Wilson Bull., 103(3), 1991, pp. 522–538

ORNITHOLOGICAL LITERATURE

PHYLOGENY AND CLASSIFICATION OF BIRDS: A STUDY IN MOLECULAR EVOLUTION. By Charles G. Sibley and Jon E. Alquist. Yale Univ. Press, New Haven, Connecticut. 1990: xxiii = 976 pp., 385 figs. $100.—The present and future of the science of phylogeny lies in molecular biology. Over the past 20 years, avian systematics has undergone a renaissance driven by the development of sophisticated technology that began with analyses of tissue and egg proteins and continues now with the newest technique—DNA hybridization.

DNA (deoxyribonucleic acid) is the molecular material which provides the blueprint for the synthesis of all protein and, therefore, is the genetic basis of most of the organisms on Earth. Each single strand of DNA consists of a series of nucleotides composed of three subunits—a sugar, a phosphate group, and a nitrogenous base. The sugar-phosphate groups comprise the backbone of each strand. Normal double-stranded DNA molecules consist of two single strands of DNA wound around each other in the familiar Watson-Crick double helix. In double-stranded DNA, each base of a nucleotide in a single strand is attached to a base in the other strand, forming a ladder-like structure in which the rungs are base pairs. There are four base species, but only certain bases will form base pairs. The base pairs contain the genetic code in groups of three (triplets) along single strands, and it is from this that the cellular machinery obtains templates for formation of protein. Complimentary single strands of DNA, therefore, bind to one another virtually perfectly. If double-stranded DNA is broken down to the single-strand form, it will reform spontaneously, and the single strands will be tightly held to one another as a result of the chemical bonds between the bases. DNA hybridization techniques are based on this principle.

In DNA hybridization studies, single-stranded DNA from two species are mixed and allowed to reform the double-stranded helix. Methods are then used that measure the strength with which the hybrid strands bind (melting temperature of the hybrid duplex molecule). Strands from similar species have many corresponding sections and bind strongly. Strands from dissimilar species bind weakly. The strength of binding is measured and used to construct appropriate phylogenies. This technique is especially important because it obtains measurements directly from the source of all genetic differences. This is, DNA-DNA comparisons provide insight into phylogeny because evolution produces changes in base sequences. There is reduction in the melting temperature of hybrid DNA molecules that is in proportion to the number of base sequence differences. The more differences (and lower temperature), the longer ago the two species shared common ancestry.

The present book is an unusual combination of elements. It is partly a textbook of molecular phylogeny and partly a report on one of the most exhaustive data sets I have seen. Sibley and Alquist devoted 11½ years to the continuous production of DNA-DNA hybrids in an effort to clarify the phylogeny of living birds. In the course of this work they produced 26,554 avian DNA hybrids representing approximately 2000 species of birds. The amount of work involved in obtaining and preparing samples alone appears staggering.

The authors begin the book with extensive sections on the history of DNA analysis, including the basic chemistry of genetic materials, structure of DNA, gene structure, and genetic regulation. They describe in detail DNA hybridization techniques, sequence of the genome, families of repeated DNA, comparative DNA studies and, finally, their materials, methods, and data analyses. They discuss their findings in light of molecular evolutionary "clocks," demographic factors, and the rate of DNA evolution. It is not until after 17 chapters (all of which are extremely rich sources of information on avian phylogeny and the analyses of DNA), that they arrive at the results of their extensive data set. The closing section is

one of the best, most understandable summaries of the importance of vicariance/dispersal that I have seen.

The book is exemplary in its thorough, detailed presentation of the results of these measurements. The authors present in 385 figures the graphic representation of their data sets and various cladistic diagrams of the relationships of different groups of birds. The huge number of figures is matched by the extensive reference section and comprehensive presentation of background materials for each taxonomic group. Historical background is presented in numerous instances and provides additional insight into the phylogeny and taxonomy of avian groups.

That this book is important goes without saying. However, it is also very well written and definitely is not boring. Non-avian biologists will benefit from its introductory sections. New students of avian phylogeny, evolution, and systematics should get their copies now. Older students will profit from it also; my ornithological lectures on the evolution and systematics of birds will benefit from my use of the book. The book offers little to the non-scientist, although some of the chapters may be useful to those with advanced interests in the relationships among major groups of birds.

The book is expensive, but it is long in quality and appears to be well worth the money. The typesetting and format are clear and pleasing. I detected no typographical errors, although there must be a few in such a long text. The book is nicely bound and has an attractive dust jacket. It should endure on the shelf very well, even though it will be used a great deal by many of us.

All-in-all, this is a monumental book which, in my opinion, qualifies as one of the major ornithological contributions of this generation.—CHARLES R. BLEM.

AFRICAN BIRDS OF PREY. By Peter and Beverly Pickford (photos) and Warwick Tarboton (text). Cornell Univ. Press, Ithaca, New York. 1990:227 pp., 170 color photos with captions, 81 range maps, 81 drawings and silhouettes, $45.00 (cloth).—While not a "coffee table" type book, nor one heavy on bird biology, Pickford and Tarboton have nonetheless made a good compromise between the two and thus a fine gift book. The text does give a good lightweight flavor of raptor biology for the selected species and a blend of science and photographic art. This is not really a book on birds of prey of the continent of Africa, as the title might suggest, but rather of those raptors in southern Africa south of the Kunene, Okavango, and Zambezi rivers. So, of the some 92 diurnal raptors and 29 nocturnal raptors of Africa, 69 diurnal and 12 nocturnal species are covered. Three, the Cape Vulture (*Gyps coprotheres*), Black Harrier (*Circus maurus*), and Jackal Buzzard (*Buteo rufofuscus*) are given as endemic to the region. (Some authors include the Jackal Buzzard as a race of a wide ranging form that includes what Tarboton calls the Augur Buzzard [*Buteo augur*] in this text.)

The layout is visually pleasant. For the most part there is a page of text accompanied by either a single or, more frequently 2–3, photos of each species. An extensive appendix has a single column of text per species and provides a brief summary of the name, size, identification, habits, distribution, status, breeding, food habits, and voice, followed by a distribution map and a ventral drawing of the falconiformes in flight or a perched silhouette for the strigiformes. There is also a list of further readings and a glossary.

