REVIEWS

EDITED BY WALTER BOCK

Some adaptations of marsh-nesting blackbirds.—Gordon H. Orians. 1980. Monographs in Population Biology No. 14. Princeton, New Jersey, Princeton University Press. Pp. xii + 295, illus., 17 appendices. Cloth $18.00, paper $7.95.—Avian ecologists have played important roles in the development and testing of ecological theories dealing with habitat and mate selection, territoriality, foraging strategies, and competition. Certain avian communities lend themselves to studies of these topics better than others, as Orians and his students have demonstrated for blackbirds in the western United States since the early 1960's. In this book, Orians has presented an overview of much of the work done on these birds along with a wealth of heretofore unpublished information. The book is organized around the common theme of the long-term adaptations of blackbirds to the uniquely unstable and highly productive marsh systems found in the West, as contrasted to the more stable but less productive marshes of the eastern United States and South America. Data collection and analysis are directed toward answering specific questions raised by current theory, such as optimization theory for determining diet, central place foraging, and so on.

The book begins with a discussion of the basic biology of the blackbirds found in western environs, although the three main species of concern, the Red-winged Blackbird, Yellow-headed Blackbird, and Brewer's Blackbird, are emphasized. Discussion of South American species is postponed to a later chapter. The next chapter deals with the characteristics of the marsh systems. Orians points out that many new marshes have been created by recent irrigation projects, but he does not indicate whether the new marshes differ in any substantial way from old ones estimated to have been created by Pleistocene flooding. The chapter ends with a brief discussion of the materials and methods used in the study. It is here that Orians clearly lays out the limitations of his work and the effects these have on his results. His was a choice of breadth, to examine many aspects of the birds' biology at the risk of not obtaining appropriate and focused data to answer specific questions about specific single topics.

A major feature of most of the western marshes is their production of immense numbers of aquatic insects. These are fed upon heavily by all species of blackbirds nesting there. Orians presents extensive data on the pattern and quantity of the emergence for 12 marshes offering a range of conditions. Most of the data are derived from 1968, with a few marshes also sampled in 1969 and 1970.

The marshes clearly vary in seasonal and diurnal patterns of insect availability. Orians goes to considerable lengths to quantify these patterns, but uses the results only qualitatively in discussing habitat and prey selection later on. Perhaps this is why no statistics of dispersion were presented with the emergence data.

Chapter Three takes up the problem of selection of habitats, territories, and mates. To the blackbirds (only Red-wings and Yellowheads are discussed here because Brewer's is colonial), choice of habitat probably means choice of a marsh. Using the theoretical construct of Fretwell and Lucas to predict the behavior of blackbirds, Orians reasons that males of Red-wings and Yellowheads should show the Dominance Distribution since they are highly territorial and polygamous and could be expected to have higher average reproductive success in good marshes by excluding other males. Males, therefore, should settle in the best marshes first. Females, on the other hand, must devote considerable effort to acquiring energy for egg laying, and once incubation begins they should spend little time or effort to exclude other females. Furthermore, since polygamy is common, females should settle first on good territories where there already are females, in accordance with the polygamy model of Orians (1969). Overall, females should approximate the Ideal Free Distribution of Fretwell and Lucas. Unfortunately, Orians does not have the data to test the predicted male pattern.

The remainder of the discussion on mate selection is devoted to the females. A host of tests are run on female responses to between- and within-marsh qualities, largely with no demonstrable trends appearing. For example, females do not select territories earlier in better marshes (as estimated by the mean date of the first egg). Nor do females clearly settle earlier in territories of larger harem size, a presumed indicator of higher quality of territory, except for Yellowheads in the Columbia Refuge. The quality of the male's territory in terms of productivity as correlated with the number of females present was only significant for Yellowheads. Good marshes had sex ratios and fledging success equal to poor ones. All these tests point to little discrimination of females for more productive marshes or territories. Orians does not feel these results are conclusive and points to the fact that harem size *is* smaller in eastern marshes, which produce fewer emergent insects. Also, he notes that harem size is smaller in Red-wings that have

been excluded by Yellowheads from the best sites on marshes at the Turnbull Refuge. However, no data are provided to test these observations.

Orians next considers reproductive success of females of different harem sizes, since they should theoretically be higher in larger harems. Red-wings support the prediction in 1966, but give the opposite pattern in 1967 on the same marsh.

Orians concludes the section on selection of territories by examining the hypothesis that females show no choice in selecting a territory. He reasons that the ratio of females to males in harems should approximate a binomial distribution around the mean value. He was unable to reject the hypothesis of no choice except for one marsh, where one male with a harem of 33 females strongly influenced the test! Once again, Orians is not ready to concede to the test. He points out that certain territories are known to consistently attract more females every year than other territories, that harem sizes are correlated with the amount of vegetation edge (Yellowheads only?), that average nesting success does not decline with harem size as a random model predicts (although recall his contradictory results on this issue), and that correlations of starting date of first nests and number of females attracted to a territory, albeit weak, are hard to explain in a no-choice model. Orians does not suggest how one may examine this important problem in more detail, or what data should be gathered for a more appropriate test.

The remainder of Chapter Three considers determinants of territory size and cues used to select territories. Orians predicts that smaller territories will occur on more productive marshes and smaller territories in more productive places within a marsh, such as along edges facing open water, which have greater numbers of emerging insects compared to shore-side edges. No correlations were found for Red-wings anywhere. Yellowheads held smaller territories on the more productive marshes at Turnbull Refuge. Data were not available or were qualitative for other sites. Again, Orians resorts to comparisons with the eastern United States where territories are larger in the uplands. Patchiness below the resolution of Orians' sampling techniques may have prevented him from showing patterns with his productivity data.

Clues used to select territories are largely unknown for most birds. Orians' suggestion that females may assess aquatic prey density by seeing the larval stages in the water while feeding along the shore is intriguing and deserves some experimental consideration in future studies. Other ways of judging territories, such as by vegetation patterns, stem density, and so on, are possibilities, but testing them will be difficult. The data presented for Yellowheads indicating an avoidance of trees near their territories may be an indication of such a process. The avoidance is apparently based on poor feeding efficiency in trees, a supposition that also needs testing. Orians concludes Chapter Three with the statement that there is strong evidence for females choosing territories based on their quality and not those of the male holder. He is apparently not referring to earlier data, most of which showed no correlation with territory quality, but other facts which he then presents. Females apparently pay little attention to territorial males when they arrive but instead feed intensively. No data are presented in support of this contention and certainly other hypotheses could be advanced to explain such behavior, such as building food reserves for egg laying. He also states that females stay on a territory if the male if removed. Again no data are presented, and, if already inseminated, perhaps the female gains little by leaving. The strongest evidence is that some territories are more successful from year to year, as found by Searcy (1977). This seems like the most clear-cut evidence for territory rather than male selection. The case is still open, however, as Orians has obtained data from Turnbull Refuge in 1966 that suggest that males may offer protection to nests from predators.

The emphasis is on foraging patterns in Chapter Four. A brief discussion of theory on choice of feeding patch and decision to leave a patch, selection of prey items, and central place foraging precedes tests on data. Geographically, Orians demonstrates that western Red-wings have a much higher frequency of aquatic insects in their diet than do eastern upland or marsh-nesting Red-wings. Among western marshes, Red-wings have higher frequencies of aquatic prey where there are no Yellowheads, but otherwise marsh productivity and frequency of aquatic prey eaten are not correlated, perhaps because Red-wings are able to fly to nearby marshes to feed. A test of patch use as determined from prey fed to nestlings and assignable to particular patches gave the unexpected result of higher diversity for Yellowheads even though they appear to be more patch-specific than Red-wings or Brewer's. Difficulties in assigning prey unambiguously to patches, more or less continuous sampling of patches by the birds, or data pooled over too many days, marshes, seasons, and weather conditions could be responsible for the result.

All three species of blackbirds shift their feeding sites during the day. The predicted reason for the shifts was lowered prey capture rates in the current patch. However, direct observation of prey capture rates along marsh edges yielded equally high capture rates to those in uplands. Furthermore, prey

delivered to nestlings indicated no diurnal shift in prey delivery rate. More detailed data on individual birds are needed to clarify patterns in patch use.

Guessing that pursuit and handling times are about 1 s long for Red-wings, Orians predicted that feeding birds should reject small prey (Diptera) when large prey (aquatic prey) can be captured at a rate of 12 or greater per min. However, no evidence from several data sets could be found that indicated that small prey are ever rejected. Orians advances several hypotheses to explain the results, ranging from an improper guess at pursuit and handling times (which have never been measured) to the possibility of some "physiological inertia" in adults, where they are compelled to take small items because of their own relatively poor energy status because of their breeding efforts.

A major prediction of central place foraging theory is that larger loads of prey should be delivered to the nest when the foraging patch is farther away. Orians lacks the appropriate data to test this for Red-wings and Yellowheads, but Brewer's clearly do deliver more prey from more distant trips. The times required to gather prey at different distances were not reported so one cannot be certain that the larger loads represent equal or higher returns per unit time compared to closer foraging sites.

In Chapter Five, Orians turns his attention to the variability of resource use by Red-wings and Yellowheads. Red-wings use more kinds of nesting sites over their range and occur in more kinds of marsh conditions. However, levels of variation in size of territories are similar for the two species even though Red-wings have larger territories on the average. Variations in sex ratio on territories are also similar for the two species, which suggests similar levels of variability among territories.

Red-wings have larger average clutch sizes on some marshes, and Orians claims that they show more variation in clutch size than Yellowheads. However, the data in Appendices L and M do not yield very different coefficients of variation ($\bar{x}$ C.V. = 14.5 vs. 18.4% for Yellowheads vs. Red-wings, respectively, as calculated from data in the Appendices). Other tests of variability on diversity of foods fed nestlings on the same marsh or on overall diet breadth of all three species for a number of marshes showed no differences between Red-wings and Yellowheads, even though Yellowheads were again expected to have lower variations.

The next chapter deals with the possible interactions between Red-wings, Yellowheads, and Brewer's blackbirds. Orians attempts to show that tarsus length can be used to predict foraging efficiency in cattails, ground, and tree habitats. He is foiled because his experiment (which had design problems) yielded higher feeding rates in cattails for Brewer's Blackbirds, which should do the poorest there because of their relatively long tarsi. Orians resorts to a simple model to show the expected result of morphological traits, but this does not add anything to resolve the problem of whether the species really do have varying foraging efficiencies. Body size is clearly an indicator of dominance in interference competition, and one can rank the species from dominant to subordinate as Yellowhead, Red-wing, and Brewer's. Clearly, certain aspects of the natural histories of these species have been molded by such interactions, such as habitat selection.

