

BOOK REVIEWS

CHRISTOPHER W. THOMPSON, EDITOR

GLOBAL ORNITHOLOGY

Handbook of the Birds of the World, Volume 1 (Ostrich to Ducks).—J. del Hoyo, A. Elliott, and J. Sargatal [eds.]. 1992. Barcelona: Lynx Editions. 696 pp. ISBN 84-87334-10-5.

Let's start this review with a simple, unabashed, "Wow!" This impressive first volume launches a truly ambitious project—to detail the birds of the world in 10 major volumes. Some of us, quite frankly, were skeptical about this new handbook, which had been cooking quietly for a decade and then came to public attention in an aggressive marketing campaign in 1992. None of us was prepared for such a wonderful book. It has no real peer.

Lynx Publications, the publishers of *Handbook of the Birds of the World* (HBW), was formed in 1987 with the financial backing of lawyer patron Ramón Mascort. After several smaller publishing projects, the new publishing company reorganized to take on their dream project. Their stated goal for HBW is to provide an extensive reference work that demonstrates the extraordinary diversity of birds with comprehensive worldwide coverage from a genuinely international point of view. A second primary goal is to contribute to the conservation of birds and their habitats by attempting for the first time, in partnership with ICBP, to analyze the conservation status of all species, not just the endangered or threatened ones. The three primary editors assembled one team of authors and researchers and a second team of artists led by Francesc Jutglar and produced the first volume in roughly three years time, if I correctly understand the editor's review of HBW's genesis.

Volume 1 of HBW starts with an introduction to the International Council for Bird Preservation (now Bird Life, International), a global bird conservation organization whose significant contributions appear throughout the text. Then follows a 39-page introduction to the Class Aves, a succinct, comprehensive, and nicely illustrated mini-course in ornithology. I should say little more because my own textbook was apparently an important (acknowledged) source for this section.

The body of HBW is organized taxonomically with strong summaries of the biology of each bird family, starting with a boxed summary of its characteristics and composition plus a map of its global distribution. A clever graphic conveys the approximate maximum and minimum sizes of the component species relative to an outline of a human (for little birds just the mannequin's lower legs!). The body of the text is organized into sections on systematics, morphological aspects, habitat, general habits, voice, food and feeding, breeding, movements, relationship with man, status and conservation, and general bibliography. Generously gracing the family presentations are stunning photographs of many species, not just portraits, but carefully

selected images of birds doing interesting things and in striking natural settings.

HBW is based on a strong comparative and phylogenetic approach, including helpful hierarchical diagrams of the subfamilial taxonomic structure. The editors wisely chose a conservative course with respect to classification. They did not adopt the classification of Sibley and Ahlquist (1990) and Sibley and Monroe (1990), instead they started with the well-balanced system of Morony, Bock and Farrand (1975) with appropriate updates. Throughout, however, HBW summarizes the DNA-based proposals in the appropriate contexts. Provided also at the end of the Introduction is a helpful, tabular comparison of the Sibley and Monroe classification with the traditional arrangement.

Following the overview of the family are terse, telegraphic individual species accounts (in very small type), organized by genus, and including topics that parallel the preceding general text, e.g., nonscientific names, taxonomy, distribution, descriptive notes, habitat, food and feeding, breeding, movements, status and conservation, and bibliography. Each species profile includes a color-coded map of its global distribution. Interlaced among the species profiles are full size color plates depicting each and every species and, in some cases, distinctive subspecies or color morphs.

Volume 1 concludes with a massive bibliography and a taxonomic index.

My overall impression, and I believe I am not alone here, is that this is a sensational book, with rather few shortcomings. Among the highlights are its rich, detailed text, its first rate photographs, and its expert conservation sections.

The text, whether an overview of each family or a capsule of information on each species, is accurate, comprehensive, and current, an amazing accomplishment given that the editors and authors are not internationally renowned ornithologists. They are now! The book was extremely well-edited in terms of both substance and technical copy. The text is amazingly clean and accurate, and the coverage of obscure references, including some of my own waifs, is inspiring. I, myself, am not an authority on any of the groups of birds treated in Volume 1, nor do I have Ken Parkes' eagle eye for factual error. I could not, however, find any serious errors of omission, commission or typography in the sections for which I knew a modest amount.

The stunning photographs make up perhaps the richest collection of high quality, informative images of birds in their natural habitats that I have ever seen. The technical and artistic qualities of the photographs are first rate. Equally impressive is the number of really rare species, such as the Zig Zag Heron and Brazilian Merganser that are fully portrayed, some for the first time. Beyond debuts, however, are the information-rich contents of the photographs, which are accompanied by legends that teach you something and that cleverly complement the text itself. Among my favor-

ites are the photographs of a Mottled Petrel climbing a tree to launch itself (p. 220), an ice-caked Antarctic Petrel chick sitting in its exposed nest (p. 221), and a bloody, red-headed Giant Petrel displaying at a seal carcass (p. 225).