The book is a joint product of a team of photographers and the text by a professional biologist. As such, it requires two assessments; the photos and the text. By comparison with the quality of photos available of African species or those in similar recent books (Hollands, D., Eagles, hawks and falcons of Australia, T. Nelson, Victoria, 1984; Newton, I. [consulting

ed]., Birds of Prey, Facts on File, Inc., New York, 1990), the book is disappointing. The quality of the photos or what they depict of the species varies enormously. In some cases, the immature plumage is shown, in others the adult plumage. The photos of the Bearded Vulture (*Gypaetus barbatus*), Black Harrier, Lizard Buzzard (*Kaupifalco monogrammicus*), Cape Vulture, and Barred Owlet (*Glaucidium capense*) are, for example, excellent illustrative photos that either depict the bird well or the species in its habitat. On the other hand, the Gray Kestrel (*Falco ardosiaceus*) and Bat Hawk (*Maceiramphus alcinus*) are so shaded or dark that one can not get a flavor for those species. Because of the position of one frontal pose and hidden legs of the Booted Eagle (*Hieraaetus pennatus*), it is hard to distinguish it from the North American Red-tailed Hawk (*Buteo jamaicensis*). The flight photos are, for the most part, pleasantly in focus. Overall, the photographic contribution to the book is only average.

The text is very good within the limits of its purpose. Warwick Tarboton is an extremely knowledgeable biologist with extensive experience with raptors. He provides some valuable insight to each species. There seems to be no consistent format for the text, which is all right. Rather, those portions of the species biology that the author deemed important are given. The text seems to be relatively error free. I did find what may have been an editorial error in calling the Peregrine Falcon *Peregrinus falco minor* rather than *Falco peregrinus minor*. There is also some misinformation in the same species account by stating that an entire subspecies (*F. p. anatum*) became extinct in North America because of chemical poisoning. It is true that populations or portions of that subspecies were lost during that time period.

Overall, the book makes a contribution to one's library, and while a bit over-priced because of its drawbacks, it is not out of line with similar books and by today's standards.—CLAYTON M. WHITE.

OWLS OF THE NORTHERN HEMISPHERE. By Karel H. Voous, illus. by Ad Cameron. William Collins, London; Massachusetts Institute of Technology, Cambridge. 1988:320 pp., 50 color plates and as many full page plates of sketches, usually several to the plate; 24 maps, 25 × 34 cm. $60.

OWLS: THEIR LIFE AND BEHAVIOR. By Julio de la Torre, illus. by Art Wolfe. Crown Publs., New York. 1990:ix + 214 pp., 175 color photos. 24 × 32 cm. $35. Foreword by Roger Tory Peterson.—The owls of the Northern Hemisphere have recently been the subject of a number of books. Seven of the species are common to North America and Eurasia, while some of the others, such as the Great Horned Owl (*Bubo virginianus*) and the Northern Eagle-Owl (*B. bubo*), are closely related. In the Old World, aside from the extended treatment of owls in vol. 4 of the "Birds of the Western Palearctic" and vol. 9 of the German "Handbuch," one has Mikkola's fine "Owls of Europe." In America, there is the inevitable volume by Paul Johnsgard; for a generally laudatory review of it see this journal, 1990:192–193. The overly promoted "Owls of North America" by A. W. Eckert and K. E. Karalus (artist) is hardly worth mentioning except to express sympathy for an artist asked by a naive author to provide full page plates for 18 subspecies, real or imaginary, of the Eastern Screech Owl (*Otus asio*) and 11 of the Great Horned! Turning to the two volumes at hand, Dr. Karel Voous, Holland's best known ornithologist, was asked in 1981 to provide a text for a portfolio of plates of owls of the Northern Hemisphere by a countryman. Ad Cameron. Not to be hurried (the book appeared in 1988), Voous, a longtime student of the Strigidae, has written a lengthy, authoritative, and in some ways, pioneering book. Taxonomy, distribution, zoogeography, ecological interactions, and the physiology and anatomy of hearing and vision all

receive in-depth treatment. Nor are other aspects of natural history neglected. The account of the Tawny Owl, for example, runs to an estimated 6200 words. Species such as the Stygian owl (*Asio stygius*), the African Marsh Owl (*A. capensis*) and the Brown Fish Owl (*Ketvpa zeylonenis*), which have only a talon hold in the Northern Hemisphere, have been included—47 species in all—so one has a sampling at least, of almost all the genera of the family.

Mr. Cameron's paintings I would call good, but not inspired. Of equal or perhaps greater interest are his sketches and drawings, usually several to the plate, of various activities and postures. One, for example, shows four incubating owls of as many species, one a Great Gray Owl (*S. nebulosa*) on an old Northern Goshawk (*Accipiter gentilis*) nest, the other three ground nesters, including an eagle owl, while a smaller owl surveys them warily from the entrance of its nest cavity. It is unfortunate that this is such a big, massive, expensive book. To be sure, the MIT Press (yes, they actually published a book on owls) quickly became nervous and remaindered the $60 volume at one-third price before it had a reasonable run for the money.

In the second book here under review, the tail also wagged the dog in that the author was engaged to provide a text for illustrations—this time color photographs by Mr. Art Wolfe, who, the jacket tells us, is "the world's foremost photographer of owls"! He has hitherto hid his candle under a bushel, but one readily admits that all of his photos are technically excellent. Perhaps we have too many owlets lined up on limbs (of their own volition?) but there are excellent takes of adults also. I half expected to find a few scarce or local species such as the Whiskered Owl (*O. trichopsis*) or the Ferruginous Pygmy-Owl (*Glaucidium brasilianum*) omitted or glossed over, but, no, they are all here. Someone was very good at finding nests! As to the jacket claim, several photographers have taken unsurpassable shots of owls.

Anyone who knows Julio de la Torre would expect the text to be racy, even slangy, and that it is. But Julio is a genuine longtime owl enthusiast and he has done his homework as well. Recent changes such as the relentless advance of the Barred Owl (*Strix varia*) to the Pacific are discussed. He provides some extras, such as a chapter on fossil owls in which the giant owl of the Cuban Pleistocene, de la Torre's former homeland, needless to say, gets attention. Nor is the author adverse to speculations—such as the interesting one that the Northern Hawk-Owl (*Surnia ulula*) is an oversized relative of the pygmy owls. While one might ask for confirmation of a few statements, "Owls, Their Life and Behavior" provides a colorful, popular introduction to these birds.—D. AMADON.

FOOD HOARDING IN ANIMALS. By Stephen B. Vander Wall, illus. by Marilyn Hoff Stewart. University of Chicago Press, Chicago, Illinois. 1990:xii + 445 pp., 166 numbered text figs., 24 tables, 2 appendices. ISBN 0-226-84735-7. $76 cloth, $29.95 paper.—This highly commendable book is the first taxonomically comprehensive, and the most exhaustive, synthesis of the vast and scattered literature on evolutionary, ecological, and behavioral aspects of food storage in animals. Food hoarding, which Vander Wall defines as the handling of food in ways that conserve it for future use, is a key component of the integrated adaptive strategy of many birds, mammals, and arthropods. Vander Wall reviews the current state of knowledge on a wide variety of topics, such as the reproductive benefits accruing from the use of stored food, the ultimate causation of food hoarding, the cache-protecting behaviors used by food-hoarding animals, the internal and environmental influences on hoarding behavior, the role of memory in the retrieval of scattered food stores, the effect the storage of plant propagules has on the dispersal and establishment of plants, and the impact food hoarding may have on community structure. In addition, he devotes three chapters to an overview

of the hoarding behavior and related natural history of animals within three taxonomic groups—birds, mammals, and arthropods. Ornithologists will be particularly interested in Chapter 9 ("Food-hoarding Birds"). In that chapter, Vander Wall reviews the literature documenting the food hoarding behavior of 100 bird species from 15 families, particularly the Corvidae, Paridae, Falconidae, Strigidae, Laniidae, Sittidae, and Picidae.