Chapter Seven is devoted to Argentine marsh-nesting blackbirds. Orians provides valuable information on the natural history of three species. He was unable to collect sufficient data to make specific comparisons with North American blackbirds, but in general he was able to show that the three Argentine species are less similar to each other than the Pacific Northwest species. Polygamy was not evident, and other features, such as helpers at the nest, are probably related to the very low production of aquatic insects in Argentine marshes.

Orians concludes with a brief treatment of birds in marshes of the world in Chapter Eight. He finds no evidence of an increase in species richness in marshes affording more varied feeding opportunities, but this could be due to a paucity of data. Polygamy seems to be primarily a passerine phenomenon and is rare in nonpasserines.

Finally, Orians raises the question of what impact Pacific Northwest blackbirds have on their odonate prey. He attempts some simple calculations using emergence data and feeding rates to examine total predation, and finds that the birds eat more prey than available. This obviously does not occur and is probably the result of imprecise data. Orians argues that the most likely effect of blackbirds on their prey is not population regulation anyway, but selection pressure on phenotypic traits such as emergence patterns.

In general, I found this book to be stimulating. It is well-organized and Orians' writing is clear and interesting. Anyone interested in marsh-nesting birds will find the book invaluable, as will those interested in foraging and social ecology. Its shortcomings are primarily ones of approach, in that a large number of tests of various theories yielded inconclusive results because the data base was inappropriate to the test. Orians is well aware of this and in most cases points this out in association with a test. In general, the geographic patterns and those dealing with between-marsh features are best treated by Orians'

extensive data collection approach. Unfortunately, most of the foraging and social theories examined are better treated with intensive data collection, which was apparently beyond the time and energy that Orians could devote to the study of marsh-nesting blackbirds.—D. L. BEAVER.

Revision of the *Myiarchus* flycatchers of South America.—Wesley E. Lanyon. 1978. Bulletin American Museum of Natural History, vol. 161: 427–628. 89 figures, including 19 maps and 46 habitat photographs, 48 tables. $12.70.—Within the Tyrannidae, several large genera have posed severe problems to taxonomists (and bird watchers) for decades. These genera (notably *Elaenia, Empidonax,* and *Myiarchus*) contain complexes of sibling forms so morphologically similar that positive species-level identification of museum specimens is usually difficult and occasionally impossible. With the publication of the revision reviewed here, we now have one fewer troublesome flycatcher genus. By completing this monolithic, 10-yr study of the 11 South American *Myiarchus* species, Lanyon culminates more than two decades of dedication to solving the species-limit problems in this genus of 22 species. His work is a textbook example of how modern field techniques can and should be combined with the classical, museum-based taxonomic approaches by which Zimmer, Hellmayr, Todd, and others faced difficult tyrannid genera in the past.

As in his previous studies of Central American and West Indian *Myiarchus,* a central feature of Lanyon's present work is his detailed analysis of vocal characters in nearly all forms, including meticulous use of his "standardized playback experiment." This procedure, more thoroughly discussed below, documents presence or absence of behavioral responses by members of one population to vocalizations of its own versus other, congeneric populations as a means of establishing whether reproductive isolation exists between two related forms.

The results consist of three separate keys to 11 South American species, followed by species accounts in which the vocal repertoire, biology, and systematics of each subspecies are examined in detail. Two of the dichotomous keys are based solely on voice. One uses typical vocal responses to intruding conspecifics (or experimental playbacks), the other uses dawn songs of each form (excluding *apicalis*). Both keys are accompanied by sonograms. The latter key will be of more use to the general audience, but both are easily interpreted and followed. The morphological key is the first of its kind for the species in question, and is immensely valuable for identifying museum specimens to species. I tested the key, using three specimens each for 18 forms with identifications and localities concealed. One old specimen of *M. s. swainsoni* posed a problem (because of worn wings), and the color difference between specimens of *panamensis* and *ferox* (allopatric, sibling species) bordered on the imaginary. Otherwise, the key was easy to use and produced correct identifications.

In the main text, Lanyon summarizes for each species and subspecies all available information on breeding biology (including molt and gonadal data), habitat (including numerous photographs), distribution (including range maps with localities plotted), and systematic history. The author examined over 4,500 museum skins, including 325 that he collected after recording the voice. Lanyon describes his materials, techniques, itineraries, and data in such elaborate detail that the motivated reader can examine on his own all the evidence upon which the conclusions are based. Numerous quotations from field notes, mostly describing results of playback experiments, can be skipped without losing the author's logic. In many cases, these quotes offer valuable, though tangential, insights into the living bird. I was especially intrigued by the occasional reference to interspecific interactions, a subject otherwise ignored in this largely taxonomic report.

Lanyon includes a detailed outline of previous classifications of *Myiarchus,* and fully defends in the text each of his proposed changes. Compared to the most recent previous treatment, the Zimmer classification followed by Meyer de Schauensee (1966, Species of birds of South America, Narberth, Pennsylvania), Lanyon recognizes two additional species and synonymizes 10 clinal subspecies. He describes no new forms. Overall, it is a tribute to Zimmer's remarkable taxonomic insight that, after such thorough study by Lanyon, so few changes are proposed within this notoriously difficult group.

The most important taxonomic advance is Lanyon's long-awaited documentation that both *panamensis* and *venezuelensis* are distinct species, not races of *ferox* as previously treated. These facts could not have been established without detailed study of vocalizations throughout the ranges of the three forms. Indeed, as indicated by voice the affinities of *venezuelensis* actually lie elsewhere in the genus despite its morphological resemblance to *ferox*. The account of this discovery (pp. 495–496) is a lesson in the importance of wide field experience with the living bird in modern avian taxonomy at the generic and specific level.

Lanyon's use and advocacy of the playback experiment (pp. 437–439) warrant a brief examination in this review, now that all results are in on *Myiarchus*. In his procedure, territorial pairs of a test population

TABLE 1. Summary of playback experiments and results for *Myiarchus swainsoni*, as reported in text by Lanyon (pp. 498–534).

Subspecies or intergrade tested	Choice presented in playback experiment		
	M. s. swainsoni × dummy	*M. s. ferocior* × dummy	*M. s. swainsoni* × *M. s. ferocior*
swainsoni	S[a]	neg.	S
ferocior	neg.	F	F
swainsoni/ferocior	S	F	S, F
pelzelni	S	f	
phaeonotus	S	f	S, f
pelzelni/phaeonotus	S		

[a] Responses to choices: S = positive, strong toward *swainsoni*; F = positive, strong toward *ferocior*; f = positive, weak toward *ferocior*; neg. = no response to either vocalization. "dummy" = *Myiarchus* species not closely related to *M. swainsoni*.

are offered a standardized, dichotomous choice of "intruders," consisting of sound recordings from two *Myiarchus* populations, each emanating from separate loudspeakers 100 ft apart. A plastic, generalized *Myiarchus* model near each speaker "provides focal points for the responses of the territorial birds to the auditory stimuli emanating from the speakers below" (p. 438). Aggressive responses to the model, organized into a graded series of intensity, are recorded in field notes. In Lanyon's words, "Experiments with such playback are especially informative and critical in analyses of allopatric populations . . . when sound recordings are played back simultaneously to simulate a condition of 'sympatry' " (p. 437); and (p. 439), "Excerpts from notes taken during these playback experiments . . . provide experimental evidence in support of positions taken on the taxonomic relationships of pairs of species or subspecies."

The standardized playback procedure has several proven advantages, but if used without great care it also has the potential to produce falsely negative results. Its clearest value lies in its presentation of a *choice* of simulated intruders, thereby demonstrating presence or absence of a *discriminatory ability* with respect to vocalizations of allopatric populations. Thus, form A might regularly respond to the calls of allopatric form B, but *not* to those of C, D, or E as intensely and with the same behavior sequence as to recorded calls of its own population. Particularly when the choice does not include calls of A, a strong case is made that forms A and B are not potentially reproductively isolated on the basis of voice. The results of such a choice support conspecific treatment, even though actual capacity to interbreed might never be proven. Table 1 shows how Lanyon uses a series of such choices presented to various populations of *M. swainsoni,* a species whose four races have a complex taxonomic history and have all at some point been treated as distinct species. Unfortunately, such data are never presented in this condensed fashion by Lanyon. As a result, his logically correct experimental inferences regarding the conspecific status of the four forms must be painstakingly gleaned from 36 pages of complex text on this species, including fine-print notes on 35 playback experiments. Note that in a zone of intergradation, *ferocior* and *swainsoni* vocalizations drew equal, positive responses despite carefully documented negative responses by each race to calls of the other form away from this zone.

The primary dangers in this experimental technique are twofold: (1) If insufficient choices are presented to form A, a negative response to allopatric form B might be incorrectly taken as indicating reproductive isolation between two conspecific forms. This is especially likely if form A's own songs are frequently or exclusively included in the two choices, as A can always be expected to respond more actively to its own vocalization types. Lanyon circumvents this problem by repeating the same test several times, often with different wild pairs, and by testing A's discrimination between many choices that *do not* include its own form's vocalizations. (2) Lanyon plays a variety of calls for which he lacks detailed contextual knowledge regarding information content. Furthermore, the social status of the wild birds being tested is rarely known in detail. It is possible, therefore, that test subjects could shy away from one speaker if its information content, and their current social condition, combine to make this the appropriate response (W. J. Smith, pers. comm.). However, Lanyon typically visited populations during their breeding seasons, and his playbacks contained typical territorial songs and calls of the various forms. These precautions probably minimize the likelihood of such false negatives, particularly where simple species-limit questions are involved.

Zimmer's species-level classification is verified in most cases, which raises the question of whether or not Lanyon's elaborate field experiments were really necessary. In my opinion, they were, at least for the most part. Lanyon not only circumvents the educated guesswork of previous systematists in a number

of difficult cases, but he also provides a storehouse of biologically and biogeographically important information. We can use his range maps and nomenclature with complete faith, because he himself visited key localities, documented interbreeding and/or intergradation between related forms (or lack thereof), and established the vocal characters by which each form can be unequivocally identified.

