this assumes that the missing sites in any given year are merely a random subsample of the sites occupied by the species. The use of this type of index is not in itself objectionable (if appropriate error variances are attached to the indices so generated) and such indices have been used in other bird monitoring programs in Britain (e.g. Bailey 1967, *Bird Study* 14: 195). However, at least to my knowledge, the UK Wildfowl Counts have never published any assessments of such variances.

Part 4 of the book provides an 82-page review of the major issues of conservation concern for wildfowl in Britain. Issues covered include human influence

(habitat losses, pollution, shooting, and disturbance from water-based recreation), the management of wildfowl numbers, and current conservation measures. Fifteen pages of references, a 36-page site index, and a 12-page general index complete the book.

All the usual criticisms of a volume of this type apply. Even the most recent data were three or four years out of date at publication and the general run of data used are even older. The quality of the data varies from species to species and from site to site. Comparisons of the type one wants to make are invariably blocked by variation in the data the authors have chosen to present. But Dr. Johnson's comment applies above all this: one marvels not that it may be done badly but that it has been done at all. The book belongs on North American university and wildlife agency bookshelves as an example of what can be achieved on limited resources given enthusiasm, dedication, and skill. I have no doubt but that it was for just this type of product that Sir Peter Scott founded the Wildfowl Trust all those years ago.—RAYMOND J. O'CONNOR.

A Distributional Survey of the Birds of the Mexican State of Oaxaca.—Laurence C. Binford. 1989. *Am. Ornithol. Union, Ornithol. Monographs* No. 43. viii + 418 pp., 30 text figures, fold-out map. ISBN 0-943610-54-0. \$40.00 prepaid (\$36.00 to AOU members).—This work is the outgrowth of Laurie Binford's Ph.D. dissertation, which was inspired by his first trip to Oaxaca in 1959 (he made other trips in 1961 and 1964) and completed at Louisiana State University in 1968. Binford conducted other fieldwork in Oaxaca in 1972 and 1974, resulting in a total of 12 months in the field and the collection of over 1,900 specimens and extensive notes on the birds of that state. In all, Binford compiled data on more than 17,400 specimens and consulted 935 publications in the course of his extended study. In my opinion, the result is the best annotated checklist to date of the birds of any Mexican state (and better than most of those for states in the U.S. as well). Consequently, I highly recommend the work to anyone interested in the birds of Oaxaca in particular and of Latin America in general.

While the main emphasis in this work is on the accounts of individual species (about 205 of the 426 pages), there are also extensive sections on habitats (45 pp. plus a fold-out map), an analysis of the breeding avifauna (44 pp.), and a gazetteer (43 pp.). Shorter sections cover physiography (5 pp.), climate (6 pp.), plan for species accounts (10 pp.), migration (11 pp.), type localities (14 pp.), literature cited (13 pp.), and an index (13 pp.). In a typical species account, the

first paragraph outlines abundance, frequency of occurrence, habitat use, distribution, and dates and elevations of records. Breeding information is given in the second paragraph as appropriate, and subspecies are treated in the final paragraph (this may be preceded by additional paragraphs on various other subjects).

Binford has striven for consistency and clarity in these accounts, outlining a format and defining terms that are adhered to throughout. While one might quibble with some of Binford's terminology (e.g. the use of the terms "occasional, casual, accidental" to signify abundance in irregularly occurring species), I applaud his attention to such details. All too often in similar publications, elements such as format and terminology are not well-defined or followed—which can create confusion, redundancy, and extraneous verbiage.

Binford lists 680 species of birds as acceptably recorded from Oaxaca, of which 669 are confirmed by specimens (659 personally examined by Binford). Of the 11 noncollected species, one is based on a band recovery (Long-eared Owl) and ten on sight records (Wilson's Storm-Petrel, Fulvous Whistling-Duck, Gadwall, White-rumped Sandpiper, Pomarine Jaeger, Sooty Tern, Rock Dove, Lesser Swallow-tailed Swift, Slender-billed Wren, and Golden-winged Warbler—all of which are bracketed in the accounts). Binford considers hypothetical 39 other species reported from Oaxaca, including several purportedly taken there by Mario del Toro Avilés (whose locality data are often questionable). Binford speculates that 28 of these species might actually occur in Oaxaca, along with 53 others that have not yet been reported from the state.