Aside from being the most recent and most thorough review of hoarding behavior, Vander Wall's well-written book differs from several excellent earlier reviews in two ways. First, in addition to summarizing what is known about food storage in vertebrates, "Food hoarding in animals" brings together what is known about mass provisioning in spiders, ants, bees, wasps, and beetles. Second, in addition to summarizing the literature on the ecological and evolutionary aspects of hoarding, the book provides an overview of the psychological literature concerning the proximate control of food hoarding. The psychological literature has been largely ignored by behavioral ecologists working on food-hoarding problems. Vander Wall calls for comparative studies on the regulatory mechanisms of hoarding across species. Since publication of his book, two excellent studies have used dynamic programming models to explore how internal states of the animal and environmental factors may influence daily rhythms in the storage and retrieval of caches as well as in body mass (McNamara et al., Behav. Ecol. 1:12–23, 1990; Lucas and Walters, Anim. Behav., in press). This approach to the study of dynamic aspects of hoarding behavior as controlled by internal states and environmental conditions seems to hold great promise.

For behavioral ecologists actively working on food-hoarding problems or planning to do so, Vander Wall's book is nothing short of a treasure, and it deserves a very enthusiastic recommendation. Part of the book's value is that it is an abundant source of ideas for future research. The bibliography of nearly 1500 cited works, as the publisher claims, "is itself an invaluable and unique reference." The books readership, though, should extend well beyond behavioral ecologists who have a specific interest in food-hoarding behavior. Certainly, anyone with a broad interest in behavioral ecology or ornithology should find much of value.—THOMAS A. WAITE.

GUIDE TO THE BIRDS OF MADAGASCAR. By O. Langrand. Yale Univ. Press, New Haven, Connecticut. 1990: 364 pp., 40 color plates, 6 line drawings, 4 figures, 3 tables, 205 maps, $50.00.—The island continent of Madagascar has long been of interest to field biologists. The flora and fauna of this mysterious island is highly distinctive, indeed almost bizarre. The real possibility that human pressure on the land may cause the extinction of a considerable portion of this biota in the near future fuels our interest and concern. Despite this interest, little has been published in English on the birds of Madagascar since A. L. Rand's magnificent summary of the 1929–1931 Mission Zoologique Franco-Anglo-Américaine Madagascar Expedition (1936, Bull. Amer. Mus. Nat. Hist. 72:143–499). The only other recent comprehensive treatment of the Malagasy avifauna, volume 35 of the *Faune de Madagascar* series (P. Milon, J.-J. Petter, and G. Randrianasolo, 1973), is written in French and is difficult to find; this has left a considerable void in the literature on Madagascar, which Langrand's book readily fills.

Olivier Langrand is uniquely qualified to write such a field guide. Since 1980, he has travelled extensively throughout the island. He has authored or co-authored an important series of papers on the conservation status of some of Madagascar's rarer birds—the plight of the highly endangered Madagascar Fish-Eagle (*Haliaeetus vocifroides*) was first made known through these studies, for example—and it is only fitting that the sum of Langrand's extensive knowledge of the avifauna be brought together in one volume.

This guide begins with a useful overview of the vegetative communities of Madagascar and their distribution; this is followed by a discussion of the distribution of birds in relation to these communities. Biologists who have not visited Madagascar may not be aware that Madagascar does maintain, with varying degrees of effectiveness, a system of natural reserves and parks; these protected areas are briefly described by Langrand. The introduction concludes with a brief guide to 17 bird-finding sites in Madagascar, which is supplemented by a table listing the species recorded at these sites.

The major part of the book is taken up with accounts, geared towards field identification, of 256 species recorded from Madagascar; 24 additional seabirds or waterbirds that might occur in Madagascar are discussed briefly as well. Latin, English, French, and Malagasy names are provided for each species. The accounts include the following sub-headings: description; identification; behavior; voice; habitat; diet; nesting; and distribution and status. For 200 species (the bulk of the regularly occurring avifauna), the distribution information is supplemented by a small map of the species' range; these maps are gathered together in a separate section near the end of the book. These accounts contain a considerable amount of valuable information on the natural history of each species. I would be curious to know how much of this information is original and how much has been gleaned from the literature; unfortunately, as this part of the book adheres to standard field guide format, references are not included in the text. The book reads well; thanks are due to Willem Daniels, for translating the text from the French, and to the Smithsonian Institution for subsidizing this translation.

The 40 color plates by Vincent Bretagnolle illustrate the regularly occurring species. These plates vary in quality, and although all are adequate for the purposes of identification, some fail to get across the "essence" of the birds portrayed. In some cases, in fact, such as the Madagascar Wood Rail (*Canirallus kioloides*) shown resting on its haunches, the illustration might give a misleading impression of the birds' comportment. The plates are not all drawn to the same scale, which is acceptable, but given that, it would be useful to have some kind of scale bar on each plate. It can be disconcerting to see the jeries (Plate 36) reproduced so that they appear to dwarf the greenbuls (Plate 32), although in life the greenbuls are several times the size of a jery. Although all species on any one plate are said to be to the same scale, this policy does not appear to be held to in all cases (especially on Plate 35). Among the rarer species that are portrayed in the plates are the Snail-eating Coua (*Coua delalandei*), which has not been observed in 150 years, and such scarcely better-known species as Madagascar Serpent-Eagle (*Eutriurchis astur*), Madagascar Red Owl (*Tyto soumagnei*), and Red-tailed Newtonia (*Newtonia fanovanae*). At the time that the book was written, this newtonia was known only from the unique holotype, but it has recently been re-discovered at two widely separated sites. As field biologists have good reason to be on the lookout for this species, it is unfortunate that the depiction of the Red-tailed Newtonia fails to capture the birds' remarkable resemblance to the female Red-tailed Vanga (*Calicalicus madagascariensis*).

Given Langrand's residency in Madagascar, the logistical problems of bringing this book to press must have been considerable. Greater attention to detail on the part of the press would have caught some of the almost inevitable errors or omissions. The distribution map for the Collared Nightjar (*Caprimulgus enarratus*), widespread (but scarce) in forests of eastern Madagascar, is completely blank. The columns in Fig. 3 are not identified. Also not explicitly identified are the line drawings that illustrate a handful of species that are vagrants to Madagascar. In most cases, this is not a problem—there is only one species of oriole recorded on the island, for example—but I am guessing that the unidentified swifts on page 232 are Mascarene Swiftlets. (*Colluralia francica*) The distribution maps are identified not by the name of the species, but by the sequential number that each species is assigned in the text. Consequently the maps can not be identified without constantly flipping back and forth in the book, which quickly becomes burdensome.