A few examples will illustrate the depth of Lanyon's contribution to South American biogeography: (1) A long-standing problem is solved regarding the taxonomic status of the southern highland race of *M. tuberculifer,* with documentation of morphologic and vocal clines over the species' range. This complex story ends with Lanyon's demonstration that the species forms a nearly complete ring through northern South America, "with reproductive isolation nearly but not quite complete at the southern end of this 'open ring'" (p. 449). (2) A narrow band of intergradation is shown between *M. s. swainsoni* and *M. s. ferocior* in central Paraguay, where individuals respond to, and even deliver, two distinct vocalizations that are subspecies-specific away from the hybrid zone. (3) Lanyon's demonstration of the migration routes followed by different races of *swainsoni* is the first complete picture available for any of the numerous highly migratory passerine species within South America. (4) The generic affinities of the Galapagos Island form, *Myiarchus* (formerly *Eribates*) *magnirostris,* are now positively established, as is its most likely mainland ancestor, *M. tyrannulus.*

The most disappointing feature of the revision is that Lanyon chose to postpone, with rare exceptions, any discussion of higher order relationships within the genus. His linear sequence is generated on the basis of vocal characteristics that, he points out, are more or less in line with several basic plumage dichotomies in the genus. However, as one so familiar with each species and its range of variation, Lanyon could have ended with a brief summary of the probable species-groupings. This would be especially interesting with regard to the origins of the locally endemic species *apicalis, phaeocephalus,* and *semirufus.* As it is, the reader is left to draw his own conclusions from the abundant data provided. Alternatively, and at the author's own suggestion (p. 432), we can wait for the sequel to the present treatise, in which Lanyon will deal with a series of genera apparently related to *Myiarchus,* but which have proven even *more* enigmatic. I wish him good luck, and good speed.—JOHN W. FITZPATRICK.

A field guide to the seabirds of Britain and the world.—Gerald Tuck and Hermann Heinzel. 1978. London, William Collins Sons & Co. Ltd. 48 color plates, many figures, 287 range maps plus 24 maps of seabird distribution in Great Britain. £5.25.—This book is the descendent of W. B. Alexander's (1928) "Birds of the Ocean," which by virtue of being the only book of its kind attained the status of a classic despite its many shortcomings. Recent renewed interest in seabirds has resulted in the publication of several field guides, including the Preliminary Smithsonian Identification Manuals, Harper and Kinsky's "Southern Albatrosses and Petrels," and Watson's "Birds of the Antarctic and Sub-Antarctic." All of those are of limited scope, either geographically or taxonomically. The book of Tuck and Heinzel is the first since Alexander to attempt a broad-scale approach. It includes a general introduction to seabirds (pelagics as well as gulls, terns, skimmers, cormorants, and sheathbills) and their biology, brief species accounts typical of most current field guides, 48 color plates illustrating nearly all species, and a section entitled "Seabirds of the British Isles." The latter is basically a detailed account of the status and distribution (with maps) of the breeding seabirds, and repeats information that has been published elsewhere in a more detailed fashion.

I recently had the opportunity to use the book daily on a cruise in the ornithologically rich waters along the west coast of South America between Punta Arenas, Chile and Callao, Peru. The experience was not entirely satisfactory, for the book has many serious flaws. There are errors of omission: The dark-rumped race of Leach's Petrel on the west coast of Mexico, the Yellow-footed Gull of the Gulf of California, and Olrog's Gull, recently described by Devillers (1977, Le Gerfaut 67: 22–43) are not mentioned. There are errors of commission: most notably the range maps, reproduced as world maps, 10 on one 5 × 8″ page, are so reduced that in some cases they are not even approximately correct. Examples: The breeding and winter ranges of Thayer's Gull are shown as identical, and there is no indication that this species winters commonly on the west coast of the United States; the South Polar Skua is not shown to occur anywhere except the periphery of the Antarctic continent; the winter range of the Marbled Murrelet is shown as extending south to the Tropic of Cancer, whereas it barely reaches central California; the Peruvian Diving-Petrel, which breeds in Peru and Chile to about 37°S, is not shown to occur in Peru at all, but only in Chile, from about 37°S to Cape Horn; most interestingly, the breeding range of Hornby's Petrel, whose nest has *never* been found, is mapped!

Even ranges given in the text are often erroneous. Examples: The Guadalupe Storm-Petrel "may breed on Guadaloupe (sic) Island" (it never bred anyplace else); the Least Storm-Petrel is said to breed on San

Benito Island, which is correct, but the major breeding areas are in the Gulf of California; the breeding grounds of Xantus' Murrelet are not, as implied, restricted to Los Coronados and Santa Barbara Island (see Jehl and Bond 1975, Trans. San Diego Soc. Nat. Hist. 18: 2–24).

The book also includes some statements that can be described most kindly as "interesting": viz., filoplumes have a thermoregulatory function, and petrels use stomach oil to maintain their plumage.

The species accounts are of varied competence but are in general too brief. Accordingly, important field characters, behavior, immature plumages, geographic variation, etc. are treated cursorily, and one gets the impression that the author has had little if any experience with many species. Chilean (*Pelecanus thagus*) and Brown (*P. occidentalis*) pelicans are said to be indistinguishable, despite important differences in plumage and behavior. The old saw about immature jaegers being indistinguishable (they *are,* if you follow this guide) is repeated once more. The description of the Andean Gull, "like a . . . Laughing Gull, the wings showing a distinct white leading edge," is confusing since that character is not shown by the Laughing Gull at any stage. By relying on the text alone, I was unable to identify immature Arctic Terns or even the immature plumage of the Blue-footed Booby, which has a conspicuous white dorsal patch. The authors' penchant for inventing new common names (Magellan Cormorant for Rock Cormorant; Magellan Gull for Scoresby's or Dolphin) is annoying.

The color plates are the highlight of the book. I found them to be generally useful, although not all plumages of some species are illustrated. They are attractive and generally accurate, although in my copy the Rhinoceros Auklet shows *blue* head plumes and underparts. Some of the illustrations, including text figures, obviously derive from works of earlier artists.

The bad points of the guide could have been precluded had the publishers taken the trouble to submit the manuscript for a critical pre-publication review to any of a dozen or so seabird specialists. Evidently the market is sufficiently lucrative that such checks are no longer considered important.

In summary, the use of this book as a field guide, or even as a quick reference, is seriously compromised by its many inaccuracies. It is, however, very useful as an introduction to the birds of the oceans. Where else can you find color plates of virtually every species—and at a reasonable cost? If you need a field guide you would be better off with one of the many regional guides that are available. (Whether anyone except David Ainley or a professional sailor might actually *need* a field guide to the entire world is debatable.)

The potential in this book is great. The maps should be redone with attention to detail, on a larger scale, and checked to conform to the text. The text should be amplified to include more information on field characters, immature plumages, and general biology. These changes could be accomplished in a book of approximately the same size—if the entirely unnecessary section on British seabirds were discarded.

A well-revised (not second) edition of this book will be an essential component of every ornithological library. I hope that the authors and publisher will make the effort.—J. R. JEHL, JR.

The birds of Zanzibar and Pemba. An annotated check-list.—R. H. W. Pakenham. 1979. B.O.U. Check-list No. 2. London, British Ornithologists' Union. 134 pp., 3 maps, 10 tables, 5 appendices. Available from B.O.U. (% Zoological Society of London, Regent's Park, London NW1 4RY, England) at £4.00 prepaid, including surface post (note: air mail requires an additional £1.60, and U.S. dollar payments should be made at the current exchange rate, to include an additional £1.00 for bank charges in the conversion).—"Zanzibar" conjures up all the mystique of Africa and the Orient—indeed surprisingly few people know its location! Zanzibar is 1,650 km^2 and Pemba, 1,014 km^2; they lie 40 km off East Africa at 5° to 6°S. Lat., and, although now part of Tanzania, they have had a long history of Arabic and Portuguese influence. Both are mainland "isolates," derived probably in the Pleistocene and certainly since the Pliocene. Some 200 avian species have been recorded on the islands, and the avifauna largely shows mainland affinities with curious gaps. Peculiarly, the more northern Pemba shows a greater Malagasy influence than does Zanzibar, which is nearer to Madagascar. A major problem involves taxonomy, for "Zanzibar," formerly the Sultanate of Zanzibar, varyingly included large parts of coastal East Africa over the centuries, and "Zanzibar" is a frequent type locality for many described taxa, uncertainly referring to either the island *or* the mainland. Because ornithological investigation on the island has been sporadic, some species not known to have occurred on Zanzibar Island except for the original descriptions ascribing them to "Zanzibar" conceivably could have inhabited the island, but have become extinct; others are extremely unlikely ever to have occupied the island.

The author spent some 25 yr in Zanzibar as a British civil servant, and published a number of accounts of Zanzibar birds. The present report was prepared after his retirement with considerable help by various

British ornithologists, geologists, and others. The resulting product is excellent, with informative, detailed historical, physical, topographical, and climatic sections and tables preceding its avifaunal portions. Breeding seasonality and a calendar of breeding for each species, dietary information, a distributional comparison of Pemba birds with those of Zanzibar, and treatment of migrational status of birds with several charts precede the systematic accounts, which cover the major portion (over 50 pages) of the report. There is an extensive list of references and good maps, and appendices treat rejected and omitted species, comparisons of forest occurrences of certain species on both islands, a list of types ascribed to "Zanzibar" and to Pemba, a list of endemics, and a succinct list of the 209 species accepted for the two islands.

The systematic list covers the species in brief (three lines for some common migrants) to an occasional long (up to one page, *Egretta garzetta*) account; most accounts are seven to 15 lines. The nomenclature generally follows White's various African check-lists, and English names usually are from Mackworth-Praed and Grant's "Birds of Eastern and North Eastern Africa," to the appropriate page of which a helpful reference is provided under each name. The island occurrences and status of each species are shown by symbols. The text cites records of occurrence and breeding, as appropriate, often going into considerable detail as to breeding (incubation periods and fledging periods in some species), local distribution, changes in occurrence historically, and questionable records. The author is duly conservative about uncertain records, giving details and expressing caution. Behavioral information and ecological data are stressed in relation to distribution and facets of breeding, with only occasional other details. There are some comparisons of closely related species (e.g. *Pogoniulus simplex* and *P. bilineatus*—it is puzzling that only these two related, sympatric barbets occur on Zanzibar; rather, one might expect one of them and some other among the diverse East African barbets to occur on that island).

Errors are few; there is some "slippage" in the terminal list of species: thus on p. 125 the Phoeniculidae and its species number 132 should precede the Bucerotidae and species 133, and thus the citing of *Lybius melanopterus* in the omitted species appendix on p. 115 as following species 133 becomes correct. Also, on p. 115 one is referred to the systematic list following number 163 for *Bradypterus brachypterus* (=*B. baboecala*), but the latter appears after number 167 both in the systematic list and in the species list at the end of the report.