The 680 species of birds that Binford attributes to Oaxaca exceed the totals for any other Mexican state (Chiapas had 636 as of 1971), as well as those of Guatemala (662 in 1970) and Honduras (661 in 1968). The richness of Oaxaca's avifauna stems from several factors, including its pronounced ecological diversity and location in an area where several biotic regions meet. Although the state is only 36,371 square miles (about the extent of Indiana), it rises in elevation from the Pacific Ocean to 11,138 feet. Within its boundaries, Binford recognizes three ecophysiological regions, five physiographic areas, and eleven major habitat categories (the latter ranging from mangrove swamps to montane coniferous forests). Incidentally, users of this publication will do well to digest figures 1 and 31, which provide an appreciation of topographic/ecological features crucial to the understanding of the distribution of birds in Oaxaca.

I found very few deficiencies in this publication, although the complexity of its subject matter can be daunting and even overwhelming at times. The only typographical errors that I encountered were San "Jan" (=Juan) on page 12, "Cuatro" (=Cuatro) Ganados on p. 28, and "scrub" (=scrub) on p. 38. Although I do not like capitalized colloquial names for plants, the

specific name "bracken fern" should be capitalized on p. 29 (on the contrary, the generic names "Manzanita" [p. 32] and "Paloverde" [p. 39] should not be capitalized). Also, *Prosopis chilensis* (pp. 39 and 41) is not really the "Honey Mesquite" (this name is usually applied to *P. glandulosa* Torr.), and *Taxodium mucronatum* should be referred to as the "Montezuma Cypress" rather than "Bald Cypress." Finally, although a generally superior job has been done in the rendition of Spanish words, I did note the lack of accents on botánicas, botánico-geográficas, cactáceas, climatología, climatológico, distribución, El Camarón, fitogeográficas, geografía, hidrología, Isla de los Pájaros, Martín del Campo, meteorología, orquídeas, ornitología, pináceas, región de Huajuapán de León, república, Santa Fé, San José del Pacífico, sección autográfica, sistemáticas, útiles, vegetación, and volcánica (also, the adjective "mexicano/a" is not capitalized in Spanish).—JOHN P. HUBBARD.

OTHER ITEMS OF INTEREST

Resident Forest Birds in Thailand: Their Status and Conservation.—Philip D. Round. 1988. Cambridge, England, ICBP Monograph No. 2. xiv + 211 pp., 10 figures, 16 black-and-white plates. ISBN 0-946888-13-2. Paper, £8.00. **Key Forests for Threatened Birds in Africa.**—N. J. Collar and S. N. Stuart. 1988. Cambridge, England, ICBP Monograph No. 3. vii + 102 pp., 7 figures. ISBN 0-946888-15-9. Paper, £7.00. **Nepal's Forest Birds: Their Status and Conservation.**—Carol Inskipp. 1989. Cambridge, England, ICBP Monograph No. 4. xvi + 187 pp., 19 figures. ISBN 0-946888-16-7. Paper, £9.00.—In these monographs, the International Council for Bird Preservation (ICBP) documents the avifauna of three different groups of forests. These are practical guides that establish conservation needs in response to the destruction of forest habitats.

"Resident Forest Birds in Thailand" assesses the status of birds in relation to the remaining forest cover in different habitats and geographical regions. It describes the geography, climate, and vegetation of different regions and the major factors that threaten the avifauna. Round identifies key areas for bird conservation and makes recommendations for future survey work and forest conservation. A distributional list of resident landbirds is included. "Key Forests for Threatened Birds in Africa" describes major forest sites for conservation in Africa, Madagascar, and related islands. Information on the birds and wildlife of 75 areas is grouped in order of importance and urgency for conservation based on existing conditions. The book is targeted at decision-makers, development agencies, and conservation organizations. It reviews the measures currently underway as well

as those which should be initiated. In "Nepal's Forest Birds," Inskipp analyzes forest types and their bird communities, lists current and proposed conservation measures, and identifies threats to the avifauna. Extensive bird checklists are provided, including a regional breakdown. The monograph identifies important unprotected forests, describes their value for bird conservation, and recommends future protected areas.