The classification of the Malagasy avifauna, especially of the passerines, is to a considerable degree unresolved. Langrand wisely avoids making many new arrangements in the sequence of species, but I was surprised to see the jeries (*Neomixis, Hartertula*) in the Sylviidae rather than with the babblers (Timalliidae). While this arrangement may be no more right—or wrong—than any other classification in use, I am not aware of a recent precedent for this sequence.

A nice feature of the book is an etymology of many of the Malagasy bird names; a majority of these are onomatopoeic.

I highly recommend this book to anyone who visits Madagascar. Langrand is to be congratulated on a job well-done. This book represents one of the most important steps for spurring international interest in the biology and conservation of the poorly known, fascinating, and threatened avifauna of Madagascar.—THOMAS S. SCHULENBERG.

NATURAL HISTORY AND MANAGEMENT OF THE SAN CLEMENTE LOGGERHEAD SHRIKE. By Thomas A. Scott and Michael L. Morrison. Proceedings of the Western Foundation of Vertebrate Zoology, Volume 4, No. 2, Western Foundation of Vertebrate Zoology, Los Angeles, California. 1990:35 pp., frontispiece, abstract, 10 tables, 10 figures (5 photographs), 3 appendices. $ 5.00.—Loggerhead Shrike populations have decreased across much of North America, thereby providing the stimulus for research on several declining populations. This monograph makes a significant contribution to our knowledge of one of these populations, the San Clemente Loggerhead Shrike (*Lanius ludovicianus mearnsi*), an endangered subspecies endemic to San Clemente Island, California.

Professionals, particularly those interested in endangered species and studies of insular birds, will benefit greatly from this publication. Recreational ornithologists, however, may lose interest when working through the numerous tables, figures, and statistics.

This publication stemmed from a five-year study which investigated the natural history and population ecology of the San Clemente Loggerhead Shrike, so as to allow for comparisons with stable populations of mainland shrikes. The objectives were to identify factors that may have precipitated the decline of this subspecies and to develop management recommendations for preservation of the endangered birds. Five major areas of study are listed as subheadings in the "Results and Discussion" section. They include shrike occurrence and abundance, population biology, foraging behavior, breeding behavior and nest predation, and nesting habitat and the effect of browsing animals.

The authors provided excellent information on the current status of the population and a concise quantitative description of the environment which the San Clemente Loggerhead Shrike inhabits. By examining the behavior of shrikes, as well as the environmental factors affecting them, the authors were able to identify constraints that likely preclude population growth. Based on this solid quantitative foundation, the authors developed a detailed management strategy that could be implemented to reduce population constraints. As with some other island systems, exotic animals appeared to play a significant role in the degradation of native flora and fauna. The authors suggested that habitat could be improved by removing goats and by direct supplementation of shrubs. They outlined specific guidelines for the propagation, establishment, and maintenance of shrubs so as to maximize their effectiveness. The authors also suggested that shrike reproductive output be enhanced through double-clutching and the release of captive-reared young. Finally, they proposed that the survival of shrikes be increased through direct predator removal. Although attempts at removing predators in other areas have often proved impractical, the authors outlined a specific approach designed to be feasible on San Clemente Island.

Criticisms of this work are few; however, it should be noted that an explicitly stated assumption of this study was that differences between the declining population of San Clemente shrikes and those of stable mainland populations would allow for the identification of factors contributing to the San Clemente shrikes' decline. Although this comparative method represents a valid approach, it is unfortunate that the authors frequently included comparisons between the declining San Clemente Loggerhead Shrike and several mainland shrike populations which are not stable, but are also reported to be in decline. This does not reduce the validity of the authors' study, however, it does leave conclusions about the significance of these comparisons up to the reader.

In summary, this timely, well-written document makes a significant contribution to our knowledge of the San Clemente Shrike. Numerous subheadings, appendices, and concise tables and figures make it easy for the reader to extract specific information. Also, photographs of the habitat provide a good qualitative sense of what the area is like. The wide range of topics covered in this paper relative to other scientific literature on shrikes makes it a contemporary complement to the 1931 monograph by A. H. Miller.—DALE E. GAWLIK.

THE MANX SHEARWATER. By Michael Brooke. Illus. by Dafila Scott. T. & A. D. Poyser, London. U.S. edition. Academic Press Inc., San Diego, California. 1990:246 + xviii pp., 39 numbered black-and-white figs., 56 tables. $32.50.—My first encounter with a Manx Shearwater (*Puffinus puffinus*) was on a quiet summer night in the Faeroe Islands. I was listening to the soothing purrs and trills of the storm-petrels, when something shot past my ear and thumped onto the ground, screaming like a bat-out-of-hell with whooping-cough. I nearly fell off the cliff.

This is how Michael Brooke meets them all the time, and he has the scars to prove it. Brooke is a senior Oxford University zoologist, at the Edward Grey Institute of Field Ornithology, who has spent half his lifetime studying this intriguing seabird. Most of his work has been done on Skomer Island in the Irish Sea, off the south-west tip of Wales. But shearwater research there, and on Skolkholm nearby, goes back fully 60 years, to Ronald Lockley's classic studies in the 1930s. There have been breaks in continuity, notably during World War II, but the Manx Shearwater remains one of the best-studied birds.

Brooke summarizes the astonishing breadth of this research. He begins with the distribution, taxonomy and morphometrics of the Manx, with reference to its related subspecies and species. His data go back far enough for him to test for the inheritance of body characteristics, and there is evidence for this in tarsus size. However, his principal interest is in the birds' breeding ecology and population ecology. Most of his chapters are given over to aspects of this: from the pairs' burrow choice in March, and the females' pre-laying exodus, until parents and chicks abandon Skomer in September. Incubation and fledging success, the efficiency of experienced and inexperienced parents, chick growth rates, and artificial twinning experiments are some of the topics that he tackles along the way.