This report generally is well executed and informative, and is an important contribution to East African ornithology.—L. L. SHORT AND J. F. M. HORNE.

The development of behavior: comparative and evolutionary aspects.—Gordon M. Burghardt and Marc Bekoff (Eds.). 1978. New York, Garland STPM Press. xiii + 429 pp. $37.50.—The ornithological studies of Whitman, Lorenz, Tinbergen, and Lehrman dominated research in behavioral ontogeny throughout this century's first 50 yr. More recently, ontogenetic studies have diversified to encompass many phyla and classes. Nonetheless the four ornithological chapters of this symposium volume address important ontogenetic questions; each will be discussed separately.

A neuroethological approach to the study of the ontogeny of coordinated behavior.—Anne Bekoff.—Bekoff probes the neural circuitry that underlies the ontogeny of complex, coordinated behavior, an ontogenetic level rarely considered by either ornithologists or ethologists. Furthermore, she is sensitive to ethological issues unrecognized by neurophysiologists. Hence, her contribution is unique. It is also outstanding. She demonstrates the progressive development of neuro-muscular coordination within the joint, the somewhat later coordination between joints along the same limb, and the still later development of coordination among limbs. These results convincingly support the conclusion that elements of coordinated behavior develop much earlier than the coordinated behavior itself. Bekoff also suggests the possibility, based on behavioral observation and EMG recordings, that the same neural circuit may govern more than one pattern of behavior (e.g. hatching and walking). These considerations lead to the important conclusion that behavior that seems to appear *de novo* is based, in fact, upon an underlying neural circuitry that develops gradually. Experience (ontogeny) and genes (phylogeny) interact throughout ontogeny to produce a coordinated behavioral act.

A field study of the development of behavior in Adelie Penguins: univariate and numerical taxonomic approaches.—Marc Bekoff.—Shakes and stretches are the first maintenance action patterns to appear, followed by preening of major body surfaces (e.g. breast), and lastly patterns associated with oiling. The appearance of behavioral acts parallels morphological development (e.g. emergence of feathers, development of the uropygial gland) and postural changes. Throughout the ontogeny of nonoiling maintenance, the duration of individual action patterns decreases whereas the length of maintenance sequences increases. However, transitional probabilities between action patterns remain similar across all age groups

with no increase in stereotypy. Bekoff states that patterns are randomly sequenced. However, patterns are not equiprobable and there is no information on dyadic transitions. Can any pattern follow any other pattern or are there limitations? Kinematic graphs would resolve this point.

Among oiling chicks and adults, removing oil from the uropygial gland and transferring it to the wing occurred early in the sequence of maintenance behavior, but otherwise the action patterns were randomly sequenced as with nonoiling maintenance. Oiling chicks appears to use shoulder preening as a pivot point from which to cross from one side of the body to the other. Such predictability occurred in no other age group, whether oiling or nonoiling.

Principal components analysis and discriminant function analysis were used to demonstrate the increase in sequence length and decrease in duration of individual patterns. The statistical procedures, however, are difficult to follow, factors II and III of the principal components analysis cannot be identified, and the age-related shift in duration of patterns and sequence length is clearly evident in Table 2. Furthermore, I am uneasy about an analysis that lumps frequency of occurrence of several action patterns, mean duration of those same patterns for each age class, mean number of patterns per min per age class, and frequency of transitions from side to side. The data are too interdependent. Perhaps the analyses helped by indicating which trends were most important. Perhaps.

Despite my reservations, Bekoff has focused on a tremendously important and difficult problem. I hope that his chapter will be widely read and will stimulate research into the questions he raises.

Laboratory investigations of imprinting.—Howard S. Hoffman.—Hoffman departs from the book's established style of research reporting to write a position statement. Imprinting is not unique, it is an example of classical conditioning. Hoffman points out that visual motion is innately reinforcing to precocial chicks and that the nervous systems of many animals include highly refined detector mechanisms responsive to motion. Hence the mother's motion elicits an unconditioned response in the hatchling, which then becomes conditioned to details of the mother that formerly elicited no response. Hoffman's argument is thoughtful and persuasive. Hess, in his commentary, agrees with Hoffman's view of imprinting, but suggests that more must be known about imprinting under natural conditions.

Aspects of learning in the ontogeny of bird song: where, from whom, when, how many, which, and how accurately?—Donald E. Kroodsma.—Kroodsma fashions a superb chapter that combines a synthesis of previous work with reporting of original research. He opens with general conclusions. Juveniles must be exposed to the songs of adults if species-typical song is to be learned. However, the adult model varies. Among Long-billed Marsh Wrens (*Cistothorus palustris*) juveniles are capable of learning from the father, but they are more likely to match the songs of their territorial neighbors, thereby modifying whatever has been learned from the father. Juvenile Zebra Finches (*Poephila guttata*) learn song preferentially from the father. Consideration of when song is learned leads to a second generalization, that most species have a sensitive period during which song is learned. Is that sensitive period hormonally controlled? Are different characteristics learned at different times within the sensitive period? These and other questions are unresolved and scantily studied.

In turning his attention to repertoire size, Kroodsma also focuses on his own work with wrens. Large repertoires and variable patterns of repetition are characteristic of Long-billed Marsh Wrens, Short-billed Marsh Wrens (*Cistothorus platensis*), and Rock Wrens (*Salpinctes obsoletus*), which unlike other wrens occur in high densities in communities with low avifaunal diversity. Two of the three are highly polygynous, implicating epigamic selection in the development of repertoire size and variability. Kroodsma progresses from analysis to speculation: could skill in song matching, repertoire size, and loudness of delivery betray vigor of potential mates or rivals? What of dialects? The interaction between repertoire size and the number of dialects is poorly studied.

In a final comparison of *Cistothorus* wrens, Kroodsma points out that Short-billed Marsh Wrens have a stereotyped species-common introduction to the song. Nonetheless experiments with hand-reared wrens, all of whom learned the same atypical introduction, show that the introduction is not innate, but learned. Stereotypy is not evidence of innate behavioral control, an important point made by Kroodsma, but often missed.

In their introduction, Burghardt and Bekoff state that "while it is universally agreed that all behavior, just as all structure, has a developmental (ontogenetic) history, so do developmental processes have an evolutionary history." The mosaic interaction of evolution and individual experience is the common theme that recurs throughout the book, whether evident in the interaction of nerve impulses and interjoint coordination in chicks or evolutionary selection of the optimal period for auditory learning in wrens. The editors are to be congratulated on an unusually coherent and exciting symposium volume, and Garland STPM Press on a readable volume that contains few mistakes. I encourage ornithologists to read

even the nonornithological chapters, where they will discover much to think about.—EDWARD H. BURTT, JR.

Nomina Anatomica Avium.—J. J. Baumel, A. S. King, A. M. Lucas, Y. E. Breazile, and H. E. Evans (Eds.). 1979. London, Academic Press. xxv + 637 pp., 145 figs. $64.50.—This "Annotated Anatomical Dictionary" has been available since the beginning of this year and is the fruit of the combined effort by the editors and 84 other anatomists for several years. As stated in the introduction, this book is intended to improve the communication among avian scientists and to advance anatomical knowledge of birds by introducing a standardized Latin nomenclature for the anatomical structures of the entire avian body. A lengthy "General Introduction" summarizes the historical background of avian anatomy and of standardized nomenclature in human and veterinary anatomy and explains the objectives and the methodological approach used for the compilation of the "Nomina Anatomica Avium" (NAA). The main portion of the book, the actual "anatomical dictionary" is organized into several chapters, each of them dealing with a definite organ system, e.g. external morphology, skeleton, ligaments and articulations, digestive system, etc. Each chapter has been compiled by a particular editor after having consulted various anatomists specialized in a certain organ system. Following a brief introduction in which major sources of references and the guiding principles for the choice of anatomical terms for the particular system are stated, the Latin names of anatomical structures are organized into a hierarchical list, i.e. a particular organ of the entire system heads the list of the various parts of that organ and, if present, the different structures and substructures are listed directly under the organ parts to which they belong. For about one-third of the anatomical terms, annotations or references to figures are given. The numbered annotations are concentrated at the end of the list of terms of each chapter and contain mainly some few references to selected synonymies and, depending on the chapter, some rare clarifying descriptions or references to the original description of the annotated structure. Each chapter is concluded by a collection of figures of which about one-third represent original drawings. Most of the figures are very well made, some are excellent (e.g. sensory organs), and some others are more like rough sketches (e.g. central nervous system). Although there are some cross-references between the chapters, each chapter represents a separate entity, which shows, for instance, in the rather confusing fact that the numbering system for the annotations and figures starts with 1 for every chapter. The last 50 pages of the book contain a taxonomic list of the species mentioned in the annotations and figures, a 40-page-long bibliography, and an index of the anatomical terms. The book is well organized and has a pleasant print.

The painstaking work and the perseverance at a monumental task of all contributors to the NAA deserve admiration and recognition. A standardized anatomical nomenclature has the potential of enormously facilitating the literature search, international communication, and research in avian anatomy. If the NAA, at least in its first edition, does not succeed fully in providing the desired service, it might be less the responsibility of the editors than due to the special place of avian anatomy within the anatomical disciplines. Unlike the NA (Nomina Anatomica), the standardized nomenclature for human anatomy, and the NAV (Nomina Anatomica Veterinaria), the standardized nomenclature for the anatomy of domesticated mammals, NAA attempts to introduce a standardized anatomical nomenclature for a much larger, extremely diversified group of animals. Whereas the NA and NAV were introduced at a time when the anatomy of the human body and of domesticated mammals was well studied and known in its details, avian anatomy has not yet reached that state. The anatomy is better known in some few species (e.g. chicken, turkey, pigeon) than in the rest of the birds, and some systems are better known than others. Compounding the patchiness of knowledge in avian anatomy is the fact that only relatively few specialists are working in that area, whereas human and veterinary anatomy has been described, checked, rechecked, and completed by countless researchers and medical and veterinary students. And because avian anatomy is still an area of specialists, the danger that inaccurate or incomplete anatomical descriptions may be accepted as authoritative ones is greater than in human and veterinary anatomy.