These monographs are a summary of a considerable body of information which sadly reflects a reduction in forests and associated resident landbirds in tropical developing countries. However, they provide abundant, accurate information and, as guides for appropriate action, should be essential to individuals and organizations working to reverse the current trends.—JUSTINE B. CRUZ.

A Guide to Bird Behavior, Volume 3.—Donald W. and Lillian Q. Stokes. 1989. Boston, Little Brown and Company. iv + 397 pp., 50 illustrations, 33 text figures, 47 line drawings, 2 appendices, and glossary. ISBN 0-316-81737-6, \$18.95 (cloth); ISBN 0-316-81717-1, \$10.95 (paper).—This is the third volume of a series produced to introduce nonbiologists to the behavior of widespread and familiar birds. Volume 1 featured common and easily observed birds (e.g. European Starling), volume 2 focused on species requiring some effort to watch (e.g. Red-eyed Vireo), and the current volume introduces an array of species which have captured the public's imagination (e.g. Eastern Bluebird and Bald Eagle). Many of the species included are uncommon or particularly sensitive to human interference at nest sites and many accounts include caveats about taking care to avoid unduly disturbing birds under study. Ten of the 25 species covered by this volume are birds of prey; the earlier volumes covered only American Kestrel.

The book is divided into species accounts which are subdivided into four subunits: a few introductory paragraphs, the "Behavior calendar" which illustrates the sequence of different stages of the species annual cycle, a series of brief descriptions of the visual and auditory displays of the species, and in-depth descriptions of the characteristic behaviors shown at different stages of its annual cycle. References consulted for each species are listed in a detailed bibliography.

Errors I detected in this work generally are not those of commission but of omission. For example, the distinctive begging calls of fledgling Great Horned Owls are not described. The calendars are arbitrary in cut-off dates and sometimes are contradicted by the text (e.g. the migration period of the Peregrine Falcon). One third of the 75 species covered by the three volumes are of largely eastern North American dis-

tribution, reflecting a strong eastern bias. Common western species with extensive literature coverage not included in the series include White-crowned Sparrow, Acorn Woodpecker, and House Finch (now a common feeder bird in the east). It is particularly unfortunate that the woodpecker was excluded because it would have allowed a good account of communal breeding. There is little unifying theme to the accounts; each is an isolated portrait. An evolutionary point-of-view is lacking; perhaps the authors and publisher did not wish to alienate certain portions of their readership.

In spite of these criticisms, I found this book, as well as the others in the series, an admirable effort to extend the interests of birders and feeder-watchers. The book is handsomely produced with a clean text that is free of typographical errors. The illustrations by Bob Hines add aesthetically to the work; his renderings of young birds are often charming. I recommend this book for public libraries, and the personal libraries of amateurs. Professionals would be better served by more technical references.—WALTER G. ELLISON.

Biology of the Eared Grebe and Wilson's Phalarope in the Nonbreeding Season: A Study of Adaptations to Saline Lakes.—Joseph R. Jehl. 1988. Cooper Ornithol. Soc., Studies in Avian Biology, No. 12. iv + 74 pp., 39 figures. ISBN 0-935868-39-9. \$14.00.—International conservation efforts to preserve critical habitats have become important for maintaining viable populations of migrant bird species. Nowhere is this more apparent than for shorebirds and other aquatic species that concentrate in huge numbers at a limited number of staging sites. For shorebirds, the focus of most conservation efforts has been aimed at coastal estuaries, to the neglect of many species that breed and migrate through mid-continent wetlands. Jehl's monograph on Eared Grebe (*Podiceps nigricollis*) and Wilson's Phalarope (*Phalaropus tricolor*) biology during nonbreeding stages of the annual cycle attests to the importance of Mono Lake and other saline lakes in western and central North America as staging areas for a large proportion of the world's populations of these species.