On the behavioral side, Brooke describes the birds' calls, in lyrical terms that I wouldn't use myself, and speculates about their functions. He also describes his experiments on the range of the birds' senses, testing how they find their burrows in the dark. (Mainly by sight, it seems; smell plays little or no part.) And he summarizes Geoffrey Matthews' classic homing and navigation experiments in the early 1950s, using Manx Shearwaters taken from burrows on Skokholm and released as far away as Boston (p. 7). One of the Boston birds came home, 3200 miles, in only 12.5 days—a feat of directed navigation if ever there was one. On a different tack, Chapter 8 discusses puffinosis, a chronic affliction of Manx chicks whose epidemiology has proved singularly hard to unravel. Brooke also summarizes the history

of the birds' exploitation by man. Young Manx Shearwaters, fat and almost ready to fly, were a combination of food, fertilizer and lobster-bait for the Norse-Celts of the Middle Ages, clinging to their arc of barren islands from the Scillies to Iceland. The harvest ended long ago, but in its time, it was the ruin of the giant colony on the Calf of Man in the Irish Sea. This, probably the biggest colony ever, was where the abundance of Manx Shearwaters gave the species its English name—and once scared hell out of a Viking war-fleet. The old harvest has an odd, modern successor on Rhum, in the Hebrides, where red deer (*Cervus elaphus*) come down from the hills at fledging time to catch chicks sitting outside their burrows (p. 49). Rhum has poor grazing, but the birds' bones are rich in the minerals that the deer need.

Don't be put off by the book's Introduction: a good idea which doesn't quite work. Here, Brooke tries to summarize all these disparate topics for you in advance, and the result is predictably jerky. However, the specialist chapters that follow read smoothly enough. I question the odd point of detail, of course. For instance, I don't agree with Brooke's paradox (p. 29) that it's the least aerially adapted shearwaters, like Manx, that make the longest, transequatorial migrations. Cory's Shearwater (*Calonectris diomedea*), which we both agree is the most aerial shearwater in the North Atlantic, crosses the Equator to Argentina in January. I'm no economic historian, but (p. 42) I don't think Brooke can estimate the harvest of Manx chicks on Skokholm in 1387–1388, by dividing the revenue they yielded by the price per bird in 1660—and on the Calf of Man at that! I'd like to see some direct information on the birds' pelagic ecology, along the lines of our work with Greater Shearwaters (*Puffinus gravis*) off Nova Scotia, as opposed to deductions based on long-distance movements (Chapter 4) and food deliveries to the colony (Chapter 7). But, as far as I know, the information simply isn't there yet. However, these are quibbles. Overall, I found 'The Manx Shearwater' clearly written and full of an unexpected variety of interesting information. I wish Michael Brooke every luck with his bands, his flashlight, and his little fluorescent socks, and I recommend his book to all field ornithologists, marine and terrestrial alike.—RICHARD G. B. BROWN.

BIRDS IN ART: THE MASTERS. By Inga Brynildson and Woody Hagge. Leigh Yawkey Woodson Art Museum, Wausau, Wisconsin. 1990: 127 pp. $24.95.—This book commemorates the Leigh Yawkey Woodson Art Museum's fifteen years of providing the *Birds in Art* exhibition. Selected bird art by international artists has been exhibited annually since 1976. In addition to the commemoration, the book honors 14 Master Artists selected by the Museum (one annually). I agree that those selected are indeed "Master Artists."

The volume is 12¼ × 9¾ in. (17.2 × 13.7 cm) with the spine on the short side. The covers are white binders cloth; a blue stamp of the Northern Mockingbird (*Mimus polyglottos*) logo of the Masters Medal is on the upper front cover; the end sheets are soft blue; "Birds in Art The Masters" is stamped on the spine, along with a small box, lettered Leigh Yawkey Woodson Art Museum. The shiny blue paper dust jacket repeats the Masters Medal logo in silver on the face, and lettering from the spine on the dust jacket spine. The back of the dust jacket lists the 14 honored Master Artists, repeats the box from the spine, and shows the ISBN number. A text of 127 pages, 85 color plates, 4 pages of references including publication notes and acknowledgements complete the offering.

The layout of the text is excellent. Set up in two parts, the first covers only ten pages and includes the Foreword in which Kathy Kelsey Foley, the Museum Director, deftly puts the book in perspective, particularly giving credit to all who made the celebration possible. The Preface is concerned with the "coming of age" of wildlife art in America and the role that the Museum has played and continues to play. Birds in Art—Taking Flight deals with the

genesis and growth of the "Birds in Art" concept. The Flight of the Painted Bird is a historical assessment of bird art from cave paintings in Spain to limited edition prints of today available at the local frame shop.

The title page indicates Inga Brynildson and Woody Hagge as the authors but they were, in fact, primarily editors since only six pages of text are their words exclusively. However, those pages are informative, well documented, and written in a very pleasing style. Editing the commentary provided by the Master Artists was no mean undertaking for Inga and Woody, particularly to accommodate the format of the book with the various written contributions of the artists.

The major portion of the book (112 pages) is entitled *The Masters.* Fourteen artists contribute enlightening personal reflections on painting, fine art, illustration, conservation, science, art appreciation, etc. Each artist's comments are presented on two tri-column pages, and each text is followed by six full-page reproductions of his artwork, including photographs of sculpture by the two artists working in three-dimension. The unnumbered plates are identified by title, species, medium and surface, ownership, and date the paintings were shown at a *Birds in Art* exhibition. Below each painting is an appropriate quotation from the preceding text; a very fine editorial touch.

There was great temptation for me to deal with the paintings, but my comments will concern only the artists' narratives. Each artist's text is headed by his photograph, date and place of birth, and residence or date of demise.

The first Master Artist was Wisconsin's own fiesty artist-conservationist, Owen J. Gromme. He says, "I try to demonstrate in paint what Aldo Leopold so beautifully demonstrated in words." Who can deny that he has achieved a large measure of success? He also states quite naturally, "I paint because I love it. It's as simple as that." Other Masters have echoed those sentiments.

I was shocked by the singularly unflattering photo of my friend, George M. Sutton, who was always smiling with a bright and pleasant countenance. This consummate gentleman artist was a serious student of ornithology. He claims, "I've never been able to disassociate painting from bird study." Inspiration aside, Sutton says, "The very force which drives me, at times relentlessly, to do the best I can at drawing birds is Fuertes." Louis Agassiz Fuertes, America's premier wildlife painter, was Sutton's mentor. There could have been none better for any bird artist.

Roger Tory Peterson is a household name among ornithologists, bird watchers, and bird artists. Known internationally for his bird identification handbooks, he records quite candidly, "I feel a greater sense of friendliness, ease, and camaraderie when I am in the company of wildlife artists than I feel with any other group—and that includes the hotshot birders and professional ornithologists."

Don R. Eckelberry with a keen philosophical outlook advises: "To young painters, I would say look at everything as though you have never seen it before." Of the visual appearance of a painting he points out: "It is not what is seen but *what is felt* in what is seen that counts; in other words, not sight but insight." Thus the eye must guide the heart.

Sir Peter Scott, who has no peer in the painting of waterfowl and their habitats, was a foremost global conservationist. His wish: "I hope the viewer derives as much pleasure out of seeing my art as I, as an artist, have derived out of seeing my subjects." To view a splendid Scott canvas is eminently pleasurable as both art and ornithology.