One can also perceive a difference in objectives between the NA and NAV and the NAA, of which the editors of the NAA seem unaware. The authors of the NA and NAV were primarily interested in facilitating the communication, teaching, and learning of the anatomy of clearly defined species. The main goal of human and veterinary anatomy is to provide the basis for understanding the biology of certain species, namely the human and the domesticated mammals. In contrast, the demands on the NAA are much more complex, mainly because of the addition of the evolutionary aspect that pervades directly or indirectly every ornithological study. It is in not having recognized the comparative aspect of avian anatomy that I see one of the major defects of the NAA, a defect that reduces its usefulness as a tool for avian research considerably. The coining of names for structures in various species without first establishing whether they are homologous can lead to great confusion if nonhomologous structures are

given the same name. This problem is especially serious for structures of highly adaptive organs. For example, in the chapter on the digestive system the term "torus palatinus" (p. 268) is used for the "highly vascularized palatal cushion . . . of many Psittacidae" and for the "broad elevations on . . . the palate of many granivores" (p. 275). These two structures are not only not homologous but also totally different in structure, location, and function, their only common attribute being that they are elevations situated in the palatal region. I found several similar errors, especially in the chapter on the digestive system.

When looking through this book, one of my main interests was in the question, how useful a tool would it be for a student working directly or indirectly with avian anatomy? It is in this respect that I have to admit my strongest criticism, and I will try to make my point with some examples.

The NAA cannot be used as a primary source for identifying a certain structure, which in general would be done through comparison with a description of structures within a text or figures. As mentioned above, the annotations are only rarely detailed enough to allow such an identification, and the figures are mostly only incompletely labeled. Many organs and structures are not represented in figures at all. Because only a part of the standard terms is annotated, and because only a part of the annotations contains some selected references to the primary literature, the NAA cannot serve as a guide to original publications, either. The NAA does not even provide a clue whether a certain structure might be a new description for birds or not, because the list of anatomical terms is not complete; i.e. many structures are not mentioned at all although they have been described in the literature, such as various structures on the tongue or subdivisions of muscles. All this makes it a requirement to know the original literature before consulting the NAA.

But there are also problems connected with the use of NAA as a reference for the standard name of a structure that has been identified previously through consultation of the primary literature. In the majority of the cases, the structure in question will be in a species different from that mentioned in the annotations or in the figures, and thus the problem of proper homologization arises. This problem cannot be solved unless some meaningful data (i.e. detailed description of the structure bearing the standard name) are given to allow a decision about homology to be made. Even if we disregard this problem concerning homologization, the checking for the standard name of a synonym is quite difficult, mainly because the index lists only the standard names and those selected synonyms that have been included in the annotations.

I perceive also the presentation of a Latin nomenclature in such a form as the NAA as a problem. The editors seem to have been quite aware that in our time the vast majority of scientists have no knowledge of Latin at all. To make the use of NAA easier for anatomists without Latin background, the editors tried to choose Latin names that closely resemble the corresponding names in English or Romance languages—they replaced "complicated" words by simpler ones, and they reduced the variety of expressions. The result is not convincing. First of all, within the international scientific community there is a substantial number of students who use vernacular anatomical terms that do not resemble English ones at all. Secondly, it has been my experience with students that even Latin names that resemble English terms are not recognized without difficulty unless the student has had some previous experience with the conversion of Latin expressions into modern English. Therefore, the change of well-established terms (e.g. Cavum nasi) into terms that closely resemble English (e.g. Cavitas nasalis) does not make much sense. In my opinion, Cavitas (cavity) does not resemble English any more than Cavum (cave). Furthermore, Cavum has not the same meaning as Cavitas, and therefore these two terms should not be interchanged. Thirdly, because Latin is an inflected language, the listing of anatomical terms in the singular nominative case does not enable the student to make free use of the term. To make the NAA a really useful tool for students without classical education, a glossary of Latin roots and a brief introduction to Latin basic grammar would be very valuable additions.

Although nobody can expect a first edition of such a monumental work to be perfect, I would like to conclude my general observations on the book with some selected criticisms of a more detailed nature, without wanting to argue about the merits and disadvantages of specific name choices for certain anatomical structures. For example, the general terms used to designate the different sides of the avian body are rather confusing. Why is the anterior side of the proximal part of the leg called "Facies cranialis" whereas the anterior side of the distal part is called "Facies dorsalis," instead of simply calling that side of the entire leg "Facies anterior"? And why is the medial side of the wing called "Facies ventralis," a term that makes sense only for the rather unnatural position of horizontally stretched out wings? In the chapter "Osteologia," the various skeletal elements of the skull are listed, but neither the text nor the figures clearly indicates their exact location and extent. This information, however, would be of great importance for allowing a uniform nomenclature for the avian skull. In contrast to the scant information on the skull, the chapter "Arthrologia" presents us with 70 names for the various sutures and synchon-

droses that are supposedly found in the skull. These terms are, to say the least, of questionable value for the description of the skull, as the adult avian skull simply does not show the sutures between the embryonically distinct skull elements. I wonder how many scientists will feel the need of using names such as "Synchondrosis alaparaspheno-rostroparasphenoidalis" and "Synchondrosis basiparaspheno-rostroparasphenoidalis." The chapter "Myologia" makes it really difficult to identify clearly the muscles, since no mention is made about their insertions and origins and since subdivisions of muscles are only occasionally mentioned. Those muscle subdivisions have sometimes been attributed to different muscles by different authors, a fact that would make a careful review of homologies necessary. A good system to clarify the ambiguities appears in Table 1, Musculi tracheales (p. 207), in which the standard terms, insertions and origins, and selected references are well and clearly organized. Unfortunately, it is the only table in that chapter. In the chapter "Systema digestiorum," the distinction between Ileum and Jejunum is still perpetuated, although it has been known for a long time that such a distinction cannot be made in birds. These few examples may illustrate why many anatomists might decide not to follow the recommendations of the NAA despite their conviction that a standardized nomenclature could help to advance and accelerate research in avian anatomy.

As I have mentioned briefly at the beginning of my review, the NAA has been produced at a premature moment. We still do not know enough about avian anatomy, about its variations, and about many details. Most of the data have not yet been evaluated for their general validity, and relatively few have been validated by independent parallel research. What is really needed at this point is a comprehensive anatomical "Handbuch" of the type of the "Avian Anatomy" of A. M. Lucas and P. R. Stettenheim (1972), of which unfortunately only the parts on the integument have been published. Such authoritative works genuinely advance the anatomical knowledge in avian anatomy, not only by reviewing and synthesizing existing data but also by filling the gaps left by specialized studies with detailed original data. Such works are also likely to introduce a standardized anatomical nomenclature "through the back door," namely by quickly becoming *the* reference for any scientist working in that particular field. One can only hope that the volumes on the "Integument" will be followed by further volumes on avian anatomy in the future.—DOMINIQUE G. HOMBERGER.

Research is a passion with me.—Margaret Morse Nice. 1979. Toronto Consolidated Amethyst Communications. 322 pp. $12.95 (hard cover) $9.95 (paper).—Margaret Nice (1883–1974) was born the daughter of a history professor at Amherst College, who, while loving and kind, was overprotective of his daughters and disapproved of their preparing for any professions. In this informative volume, her autobiography, Nice tells us that she began her interest in birds as a small child, started keeping field notes at age eight, and was first inspired by Mabel Osgood Wright's *Birdcraft,* a Christmas present given her when she was 12. She graduated from Mount Holyoke in 1905, having made no definite plans for a career, though she had received an excellent grounding in zoology and botany. She reports that Frank M. Chapman's *Handbook,* which she used for the bird study part of a zoology course "did not arouse my enthusiasm."

In the fall of 1907, Nice began graduate work in biology at Clark University in the face of strong family opposition. Her intention was to secure her Ph.D. with a dissertation on "The Food of the Bobwhite," but she married a physiology instructor instead. She subsequently earned her Master's with a study of children's vocabulary in relation to their environment, and, studying the speech development of her own and other's children, continued publishing in this field for 13 yr.

After several years at Harvard, where her husband taught physiology, Nice and her family moved to Norman, Oklahoma, where Blaine Nice held a professorship in physiology from 1913 until 1927. There then followed 9 yr at Ohio State. He concluded his career at the Chicago Medical School.

Nice began her notable Song Sparrow studies in March of 1928 at her home in Columbus, Ohio. She writes that her work with these birds was made possible by "the banding technique which gave sure knowledge of the individual bird through season after season." Adults were banded on the left leg, nestlings on the right. Colored celluloid bands enabled her to identify particular individuals in the field.

She and her husband took their three eldest daughters (another had died and the youngest was left in Massachusetts with her mother) to Europe, so her husband could attend an international physiological congress and she could learn more of European birds and bird men. One stop was made at the Musée d'Histoire Naturelle in Paris, where she was amazed by the petty restrictions surrounding any detailed examination of specimens. It proved necessary to tip the guard in order to resolve this problem. "His enthusiasm over the sizable *pourboire* was so great that he offered to show me all Birds of the World." In Berlin, she was welcomed by Ernst Stresemann and the latter's former student, Ernst Mayr, who was

also visiting his old teacher. Following several other ornithological stops, the Nices attended the physiological congress in Italy and then spent some time in England. She attended the International Ornithological Congresses in Oxford in 1934 and in Rouen in 1938. The latter trip also made possible the study of nesting redstarts with Konrad Lorenz near Vienna and a brief visit to a waterbird refuge in Hungary.

Nice also travelled to various parts of the American West and Canada, and reports extensively on some of these trips and on her attendance at a variety of A.O.U. and Wilson Club meetings, at most of which she presented papers. She is of course best known for her book on the *Birds of Oklahoma* (1924), which was revised and expanded in 1931, and especially for her studies on Song Sparrows, *Studies in the life history of the Song Sparrow* (1937, 1943), and *The watcher at the nest* (1939). She continued her work intermittently in later years, publishing a monograph on the *Development of behavior in precocial birds* in 1962.

Nice writes of the efforts made by a number of American ornithologists to aid their European colleagues after World War II, of the great difficulties that many of them had experienced, and of the rewards that came in the way of new and renewed personal and professional friendships in succeeding years. The book concludes with an appreciation of Nice's work by Konrad Lorenz and with a discussion concerning the organization of the Margaret Nice Ornithological Club.

Nice's prose is very straightforward and unaffected. Her account of the problems encountered in the early 20th century by women wanting to engage in serious scientific work is instructive, and her impressions of her colleagues are a useful contribution to the development of ornithology down to the 1960's. Besides its incidental interest to ornithologists in general, the book contains many useful insights into Nice's ethological studies and other ornithological interests.—KEIR B. STERLING.