The three major goals for the monograph are to document the nonbreeding biology of Eared Grebes and Wilson's Phalaropes, to discern the importance of Mono Lake (and other saline lakes in western North America) in the annual cycle of these species, and to study how these species are able to thrive in the generally inhospitable environs of saline lakes. This last

objective is a component of the second half of the monograph's title. The success with which the author achieves these goals is variable. Based on eight years of work, Jehl presents an annual chronology of grebe and phalarope use of Mono Lake, including estimates of total numbers of birds at the site, age and sex ratios, and estimates of the proportions of the populations of both species that frequent the lake. Information on changes in mass of staging birds is impressive (phalaropes nearly double their weight prior to southbound migration). Jehl mounts evidence from museum and literature sources to show that adult phalaropes migrate nonstop from staging areas in the western United States to coastal Ecuador and Peru. Phalaropes then move to wintering sites at high altitude, saline lakes in Bolivia, Chile, and Argentina. By contrast, the fall migration of juvenile phalaropes appears to proceed as a gradual southward movement. Jehl provides critical data for conservation efforts directed at preserving the unique biota associated with saline lakes, as well as important staging sites for migratory species.

Elsewhere, the text suffers repeatedly from qualitative presentation of results or lack of data altogether. For example, grebe foraging behavior is described as varying seasonally (p. 19), but no numbers are presented. Further, surface-feeding by grebes apparently predominated during summer and early autumn, but the seasonal proportions of birds using different foraging methods and how these patterns were influenced by the availability of brine shrimp (*Artemia monica*) and brine flies (*Ephydra hians*), are missing. The monograph is weakened throughout by conclusive statements that are rarely backed up by data. Curiously, where Jehl apparently possesses data that may provide interesting clues to the ecology and behavior of these halophilic species, he fails to present them. For example, color-marked phalaropes apparently were faithful to particular foraging sites (p. 39), which offered the opportunity to examine individual movements for up to 15 days. However, the treatment of this topic is limited to a two-sentence paragraph with no data, concluding that results offer "evidence of regular daily movements."

There are 39 figures (8 of which are photographs), 10 tables, and 3 appendices. Textual treatment of data is largely descriptive, using vague terminology such as "most," "commonly," and "few." Census results are usually presented without error estimates. The one figure (Fig. 4) that includes confidence intervals lacks sample sizes. I encountered only one statistical evaluation of data. To be sure, much of the data may not be amenable to meaningful statistical analyses owing to acknowledged sampling biases throughout the study. To the author's credit, this problem is addressed repeatedly in the text.

I found only a few typographical errors, and the text is easy to read. On the other hand, figures were not composed in a consistent style, and stray stencil

marks make at least one appearance (Fig. 4). Legends to figures 19 and 21 provide insufficient information to evaluate figures. Figure 23 includes data on "intensity" of feather molt in grebes, but the reader is left uninformed as to how this was quantified.

Overall, Jehl has succeeded in demonstrating the importance of Mono Lake to the Eared Grebe and Wilson's Phalarope. The monograph falls short, however, of adequately documenting the nonbreeding biology of these species, or their adaptations to saline lakes. Perhaps answers to many questions involving ecological interactions between grebes and phalaropes and their principle prey items, as well as physiological stresses imposed on these halophilic species, can be found in numerous referenced publications by the author and his coworkers. The monograph is a desirable acquisition for personal and museum libraries, especially for those specializing in conservation strategies for migratory species, and professionals with interests in the two focal species.—MARK A. COLWELL.

Functional Morphology of the Tail Apparatus of the Pigeon (*Columba livia*).—Julian J. Baumel. 1988. Berlin, Springer-Verlag. viii + 115 pp., 29 text figures. ISBN-3-540-18868-1. \$54.60.—In this work, number 110 in the series "Advances in Anatomy, Embryology and Cell Biology," Baumel describes the anatomy of the tail apparatus, a surprisingly complex anatomical structure of which the rectrices are but externally conspicuous appendages. Baumel summarizes previous anatomical studies of the structure, presents a partial synonymy of associated muscles, proposes an anatomical terminology consistent with that of the *Nomina Anatomica Avium* (including the designation of several new terms), describes the innervation and vascular supply of the region, and discusses the functional interplay among caudal vertebrae, rectricial bulb, and rectrices in the movement of the tail, including during flight. The work is characterized by a concise writing style and an attention to detail; the figures are adequate, and typographical errors are few (but note that *Gallirostris* on p. 105 should read *Gallirallus*).