Arthur Singer was inspired by many fine wildlife artists, including Louis A. Fuertes and Carl Rungius. He stated what some artists may wish to avoid, namely that "Selling prints is a business and sometimes you compromise to paint what the public wants." Critics of wildlife art feed on such an attitude long recognized but rarely admitted.

Robert Bateman is not only a superb artist but an articulate writer who uses the metaphor

as skillfully as he does a liner brush. Of his mental preparation he claims, "I try (when painting chickadees mobbing an owl) to get into the skin of the chickadees." He has been in a good many skins, and we art viewers are the better for it. (I wonder if most artists believe that an art critic to review accurately tries to get into the skin of an artist[s]. I know he often gets "under their skin.")

Guy Coheleach confirms a long held conviction of mine, that drawing is the prime basis for graphic art, when he cautions, "The biggest mistake beginners make is not learning to draw." A fun loving free spirit, he enjoys the field aspect of painting, but says ". . . I dread the time I must spend in the studio."

Charles Greenough Chase regards his art thus: "I call what I do pure sculpture or subtractive sculpture." What follows in his text is a folksy discussion of technique in an effort to differentiate between wood carving and wood sculpture. He ends his piece with the most humorous anecdote in the book.

J. Fenwick Lansdowne's assessment of his artistic skills is forthright and precise when he says, "I do bird portraits. I do fairly tightly controlled pictures with a lot of detail, a lot of exactitude." If, therefore, one were to conclude that his paintings are less exciting than loose impressionism, one would be in gross error: Fenwick Lansdowne is an excellent painter.

Keith Shackelton is an outstanding painter of seascapes. The fascination for such painting, he concedes is ". . . because they [the seas] satisfy the frustrated abstract painter that lurks within most realistic painters." Shackelton's realistic bird paintings, however, are far from ordinary. He has mastered the technique of using blue and white oilpaint to create a fascinating world of ice, snow, sky, and water.

The driving force behind Kent Ullberg's sculptures is the overwhelming desire to communicate his artistic feeling. This painter's son became a sculptor when ". . . I got my hands in clay, I fell in love instantly—really never looked back." The magnificent bronze eagle on the front lawn that welcomes one and all to the Leigh Yawkey Woodson Art Museum in Wausau is an Ullberg creation.

Lars Jonsson is the youngest Master Artist, but his statements on art are sage indeed. "Wildlife art that does not reveal something about the artist is very seldom significant." Of the artist he writes, ". . . art is the life you give to each painting." If ever there be an artist to equal the eminent Bruno Liljefors, it will most likely be Lars Jonsson.

Maynard Reece has won the Federal Duck Stamp competition an unprecedented five times, underlining his skill in waterfowl portraiture. Artists Francis Lee Jaques and Jay "Ding" Darling were the primary guiding forces for Reece, who had no formal art training. His statement, "Good illustration should be good art" is a worthy observation.

Some of the Master Artists indicated that they had no formal art training. They all express a love for their work, consider outdoor activity essential, were influenced by other artists, had an early proclivity for art, and would prefer to be called artists as opposed to bird artists.

This is a volume that provides the reader with insightful information about and by fourteen of the world's outstanding artists who specialize in bird painting. Their paintings in this volume subtly illustrate their commentary. All in all, this book is a bargain in artistic culture. Highly recommended!—ROBERT A. MCCABE.

SEABIRDS OF HAWAII: NATURAL HISTORY AND CONSERVATION. By Craig S. Harrison. Cornell Univ. Press, Ithaca, New York, 1990. 245 pp., 41 plates. $15.95 paper, $36.50 cloth.—*Seabirds of Hawaii* summarizes the available information on the breeding biology, feeding ecology, historical population trends, and conservation efforts for the assemblage of seabirds that nest within the Hawaiian archipelago. The Hawaiian islands are home to some 23 species of seabirds that together number several millions. There are few other islands in

tropical or subtropical waters of the North Pacific where these species can nest. Thus, the Hawaiian Islands are exceedingly important to the marine avifauna of the North Pacific Ocean. Sadly, several species are threatened or endangered.

In its first chapter, the author sets the scene with a discussion of the geological origin, oceanographic setting, and history of human occupation. In the second chapter, Harrison presents information on general aspects of seabird biology, including evolutionary history, population dynamics, and breeding and feeding ecology. In chapter three, he discusses the breeding ecology and the way it relates to specific conservation problems for each of the Hawaiian seabird species within the context of each family: albatrosses, petrels, storm-petrels, frigatebirds, boobies, tropicbirds, and terns. Finally, Harrison discusses conservation problems by detailing the laws established to protect birds, including seabirds, and the record that public agencies and officials have compiled in support of those laws.

There appears to be a statement, first, of Harrison's captivation by the allure of seabirds: the ecological rules of survival for these beautiful creatures in an environment inhospitable to most air-breathing animals and the pivotal importance of remote islands to success under those natural rules; and, second, of his frustration that government agencies and most officials are more aware of their vested interests than in fulfilling the duties of their office, namely, exercising authority under public laws of wildlife protection.

The first three chapters appear to be an attempt to convince the reader (wildlife officials and public servants?) that seabirds are worth protecting. In this portion of the book, the reader must be very knowledgeable about marine ornithology to know the source of the material and statements, because the material is not documented or referenced. It is accurate, however. The last chapter is an attempt to show that seabirds can be protected by other than passive means, i.e., by enforcement of existing laws and the appointment of persons knowledgeable about wildlife in wildlife positions rather than merely by passive means, i.e., the purchase of real estate on which seabirds may or may not nest. The last chapter is the only one in which facts are documented. Harrison details the actual statutes and law cases that bear on seabird conservation problems. Because of this emphasis, the book appears to be written primarily for the benefit of state and federal officials who are charged with protecting the populations and habitats of Hawaiian seabirds, of the conservation organizations that are just beginning to gain a foothold in Hawaii, and of Hawaiians who perhaps have yet to appreciate the natural treasures of their home and the limits needed to exploitation if these treasures are to last. That is not to say that those travelers to Hawaii interested in natural history won't find much of benefit in this book. It is clearly written, readable, well-edited, accurate, and illustrated with fine drawings and color photos.—DAVID G. AINLEY.

BIRDS OF THE WEST INDIES (OISEAUX DES PETITES ANTILLES). By Édouard Benito-Espinal. Les Éditions du Latanier, Anse des Lézards, 97133, Saint-Barthélemy, F.W.I. 1990:128 pp., maps, 84 color photographs, graphs, line drawings. 100 French Francs.—This attractively produced little book has a field guide format that will fit easily even in small pockets (4.5 × 8.5 in.). Its hard cover is well bound and coated with a relatively waterproof plastic material. The text is bilingual, French and English, and very concise, containing adequate information about the region and brief descriptions of 84 species, migrant as well as resident, known to occur in the area.