A field guide to western birds' nests in the United States west of the Mississippi River.—Hal H. Harrison. 1979. Boston, Houghton Mifflin Co. xxx + 279 pp. $11.95.—This book is the western counterpart of the author's *A field guide to birds' nests in the United States east of the Mississippi River* (1975, Houghton Mifflin Co.). It is intended to serve as an identification guide to the nests and eggs of 520 species of birds known to breed south of Canada, north of Mexico, and west of the Mississippi River.

The bulk of the text is devoted to 520 species accounts, which contain information on breeding range, nesting habitat, nests (size, composition, and location), eggs (average dimensions, color, shape, texture, and clutch size), incubation behavior, and number of broods. These data are presented concisely and are generally accurate and up-to-date. Within many accounts there is a commendable emphasis upon how to distinguish nests or eggs from those of other species with which they are apt to be confused.

This must certainly rank as one of the most readable field guides ever produced, primarily because of the author's inclusion throughout the book of various tidbits of knowledge drawn from his personal field experience. The beginning chapter, "About this Book," which introduces the amateur user to fundamental aspects of nests and eggs, as well as to the book, is a bit rambling, occasionally repetitive, and consistently interesting. It contains few errors of fact, but certain of the author's interpretations might be challenged, e.g. "The ultimate in nest-building evolution is the cupped nest . . . ." For many species accounts there is a "notes" section that the author has accurately labelled as a catchall. Here one can find information ranging from the essential (unlike the other two mergansers, red-breasteds never nest in tree cavities) to tangential (Spotted Owl Douglas Fir habitat in Oregon is worth at least $1,600,000 per 100 acres to timber interests).

The most outstanding feature of the book is the 256 color photos by the author and his associates of nests and eggs, or of nests with their owners. Harrison has long been regarded as one of America's best bird photographers, and if only for purely esthetic reasons this photo collection is a bargain at today's book prices. There are also 161 equally good black-and-white photos illustrating nests or habitats of selected species. Some of the latter demonstrate the obvious (e.g. Wrentit chaparral habitat in California), and could well have been omitted in favor of more useful material, such as a bibliography, which the book lacks.

Apparent errors of fact in the text are few and mostly minor in nature. A few perhaps worth mention are that White-tailed Hawks are not known to have nested in California, Black Hawk eggs are not usually "heavily marked" (as stated in the Zone-tailed Hawk account), Caspian Tern eggs are not very similar to Royal Tern eggs, Great Horned Owl eggs are larger than Great Gray Owl eggs, and Willow and Alder flycatcher eggs cannot be distinguished safely on the basis of ground color, at least judging from the large series in our collection. Some statements or illustrations are not typical of species throughout their ranges. For example, Pacific coast Great Horned Owls rarely if ever attack intruders at the

nest, unlike those in the East, and the Black-chinned Hummingbird nest shown in Plate 13 is very atypical of the undecorated brownish nests found in California and will be misleading to users of the book there. Most unfortunately, the author repeats uncritically some long discredited incubation periods from the early volumes of the Bent life history series, thus perpetuating inaccuracies that antedated Bendire into yet another generation of American ornithology (see Nice 1954, Condor 56: 173–197).

Despite its merits, I am doubtful that this book will succeed in its overall objective of serving as a field guide to identifying the nests and eggs of western birds. Because of overlap in the species covered by the black-and-white and color photos, only slightly more than half of the 520 species listed in the book are represented by nest illustrations, so one must rely entirely on the text for information on them. There is no starting point for the novice user who wishes to identify a nest before him. There is no key that will immediately limit the choices to the most likely species; thus the user is forced to pore through the species accounts and illustrations until a likely match is found. Furthermore, despite their photographic excellence, the nest illustrations just do not suffice very well for identification purposes. This is partly due to the understandable difficulty of adequately portraying highly varible objects with a single illustration. Also, because most of the photos are shot from above down into the nest to show the contents, there is a certain cup-like sameness to many of the illustrations. The exact manner of placement of some nests is obscured because the photographs were made at too close a range, or cropped too tightly (e.g. Black-crowned Night Heron, Rufous Hummingbird). A better but more costly approach might have been to show a view of each nest from above and from the side, as is done in black-and-white for the Ruby-throated Hummingbird.

Most of the eggs shown in the photographs are too small to be very useful for identification purposes except in a general sort of way. Furthermore, some of them are reproduced so poorly that the true colors are not apparent. This is especially true for certain blue eggs, including those of the Great Egret, Mexican Jay, Western Tanager, Lazuli Bunting, Blue Grosbeak, Dickcissel, Purple Finch, and Black-chinned Sparrow, although other delicate blues, such as those of the Wrentit and LeConte's Thrasher, are reproduced accurately. Several rare or recently arrived nesting species within the area of coverage, including the Hook-billed Kite, Semipalmated Plover, and Violet-crowned and Berylline hummingbirds, are listed without nest or egg descriptions, although such details might be particularly useful to users along the margins of the area of coverage.

It is inevitable that this book and its eastern counterpart will be confused with *Colin* Harrison's recently published *Field guide to the nests, eggs and nestlings of North American birds* (reviewed in Auk 96: 823–825, 1979), so comparisons are necessary. The latter has the advantage of covering all North American breeding species, not just those of the lower 48 U.S. states, and does so in a single volume. Because none of these books is likely to be taken in the field often, however, this disadvantage of Hal Harrison's book is mostly a financial one, at least for U.S. users. Both Harrisons relied heavily on the Bent life history series in compiling the nuclei of their respective species accounts. However, the Hal Harrison books were further strengthened by that author's own considerable field experience and his diligent efforts in consulting the post-Bent literature.

For text details on eggs, the books are very similar, although Hal Harrison perceives potential identification problems better and attempts to deal with them. His books offer the best compilations of nest photos available to North American bird students, whereas the Colin Harrison book contains good information on nestlings and their development, as well as excellent illustrations of the young of many species. Furthermore, the egg plates in the latter book are the best single source of this kind for North American birds, although they suffer from some errors and deficiencies in reproduction. In short, persons able to acquire only one of these books should probably purchase Colin Harrison's volume if they are primarily interested in eggs or nestlings. They should obtain one of Hal Harrison's books if they are more interested in finding or identifying nests, or in simply owning some nice photographs of them.

In his obligatory forward to Hal Harrison's western book, the 25th title in the household field guide series that bears his name, Roger Tory Peterson observed that much of the egg collecting of amateurs in the past contributed little to the science of ornithology. While this is certainly true, it should nevertheless be remembered that much of what we know about the nesting habits of North American birds is the direct result of the activities of the oldtime egg collectors. This is especially true of the monumental Bent life history series, which, regardless of its frequently anecdotal nature and other deficiencies, is still a primary source of information on North American birds, as indicated by the great reliance placed upon it by Colin and Hal Harrison. When egg collecting fell into disfavor in this country, lay naturalists turned to less exploitive methods of enjoying bird study, such as life listing, photography, and banding. While this has led to the present generation of amateurs that is remarkably sophisticated in its knowledge of the distribution of North American birds, it is doubtful that many of our best birders or even contem-

porary professional ornithologists know as much about the nesting habits of our common birds as the schoolboys of past eras.

It is to be hoped that the recent publication of the various Harrison guides to nests and eggs will stimulate a new era of interest in avian breeding biology, one that results not in trophies for private cabinets, but in substantial advances in our knowledge of birds.—LLOYD KIFF.

A soldier scientist in the American southwest: being a narrative of the travels of Elliott Coues, Assistant Surgeon, U.S.A., with his observations upon natural history.—Michael J. Brodhead. 1973. Tucson, The Arizona Historical Society (Historical Monograph No. 1). 74 pp. $4.75.—Surprisingly, no one has yet published a full-length biography of this many-faceted man who was not only a physician, ornithologist, mammalogist, and herpetologist, but also an editor, a productive author of keys, check-lists, bibliographies, and guides of various kinds and briefly, a theosophist. Such a study is badly needed, and fortunately the author of this readable paperback is coauthor of the first detailed assessment of Coues' career, which is due to be released before the end of this year.

In the meantime, Brodhead, a professor of history at the University of Nevada, has produced, perhaps as a preview, a short and readable account of Coues' first travels in the Southwest as an army physician in the 1860's. Brodhead's capably written narrative connects excerpts from Coues' correspondence, reports, articles, and monographs to produce an account of these adventures from the spring of 1864 to the fall of 1865. Coues was stationed for much of this period at Fort Whipple, Arizona Territory, but also spent some time in New Mexico and California. Most post surgeons in the West had few medical duties beyond patching up the victims of occasional skirmishes with the Indians. Many frittered away their off duty hours or got drunk; some were driven by boredom into early resignation, but others, like Coues, turned their attention to natural history.

Coues was an avid collector of birds, mammals, and reptiles, even at the risk of firing his rifle when his superiors wanted to avoid the attentions of local Indians. His enthusiasm for collecting was contagious, however, and Coues himself was generally popular with officers and enlisted men alike. He himself soon became aware that he was in danger of being collected by hostiles, confessing that "practical ornithology in Arizona was a very precarious matter, always liable to sudden interruption, and altogether too spicy for comfort."

Though his interests in natural history took precedence with Coues, he did a competent job of establishing and maintaining the medical facilities at Fort Whipple and made his services available to the citizens of nearby Prescott. Shortages of water, of suitable reference material, and of a competent assistant continually plagued him. Amusing moments occurred from time to time, however. Thirsty soldiers sometimes tapped his 5-gallon specimen containers of alcohol when other more suitable refreshments gave out. They were once temporarily cured of their propensities for pilfering when a keg was smashed, the contents were drained and pickled snakes, lizards, and other local fauna came into view.

Brodhead does an excellent job of introducing his readers to the trials and rewards of Western field ornithology in the mid-19th century. Coues was a facile and entertaining writer; few had his gift with words. Brodhead has chosen his excerpts well. There are fine color illustrations taken from contemporary publications in this well-designed and attractive book. If this little book is a good sample, the forthcoming biography by Brodhead and Paul Cutright promises to be a major contribution to the literature.—KEIR B. STERLING.