The volume is descriptive by design, and, unfortunately for phylogenetically oriented readers, "evolutionary considerations" are to appear elsewhere. The readership of the book will be limited to those competent in modern anatomical terminology, an audience not likely to increase significantly until an up-to-date technical manual on avian dissection is published. The book is an essential addition to libraries

of universities and research-oriented museums. The price of the volume, which approximates \$0.45 per page, will preclude its purchase by most students; it would be interesting to learn the reason that this outlet was chosen for its publication. Nonetheless, Baumel has imbued what could have been a sterile text with a spirit of investigational adventure, and he has documented a significant advance in the study of avian anatomy.—BRADLEY C. LIVEZEY.

Naturalized Birds of the World.—Christopher Lever. 1987. New York, John Wiley & Sons. xx + 615 pp. Unnumbered drawings by Robert Gillmor. ISBN 0-582-46055-7. \$205.00.—"The object of this book is to describe when, where, why, how and by whom the various alien birds now living in a wild state throughout the world were introduced, how they subsequently became naturalized, and what effects—for good or ill—they have had on the native biota, and vice versa." No small task. There are approximately 130 species accounts. Each account includes one map of the "natural distribution" of the species and a second that indicates the "naturalized distribution." The accounts give the location and history of the various introductions. Many failed attempts are catalogued, and may increase by half the number of attempts. The failures are a set of tales with an interest all their own.

The reasons that people introduce birds to an area are often curious, or whimsical; the results can be disastrous. People generally find birds attractive and Lever suggests a variety of reasons. Depending on the species or the location, birds have been introduced for hunting (sport), for sentimental, nostalgic or aesthetic reasons, as a food source, to provide biological control of pests, as scavengers, or to protect and conserve the species. Many have inadvertently escaped from captivity. While the process of naturalization may be successful, the consequences may not be. Alien species have served to transmit disease and parasites, damaged human food resources, befouled buildings, disturbed ecosystems, competed with indigenous species, and contributed to genetic changes in local populations. The sequence of events that follow a successful introduction—release, breeding, establishment—are clear. The sequence is repeatable and predictable. The individual descriptions of these events vary in length and detail, but they make fascinating reading.

Naturalized species will have their strongest influence in insular situations. Islands tend to be small and in delicate equilibrium at best. I was impressed

by the number of cases where islands were host. Hawaii, for example, seems to be mentioned with unusual frequency (54 species). New Zealand is another. The data to test this perception are not available in any accessible fashion. Some tabular data would have been informative. There are, of course, numerous cases still unsettled. Nevertheless, the processes are important because they operate in natural range extensions, when numbers increase significantly, or in changes in habitat usage. Further, the lessons already learned may influence future events. Lever's attempt at an even-handed treatment of these issues is reflected in citing and discussing the value of introductions and by summarizing efforts to develop a policy for those individuals or agencies who contemplate an introduction.

The species accounts precede an appendix, which treats the Hawaiian Goose (*Branta sandvicensis*) and the Saddleback (*Creadion carunculatus*). Both species are examples of successful conservation attempts. One wishes similar success to the California Condor (*Gymnogyps californianus*). There is an extensive bibliography, a geographic index (which birds in what place),

and a species index. Often there are items in the chapter notes or extended bibliography not cited in the text. The volume is generally well edited but does use some outdated names. In addition to the insights it provides to human behavior, the book will be valuable to readers interested in wildlife management and ecology, and to historians, biogeographers, and others.

The compilation in this volume represents a tremendous effort. It is fascinating in its own right. However, it doesn't answer some important questions. For example, documenting the success of alien species does not explain why one species fails while another related one succeeds, or why a species fails in a certain location at one time and succeeds at another. When animals are moved by humans, the context may be apparent, but the event does not provide clues to those aspects of the event that lead to successful invasion. One hopes that discovery of the patterns and dynamics of naturalization might lend insights to the structure of the ecosystem and perhaps its vulnerability to invasion. This is a rich record and deserves to be mined further.—A.H.B.