The book contains a summary, foreword, preface, introduction, a general map of the Lesser Antilles, more detailed maps of Guadeloupe and Martinique, the topography of a bird, a short section on "What is a bird," the species section which forms the main part of the book, indices of scientific, French, English, and local names, and a short bibliography.

Each species is treated on a single page. One or several color photographs, usually taken by the author, illustrate each species. They are, in general, of good quality and represent the species well. French, English, Latin, and local names follow immediately after a short section outlining the characteristics of the family. This part is given only for the first species of a family. The text is sketchy but contains adequate information about identification characters and sometimes a few details about the ecology or the behavior of the species. The author provides for each species a map of the Lesser Antilles showing on which island(s) it occurs. In spite of their small scale, I find these maps very useful because all the islands are clearly identified and the range shows clearly. A graph listing nine of the islands and nine of the main habitats indicates where a species is to be found on a given island. In this part, the author does not distinguish between permanent resident and migratory or winter resident species, although the status of the species has been given in the text.

Overall this is a very good introduction to the birds of the Lesser Antilles, and the author must be congratulated for having done such a good job. The publisher equally deserves praise for the production of a book of this quality. I highly recommend this work to anyone interested in the fascinating birds of this part of the West Indies.—HENRI OUELLET.

NEPAL'S FOREST BIRDS: THEIR STATUS AND CONSERVATION. By Carol Inskipp. ICBP Monograph No. 4, International Council for Bird Preservation, 32 Cambridge Road, Griton, Cambridge CB3 0PJ, U.K. 1989:187 pp., 12 black-and-white bird illustrations, 9 figures, 14 tables, appendix. £8.50.—Although this treatise deals exclusively with forest birds in Nepal, mention is made of some species that have adapted to habitats modified by people. One of them, the Spiny Babbler (*Turdoides nipalensis*), perhaps the most famous bird in this Himalayan Kingdom, is characterized as being fairly common in dense shrublands throughout the country. But strictly forest birds have not fared so well because this once extensively forested principality decreased to only 43% forested land by the end of the 1970s. This figure would seem much too high to a traveler around Nepal, but is put into perspective with the author's definition of forest to include areas of scattered trees and shrubland, which is what much of the still remaining forests in Nepal seem to be. This concept certainly misses the requirements of birds dependent on large tracts of mature forest, a well-studied phenomenon in the New World.

In Nepal as in many places, the retreat of forests resulted from increasing human population pressure exerting basic needs for fuel energy, fodder and bedding for livestock (the trees are climbed and the foliage is regularly lopped for these purposes, like hay is mowed), and for construction. Consequently, it is surprising and encouraging to learn that around 10% of Nepal is under an extensive protected area system. The discouraging outcome of this is the realization that not all these preserves are well-protected against human intrusions and exploitations.

Against this backdrop, author Inskipp has done an absolutely superb job in presenting the details of forest stand structure and diversity in Nepal juxtaposed against corresponding avifaunal dependence, distribution, and current status. The various forest types are described in detail, the bird species occupying each type are enumerated, and the status of each bird as to whether at risk or not is indicated. From this we learn, for example, that out of the 850 species of birds in Nepal, some 469 are forest nesters and that Nepal holds internationally significant populations for nearly 120 of these. Unfortunately, 131 species are at risk, and 84% of these are forest birds, a testimony to the rapid rate of clearing forested lands. Thus 20 birds have become extinct in Nepal, and one formerly extensive subtropical forest type is nearly gone.

Besides admirably identifying conservation issues, this book in invaluable in another important way. It describes all the parks and wildlife reserves in Nepal and gives the bird list for each. It will become a valued reference for birding tourists who flock to Nepal's parks.—DOUGLAS A. JAMES.

RAPACI IN VOLO, LIGURIA: ARCHEOLOGIA PROBABILE. (BIRDS OF PREY IN FLIGHT.) By Luisella Carretta, Pirella, Genova. 1988:73 pp.—At one time or another, those of us who study birds have wished that we could fly. Luisella Caretta shares this fantasy and relates her feelings and studies of five species of Italian raptors through text and watercolor. Because we cannot fly, we must fly vicariously through the birds we observe, study, and love. "Rapaci in Volo" is definitely a work of love by a sensitive and careful observer. Reading this book brings Leonardo to mind; how he must have pondered birds and their flight.

Written in Italian with a parallel English translation, this book details the soaring behavior of five species of diurnal raptors that inhabit the Ligurian Apennines. For each species, a short narrative is presented, with brief sections on general natural history, hunting, and flight. Because it was written for a popular audience, the scientific merit of the text is limited. A color "portrait" accompanies each species narrative. Dozens of diagrams of flight paths of individual birds are included, which may be considered ethograms. These diagrams also detail the topography, clouds, updrafts, and wind at the time of observation. Unfortunately, the watercolors and sketches lack the detail most readers expect from the field guides now available. I particularly liked the chapter about flight and meteorology despite its brevity and some inaccuracies. Together, the drawings and text give the reader an appreciation of how these birds fly.

This book was produced in a large (24 × 33½ cm; 9½ × 13 inches), softcover format. The high quality paper makes the sketches and text crisp and clean, although the cardstock from which the cover was printed will deteriorate with use. Overall, *Rapaci in Volo* should be a fun book for readers who have not observed raptors or other soaring birds.—PAUL KERLINGER.

BRIEFLY NOTED

A COMUNICAÇÃO SONORA DO ANU BRANCO—Avaliações Eco-etológicas e Evolutivas. By Hernán Fandiño Mariño. Editora da UNICAMP, Campinas, São Paulo, 1989:302 pp., 26 sonagram plates, 20 maps. Text in Portuguese. Price not given.—This master's thesis by a Colombian resident of Brazil provides detailed descriptions of the vocal repertory of both caged and wild Guira Cuckoos (*Guira guira*) in Londrina, Paraná, and vicinity. Relation of the vocalizations to behavior is analyzed in considerable detail, with frequent reference to works on avian communication by E. Morton, D. Davis, W. Smith, S. Smith, and others. It is of particular interest that the São Paulo State University at Campinas is now publishing ornithological works in this attractive book format.—WILLIAM BELTON.

BIRDS OF PREY IN VIRGINIA. A History of Specimen Records from 1853 to 1988. By David W. Johnston and William J. Ehmann. Virginia Avifauna No. 4, Virginia Society of Ornithology, Lynchburg. (Available from VSO Publications, % YuLee Larner, 1020 West Beverley St., Staunton, Virginia 24401.) 1990:58 pp. $9.00.—The authors inventoried specimens and other records of 24 species of birds of prey, including the owls. Data are given for more than 1500 specimens including about 600 egg sets. In addition, there are 400+ records of

dead birds that were probably not saved. Analysis of these data revealed historically important changes in distribution and breeding sites. Interestingly, in light of the general decline of collecting about 477 of the records were made since 1960.—GEORGE A. HALL.