AAZPA manual of Federal wildlife regulations.—C. A. Hill, W. C. Warren, and E. E. Wolf. 1979. Amer. Assoc. Zool. Parks and Aquariums, Oglebay Park, Wheeling, West Virginia. 750 pp. (looseleaf in binder). $70.00 (+$2.00 postage); **Index to U.S. Federal wildlife regulations.**—T. J. Berger and J. D. Phillips. 1977. Assoc. of Syst. Collections, Lawrence, Kansas. Approx. 400 pp. (looseleaf in binder). $150.00.—The proliferation of laws and regulations associated with the taking, possession, and transportation of wildlife, both plants and animals, has increased in proportion with the destruction of habitat, commerical exploitation, and overall decline in population density of any species. Although necessary, these regulations have become the bane of any institution or individual who must deal with the collection, transportation (especially importation) and maintenance of live or dead specimens of birds (and any other species). The complexity of regulations makes it difficult to comply with all, and ignorance of the law is no excuse, as a number of individuals and institutions have learned through sad experience. These two manuals are designed to ease the task of persons who must deal with the maze of regulations and forms.

Each appears to be excellent, but the AAZPA manual appears to be more complete and to have a better built-in mechanism to provide the user with updated and correct information.

The AAZPA manual is organized to provide a list of species covered by federal regulations with a code to the pertinent laws and regulations. No reference is given for the authority followed for the classification or scientific names used. Notes are included for variation in nomenclature, taxonomy, etc. Following the list of species, the bulk of the manual (about 85%) is devoted to a statement of the regulations, arranged by federal departments, plus separate sections for transportation and enforcement; each section has a table of contents arranged in sections, but without pagination. The sections are not clearly labelled so that the user will have to do so with the use of dividers, tabs, or some other method. Each section includes a copy of the exact regulations, copies of the applications, and full instructions and explanations of the regulations and completion and filing of applications, reports, etc. The explanations and directions are well organized and clearly written. I have received two large supplements to the AAZPA manual, the first dated December 1979 and the second dated February 1980 (with some corrected sheets sent out in March 1980).

The Association of Systematic Collections' manual covers much of the same material, but does not provide lists of species covered by the regulations or the regulations themselves, except for a list of endangered species recognized by the U.S. Fish and Wildlife Service. The arrangement used in this manual is by taxonomic groups, giving instructions of what permits are needed to take, transport, or possess animals and plants. Examples of application forms are not given. The basic approach is that of a set of instructions to follow for each situation. In some ways this method may be clearer and easier to follow once the person knows what is to be done, but it does not provide background explanation.

Both the AAZPA and the ASC and the compilers working for each organization must be congratulated and thanked for a well-done task. They have provided working scientists and administrators with clear explanations and instructions to complex sets of regulations. I would strongly recommend that each and every institution that deals with live and dead specimens of animals and plants obtain copies of both manuals. The cost will be soon realized by saving of time, headache, and frustrations. If funds are available only for one, then the AAZPA is probably the better manual to purchase, as it appears to be more complete.

The AAZPA manual may be ordered from AAZPA, Executive Office at Olgebay Park, Wheeling, WV 26003. The ASC manual can be obtained from ASC Secretariat, Museum of Natural History, University of Kansas, Lawrence, Kansas 66045.—WALTER J. BOCK.

The complete birds of the World.—Michael Walters. 1980. London, and North Pomfret, Vermont, David and Charles. Newton Abbot, xii + 340 pp. $34.00.—This is another list of birds of the world. It gives the scientific name of the species, the author, the English name, geographic range, a brief statement of habitat, food, nest and clutch size, and length of time until fledging, all as far as possible. This information is given in a telegraphic style. Each family is introduced with a short paragraph. Brief taxonomic notes are given on the position of problem genera and on the specific status of forms.

The author states that the sequence of families follows that of Peter's "Check-list," but he follows many more recent revisions of families and genera as well, as far as can be ascertained, as his own taxonomic decisions. Authorities for particular arrangements are not always or clearly cited. Because this volume does not possess a generic index, it is not easy to find problem genera. *Pholidornis* is included in the Remizidae where I would not have looked, and the newly-described *Nephelornis oneilli* is placed at the end of the Parulidae, not in the Thraupidae, which may be more reasonable for this little-known genus.

Most puzzling is Walters' inclusion of a number of species that are known only from fossil or subfossil bones, and of a number of names for questionable forms, either specimens suspected to be hybrids or aberrant individuals or from contemporary (and often dubious) accounts. The value of including these subfossil forms and these dubious taxa is most questionable.

A check of a number of families shows that the list of species is highly accurate, with all recently described species included. The format with two columns and the species name in bold face is a clear, easily used system. It would have been useful to have a heading at the start of each order in the Table of Contents and in the text. The names of the first and last species on each page are given at the top of each page, which has only marginal usefulness. Much more useful would have been the family names of those included on that page.

Walters does not define the main purposes of this work or the group of ornithologists to which it is directed. The value of the summarized data on ecology and life history of each species is dubious; no way to use these data is apparent to me. The greatest disadvantage of this book compared to other recently published single-volume check-lists of birds of the world is its price, which is twice the price of the next most expensive check-list. To be sure, each of these check-lists have their unique features, but they are all basically similar in providing a list of the recent species of birds. Considering its cost, I cannot recommend Walters' book over others available unless one can use the summarized life history data.—WALTER J. BOCK.

ALSO RECEIVED

Songs of the seasons.—F. Montgomery Brigham. 1979. Ottawa, Quebec, The Ottawa Field-Naturalists' Club. 12 in., 33⅓ rpm long-play stereophonic phonodisc. Color photograph on front, informal descriptive notes on back. $9.22 (Canadian) plus shipping and handling.—This is a *superbly* taped and engineered recording featuring the songs, calls, and other sounds of 55 species of birds (plus two frogs and a cricket) largely characteristic of northeastern North America. There are four bands on each side, and the species are arranged under eight headings such as "winter in a coniferous forest," "marsh in June," and "open fields—summer." The bird species are mostly very common ones, such as the Evening Grosbeak, Least Flycatcher, Canada Warbler, and Killdeer, which have appeared on records many times. Kirtland's Warbler and Yellow Rail are more unusual. There are no scientific names given anywhere and only a few vague scientifically pertinent comments are on the jacket. Thus, interest here is mainly esthetic. It might have been technical as well but, alas, the producers tell us only that Nagra tape recorders were used, when I would guess the microphones, techniques, and the talent of the recordist were more important in achieving the exquisite end results. Speaking of which, stereophonic nature records are still pretty rare! I am not at all sure that this one was originally from stereo tapes or whether the stereo effect was synthesized in the studio . . . or both. Obviously some synthesis was done, since one species neatly segues to another without flaw. Mr. Brigham is an Ontario-based naturalist who writes a newspaper nature column and does CBC radio talks on bird songs. He's also recorded almost 400 North and South American bird species. (I surely hope he took locality and other associated data as he travelled and recorded from Alaska to Brazil. None are given on this record, not even so much as a "most recordings were made in Quebec.") There are no spoken words on the record, so to follow the species you need to pay close attention to the list on the jacket. Even then you might get confused with the intertwining of some bird voices. I did when a Swamp Sparrow began to sing and the notes said it just gave its call notes ("dzip"). The cover has a nice full-face color photo of a Long-eared Owl (which does not appear on the record). I don't think the record is worth the price.—J. W. HARDY.

Birds of Trinidad and Tobago.—Terry White. 1977. Cassette tape. Recorded and produced by the author. Hard plastic box, paper insert with frontispiece and list of species. Price $15.00!—This tape recording is an introduction to voices of 31 species of the Trinidad/Tobago avifauna, with announcements of the species on the tape. The playing time is less than 30 min. The recording is of variable quality, ranging from low to good, with a bit more background noise than one is accustomed to hearing on such publications. The bird voices themselves are not distorted, however, and are loud enough to permit the user to play them in the wild to attract birds for viewing. No scientific names are given, but the common names are the ones used in ffrench's standard field guide to the region. The price quoted by Flying Carpet Tours, Inc., P.O. Box Q, Kissimmee, Florida 32741, the only known seller in the U.S.A., is outrageous. I'd suggest that anyone interested write to the author at 6C, Rosebery Ave., Harpenden, Herts., U.K.—JOHN WILLIAM HARDY.

The crows. A study of the corvids of Europe.—Franklin Coombs. 1978. London, B. T. Batsford. 255 pp. $28.95. (available from Batsford, Box 578, N. Pomfret, Vermont 05053).—Franklin Coombs has been studying corvids in Cornwall as an amateur ornithologist since 1935, having several species nesting in his garden and keeping several in captivity. The purpose of this book is to provide a summary of the description, distribution, and biology of every species of European corvid based on information in the literature as well as his own work. Mr. Coombs succeeds excellently in his goal. A chapter is devoted to each species, with most space devoted to behavior, territory, breeding, food and predators, parasites, morbidity, and mortality. These accounts are excellent summaries, well written and illustrated with

black-and-white drawings illustrating the displays. A map accompanies the detailed description of the distribution of each species.

A short chapter is included on the Great Spotted Cuckoo, which is parasitic on various species of European corvid, especially the Magpie. A final short chapter is devoted to a historical note on the earlier study in 1847–48 by Lewis Harding on the Rook at Trelawne in Cornwall, which Coombs describes as the first intensive study of a single species of bird.

Coombs' "The crows" is an essential work for anyone interested in the Corvidae or in the behavior and reproductive biology of passerine birds. It contains a wealth of information and well-documented and clear citations to the literature, and provides an excellent foundation on which future researchers can build. It is fortunate that Mr. Coombs decided to undertake this task of summarizing the available knowledge on European corvids and thereby making his extensive experience available to all ornithologists. He is to be congratulated for a job well done.—W.J.B.

Handbook of the birds of India and Pakistan, together with those of Bangladesh, Nepal, Bhutan, and Sri Lanka. Volume 1, second edition.—Salim Ali and S. Dillon Ripley. 1978. Delhi, Oxford Univ. Press. lvii + 382 pp. $29.95.—This new edition of volume one of the Handbook of the birds of India and Pakistan appears 10 years after the publication of the first edition. There is not a preface to the new edition, so the extent of the changes is difficult to judge; moreover, no information is provided as to whether the entire 10-volume set will be redone. Information on the dust jacket informs us that several generic changes were made, that one color plate was redrawn, four black-and-white plates of hawks in flight were added, and numerous small changes in information about range, seasonal variation in weight, and migration were made. Of the latter, most were made on the same page, so the Consolidated Index in volume 10 can still be used.—W. J. B.