CHANGES IN BREEDING BIRD POPULATIONS. Between 1930 and 1985 in the Quaker Run Valley of Allegany State Park, New York. By Timothy H. Baird. Bulletin No. 477, New York State Museum, Albany. 1990:v + 41 pp., 8 black-and-white photos and maps. No price given.—In 1930 and 1931 A. A. Saunders carried out one of the earliest breeding bird population studies as he surveyed the breeding birds of a large forested area in western New York. Timothy Baird has repeated Saunders' studies in 1983, 1984, and 1985 using methods identical with those of Saunders. During the 50 years the density of nesting birds declined from 84.6 to 73.1 pairs per 100 acres. Species composition changed but the number of species remained about the same. The two major habitat changes were maturation of the forest and browsing by the increasing white-tailed deer population.—GEORGE A. HALL.

ISLAND AFRICA. By Jonathan Kingdon. Princeton Univ. Press, Princeton, New Jersey. 1990:287 pp., many colored and black & white drawings. $39.50.—The subtitle of this attractive book, "The evolution of Africa's rare animals and plants," explains the book's rationale. A number of ecological islands, both offshore and inland, are discussed from an historical standpoint, detailing these "islands" as centers of evolution and of endemism. The book is copiously illustrated with both colored and black-and-white drawings. Although all vertebrate taxa, and some invertebrates, are discussed, there are many examples of birds.—GEORGE A. HALL.

MANAGING WATERFOWL POPULATIONS. Edited by G. V. T. Matthews. Special Publication No. 12, International Waterfowl and Wetlands Research Bureau, Slimbridge, Gloucester, England. 1990:230 pp., numerous black-and-white maps and charts. £12.—The IWRB held a symposium in Astrakhan, USSR, in October 1989, and the Proceedings are now at hand. While there are contributions from North America and western Europe, the majority of the 54 papers report on waterfowl in the U.S.S.R. There are also a few papers from Africa, China, and South America. These papers are categorized under the headings: Distribution and Status of Waterfowl; Hunting Kill Statistics; Hunting Management; Controlling Factors other than Hunting Kill; Conservation of Threatened Species; and General Management Strategies. The international flavor makes this a useful publication for waterfowl biologists.—GEORGE A. HALL.

COLD WEATHER MOVEMENTS OF WATERFOWL IN WESTERN EUROPE. By S. C. Ridgill and A. D. Fox. Special Publication No. 13, International Waterfowl and Wetlands Research Bureau, Slimbridge, Gloucester, England. 1990:89 pp., many maps and graphs. £10 (£1.50 postage and packing).—The cold weather movements of nine common species were investigated using banding data and the International Waterfowl Census counts.—GEORGE A. HALL.

The following two publications can be obtained free of charge from the Publications Unit, U.S. Fish and Wildlife Service. 18th and C Streets NW, Room 130 Arlington Square Building, Washington, D.C. 20240.

NORTH AMERICAN BREEDING BIRD SURVEY ANNUAL SUMMARY, 1989. By Sam Droege and John R. Sauer. U.S. Fish and Wildlife Service Biological Report 90(8), 1990:22 pp., 2 black-and-white figs.—G.A.H.

TESTS OF A HABITAT SUITABILITY MODEL FOR BLACK-CAPPED CHICKADEES. By Richard L. Schroeder. U.S. Fish and Wildlife Service, Biological Report 90(10), 1990:8 pp. 4 black-and-white figs.—G.A.H.

ORNITOLOGIA NEOTROPICAL. Edited by Karl-L. Schuchmann. The Neotropical Ornithological Society. Vol. 1, No. 1–2, 1990:32 pp.—This first number of a new journal contains four papers, one in English and three in Spanish. Membership in the Society can be obtained by writing The Neotropical Ornithological Society, % Mario Ramos, World Wildlife Fund, 1250 24th Street NW, Washington, D.C. 20037. Annual dues are $35 ($15 for students and $25 in Latin American countries).—G.A.H.

REPOSITORY FOR FROZEN TISSUES

We wish to publicize the existence of the Collection of Frozen Tissues at the LSU Museum of Natural Science. The Collection is supported by NSF and LSU as a service to the research community. It contains tissue samples of over 30,000 vertebrate animals preserved at −70°C. We are committed to proper curation and research use of frozen tissue samples. Although our freezer space is limited, we would like to offer our collection as a repository for personal research collections or orphaned collections that are no longer needed but are still valuable to the research community, and are perhaps occupying needed freezer space. Materials donated to the Collection become the property of the Collection (our policy on Collection use is available upon request). If you have materials you wish to donate or would like to use materials in the Collection please contact Dr. Robert M. Zink, Curator, Collection of Frozen Tissues, Museum of Natural Science, Louisiana State University, Baton Rouge, LA 70803.

1991 NABS RESEARCH AWARDS

The North American Bluebird Society is pleased to announce the presentation of the eighth annual research grant awards. The 1991 recipients are as follows:

BLUEBIRD GRANTS

Mark T. Stanback, Hastings Natural History Reservation
The Betty H. McIlwain Award
Topic: Factors Affecting Eastern Bluebird Reproductive Success in the Southeastern United States
Dr. Harry W. Power, Rutgers University
Topic: Male Parental Investment and the Threat of Cuckoldry in Mountain Bluebirds

STUDENT GRANTS

John P. McCarty, Cornell University
The James L. Williams Award
Topic: The Interaction of Environmental Conditions and Patterns of Nestling Energetic Requirements in Determining Reproductive Success of the Tree Swallow
Linda A. Whittingham, Queens University
Topic: How Should Male Parental Care Change with Decreasing Certainty of Paternity?

GENERAL GRANTS

Dr. Ian G. Warkentin, Smithsonian Institution
Topic: Winter Ecology of Prothonotary Warblers—Foraging Behavior and Habitat Use

NORTH AMERICAN BLUEBIRD SOCIETY RESEARCH GRANTS—1992

The North American Bluebird Society announces the ninth annual grants in aid for ornithological research directed toward cavity nesting species of North America with emphasis on the genus *Sialia.* Presently three grants of single or multiple awards are awarded and include:

Bluebird Research Grant. Available to student, professional or individual researcher for a suitable research project focused on any of the three species of bluebird for the genus *Sialia.*

General Research Grant. Available to student, professional or individual researcher for a suitable research project focused on a North American cavity nesting species.

Student Research Grant. Available to full-time college or university students for a suitable research project focused on a North American cavity nesting species.

Further guidelines and application materials are available upon request from:

Kevin L. Berner
Research Committee Chairman
College of Agriculture and Technology
State Univ. of New York
Cobleskill, New York 12043

Completed applications must be received by December 2, 1991; decisions will be announced by January 15, 1992.

This issue of *The Wilson Bulletin* was published on 24 September 1991.