A bundle of feathers.—Sidney Dillon Ripley II. 1978. Delhi, Oxford University Press. x + 241 pp. $16.95.—This volume of papers presented to Salim Ali on the occasion of his 75th birthday in 1971 had been published previously in the Journal of the Bombay Natural History Society [Vol. 71 (3), December 1974, but actually published in 1976]. The foreword of this volume, dated April 1977, is most obscure on the fact that these papers were all published previously. Moreover, the publication date in the review copy is 1978, but in the information sent to me by the publisher the publication date is given as 1 November 1979. The only possible explanation is that the latter date is for "publication" in New York, but no indication of this exists in the volume.

Little need exists to review the individual contributions in this volume, as most were written almost 10 yr ago. Most interesting are the reminiscences about Salim Ali, which present an excellent picture of this remarkable ornithologist. I would like to offer a few comments about publication and publication dates. This work is a reprint of the original publication in the Journal of the Bombay Natural History Society, done by photo-offset or a similar process with the only change being that of pagination. Reprinting of important works is a valuable contribution to the literature, but it should be done with a clear statement that the work is reprinted, whether it has been reset, and the exact publication date and citation of the earlier work. The republication of this work with only an oblique reference to the earlier publication is poor policy. The practice of "publishing" the same volume several times on different continents by the same or different publishers adds to difficulties of citation and knowledge of whether the same or different papers are being cited. In this case, it may be best to cite the original publication.

"A bundle of feathers" is an interesting collection of papers that I can recommend for any ornithological library, but only if it does not have the Journal of the Bombay Natural History Society.—W.J.B.

My first summer in the Sierra.—John Muir. 1979. Boston, Houghton Mifflin. 272 pp. (paperback). $5.95; **Travels in Alaska.**—John Muir. 1979. Boston, Houghton Mifflin. 326 pp. (paperback). $5.95.—These paperbacks are reprints of books that were first published by Houghton Mifflin in 1915 and 1911, respectively. John Muir belongs to a small select group of naturalists who founded the conservation movement in the United States at the beginning of this century. These books provide an excellent picture of John Muir, the man, and his observations in the Sierras of California and in Alaska before they were changed by the hand of man. Each book is more delightful than the other, and both are recommended as must reading by anyone interested in natural history and in one of the major figures responsible for its conservation.—W.J.B.

Pheasant breeding and care.—Jean Delacour. 1978. 5th edition. Neptune, New Jersey, T.F.H. Publications. 192 pp., many black-and-white and color photographs. $9.95.—This is a rewritten and updated revision of Charles F. Denley's "Ornamental pheasants, their breeding and care," the 4th edition of which appeared over 20 yr ago. Fortunately, the publishers were able to get Jean Delacour to undertake this revision. Delacour added his great experience and knowledge about pheasants to that of Denley to produce what should be considered as a new book, not a revision. The only serious lack to this volume is a bibliography to other works on the care of pheasants. Anyone wishing to keep pheasants will want to have this book available.—W.J.B.

Watching birds.—Roger F. Pasquier. 1980. Boston, Houghton Mifflin. xiii + 301 pp. (paperback). $5.95.—This is a paperback reprint, not a revision, of the excellent introduction by Roger Pasquier to how to watch birds after the thrill of the list is gone. (See the review by Hickey, 1978, Auk 95: 432). Roger Pasquier's book is delightful reading and can be recommended to all amateur ornithologists, young and old, as a way to gain even more enjoyment from "watching birds."—W.J.B.

A bibliography of the birds of Rhodesia.—M. P. Stuart Irwin. 1978. Rhodesian Ornithological Society [P.O. Box 8382, Causeway, Salisbury, Zimbabwe (Rhodesia)]. 241 pp. Rhodesia $5.00, from the Secretary of the Society.—This comprehensive bibliography first treats literature sources, in 26 pages covering some 70 journals, and keys specific volumes and pages to numbers that then are used in the major section of species references. All species of Zimbabwe are listed. Citations, by key number, cover items appropriate to the species in Zimbabwe, but in addition major references treating behavior, ecology, and other biological aspects of the species are cited in full at the beginning of each species account. The major references so cited deal with the species generally, whether or not referring to Zimbabwe. The time covered is 1873 to 1977. This bibliography immediately assumes a major role as a source of references to all Zimbabwe species, and will be useful to all workers with African birds, though many will not have access to some of the minor journals cited.—LESTER L. SHORT.

Ecology of pelicans in the Rwenzorie National Park, Uganda.—N. A. Din. 1979. Privately published through Starling Press. 128 pp., 12 black-and-white plates, 23 tables, 43 figures. Paper. Canadian $15.95.—This volume summarizes the good, preliminary work on *Pelecanus onocrotalus* and *P. rufescens* conducted in Uganda by the author in 1968 and 1969, prior to his being expelled from that country. As such, this is an admirable attempt to provide data. Unfortunately, he repeats much information from earlier publications in Ibis (1974, 116: 28–43, 477–493) and E. Afr. Wildl. J. (1977, 15: 317–326), and chose to publish in this format, rather than condensing and editing the material into a useful, scientific style. I am sorry that this manuscript was not submitted to the more usual methods of publication and fear that the author was badly advised. This publication suffers primarily from lack of editing, although J. R. Callahan of the Department of General Biology, University of Arizona, Tucson, is credited as editor. Many unfounded assumptions are included, and poor or no reference is made to studies on other pelicans. The arrangement of the appendices at the ends of chapters makes their use difficult. Of many errors and typos, one correction needed is that the pelicans nesting at St. Lucia, Natal, South Africa are *P. rufescens,* not *onocrotalus,* as noted in the text. The content of this publication, while of some interest to those of us studying pelicans, does not warrant the price. Do pelicans still exist in Uganda?—RALPH W. SCHREIBER.

Snake River birds of prey special report.—M. N. Kochert (project leader). 1979. 142 pp., numerous maps, colored charts, graphs, tables. Bureau of Land Management, 230 Collins Rd., Boise, Idaho.—Considering both density and species diversity, the raptor fauna of the Snake River Birds of Prey Area in Idaho is considered the richest in the world. The Bureau of Land Management, using it as a demonstration area for its new-found interest in wildlife and ecology, has for several years carried out intensive studies (often contracted out to universities) of all aspects of the ecology and dynamics of the raptors, their mammalian competitors, and the prey base. The last named is threatened by increasing cultivation of the land bordering canyon; this is a documented recommendation to the Secretary of the Interior that agricultural expansion there be halted. It contains a great mass of information on the raptors, though more technical reports are scheduled for the future.—DEAN AMADON.

Annotated checklist of Maine birds.—Peter B. Vickery. 1978. Maine Audubon Society. 20 pp. (paperback). $1.95. (Maine Audubon Society, Gilsland Farm, Old Route 1, Falmouth, Maine 04105).—The status and seasonal occurrence of the 393 species of birds known in Maine are summarized in a convenient chart that includes habitat but not distribution in Maine.—W.J.B.

Virginia's birdlife, an annotated checklist.—Yu Lee R. Larner et al. 1979. Virginia Avifauna No. 2, Virginia Society of Ornithology. 117 pp. (paperback). $4.50. (VSO Treasurer, 520 Rainbow Forest Drive, Lynchburg, Virginia 24501).—This check-list was prepared by the check-list Committee of the Virginia Society of Ornithology as a revision of Murray's "A check-list on the distribution and status of 400 species of birds occurring in Virginia." The discussion is divided under three headings of Coastal Plain, Piedmont, and Mountains and Valleys, with a map showing the boundary lines between each area.—W.J.B.

OBITUARY

EDWARD ALLWORTHY ARMSTRONG was a remarkable man. He was born in Belfast, Northern Ireland, on 8 October 1900. A naturalist from childhood, he never outgrew the simplest aspects of what he termed a Christian delight in nature.

Edward's higher education began with 2 years of science, then he switched and got a B.A. in philosophy and psychology at Queen's University, Belfast; there followed 2 years' theological study at Cambridge University prior to ordination in the Anglican church. He later studied anthropology and, afterwards, Chinese for 2 years at Hong Kong University, culminating in an M.A. in comparative religions at Leeds. After traveling widely and serving at several churches in earlier life, he settled at the Parish Church of St. Mark, in Newnham, Cambridge, in 1943—salary: 400 pounds/annum; duties: the care of souls and of the parish property—even to supervising maintenance of the cemetery. He retired in 1966 to 23 Leys Road, Cambridge, where he died 19 December 1978.

He published several important works. *Birds of the Grey Wind* (1940) is a charming book about his boyhood in Ireland; there were three editions and it received the Burroughs Medal in the United States. *Bird Display and Behaviour* (1942) was written under the stress of wartime, issued revised in 1947, in French in 1952, and in the United States (Dover Publications) in 1965. *The Way Birds Live* (1943) went into a fourth revised edition (1967) in the United States (Dover). A book revealing great insight and scholarship, widely admired here and abroad, was *Shakespeare's Imagination* (1946), a study of word-clusters; it had two small printings in England, then (1963) in the United States and, further revised, in hardcover (Univ. of Nebraska Press 1979). *Bird Life* (1949) was a small tome for the novice. More directly related to the church are *The Gospel Parables* (1967) and *Saint Francis: Nature Mystic* (1973), both published in the Unted States.

Edward began intensive study of the Wren (*Troglodytes troglodytes*) in 1943 and, after his New Naturalist monograph appeared (Collins 1955), someone stated the obvious—that Cambridge had done much better by the Wren than had the "other place" [Oxford] by the Robin. Such are university rivalries! This was followed by another major opus, *The Folklore of Birds* (1959), reissued in 1970 in the United States (Dover). *A Study of Bird Song* (1963) was reissued a decade later, also by Dover.

Edward became a Corresponding Fellow of the A.O.U. in 1951 and received an honorary M. A. from Cambridge that year; he was Vice President of the B.O.U. from 1963 to 1965.

As circumstances allowed, he journeyed to various places to study the Wren or to attend some conference. Well along in the 1960s, he went to Africa and was thrilled at the sight of two million flamingos, but he was not in full vigor on his return. Apparently this marked the onset of Parkinsonism. Also, he had a coronary condition, not accurately diagnosed until 1968, and there were times when he blacked out. Gradually his health deteriorated and, under sedation, seldom could he concentrate for more than a few hours. Even so, under pressure from a publisher, in four months in 1974 he authored the text for *The Life and Lore of the Bird* (New York, Crown Publishers 1975). A small paperback, *Discovering Bird Song,* appeared that year in England. Despite his ailments, both he and Mrs. Armstrong also flew to Australia to visit their elder son and family.

In 1977, as senior author with H. K. L. Whitehouse, there appeared "Behavioural adaptations of the Wren" (Biol. Rev. 52: 235–294); it should be required reading for all would-be ornithologists. The next