The conservation sections, contributed particularly by Nigel Collar of ICBP, are a third highlight of the text. These achieve a truly international and global perspective on each species' status. When all ten volumes of NBW are done, the original goals of ICBP's *Red Data Book*, conservation through sound ornithological knowledge, will be achieved gloriously at a new level.

Those are only some of the highlights. The shortcomings are minor ones; one must stretch to find much to criticize. For me, the greatest shortcoming centers on the reference system designed by the practical-minded publishers. No specific citations are listed in the text itself. Instead there are terminal reference lists called "Bibliographies," for each family and each species. It is almost impossible to relate the specific text contents to a particular source. One must review the various publications in the bibliography and then check them to determine whether they pertain to an issue at hand. But to do that, or anything else, one must first relate an author and date citation in the terminal text bibliographies to the entry in the main Bibliography at the end of the book. Also, all reference material is in tiny type. At best, the referencing system used is a clumsy one that reduces the potential working value of HBW.

A second shortcoming lies in the identification system for the color plates. As with the bibliographies, the editors have chosen an unfortunately clumsy and unfriendly referencing system in an otherwise well-designed book. Each species depicted on a color plate has a number, but there is no corresponding legend for the plate. Instead the species number on the plate connects to its number in the species accounts. Sometimes, the identification stands out easily on the opposite page, but often one must leaf through many pages to find a corresponding species account with a species name. This problem becomes worse with increasing size of a taxon and will become a nightmare in the treatment of the passerines.

In conclusion, Volume 1 of HBW is an overwhelming, impressive reference on ten orders of the birds of the world. It belongs in every working academic library and should be available for every university course on the birds of the world. It leaves behind many competing books on the birds of the world, most of them just lightweight coffee table presentations. The Handbook should be everyone's first choice for a modern, comprehensive reference on the birds of the world. But remember—at the moment we only have one impressive volume; there are nine to go. If our colleagues from Spain can maintain the same high standards they have set in Volume 1, this will be a landmark reference for ornithologists. Perhaps the ratites through the ducks were some of the easiest avian taxa to summarize, and one wonders what the editors will do when they hit the babblers or spinetails. I have confidence, however, that somehow Josep del Hoyo and his colleagues will realize their bold ornithological dream. They deserve praise for Volume 1 and best wishes for Volumes 2–10—

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PELECANIFORM BIOLOGY

Cormorants, Darters, and Pelicans of the World.—Paul A. Johnsgard. 1993. Smithsonian Institution Press, Washington, D.C. and London. xiv + 445 pp., 31 color plates, 119 figures, 34 tables, 3 appendices. ISBN 1-56098-216-0. Cloth \$49.00.

The research of a specialist in any group of birds should theoretically be aided by the appearance of a monograph covering that group, as all the important information and literature on that group should then be neatly summarized at one's fingertips, and gaps in knowledge should become obvious so that future research efforts can be efficiently directed. Ideally, a good monograph would also provide the best available illustrations and identification aids for all of the species it covers. This monograph falls short of these goals, as it does not adequately cover the literature; the literature that is cited is often misinterpreted; and much of the illustrative material is inadequate or misleading.

In the preface, the author indicates that at the inception of the work for this book he had been actively seeking a "book project," which is reflected in the level of care and interest obviously given the preparation of this book. As rationale for excluding the frigatebirds and tropicbirds, "... the other heretofore unmonographed pelecaniform families . . .," the author provides the contradictory explanations that it would have taken too long *and* the literature on them is too scanty. This book follows basically the same formula as Johnsgard's other monographs: a preface describing the book's inception; acknowledgments; introductory chapters starting with an overview of fossils, taxonomic history, and zoogeography. This is followed by other chapters on morphology, behavior and ecology, nesting biology, and populations. The species accounts form the bulk of the book (pp. 146–397), which ends with a key, glossary, drawings of heads, and a bibliography. The first two paragraphs of the text are spent discussing at length five fossils that are apparently nonpelecaniform and thus of no consequence to this subject, while an important extinct related family, the pseudodontorns, is not even mentioned. The general sequential classification of Siegel-Causey (1988, *Condor* 90:885–905) is adopted, except that a more traditional stance is taken on nomenclature, with Siegel-Causey's subfamilies being reduced to genera and his genera to subgenera.

According to Table 3 (p. 12), shags are entirely coastal, in contradiction to the range of the Imperial Shag (*Leucocarbo a. atriceps*) given on p. 253 (but not shown on the accompanying map). The Little Pied Cormorant (*Phalacrocorax melanoleucos*), which is widely distributed in Indonesia, New Guinea, and the southwestern Pacific is overlooked as a "tropically oriented cormorant species" (paragraph 2, p. 51). On p. 61, one reads that Neotropical Cormorants (*P. brasiliensis*) have been observed plunging "... in a manner something like that of gannets or Brown Pelicans . . ." when the reference cited clearly states the birds were flying less than a meter above the water prior to diving, very unlike these other species. Johnsgard states on p. 97 that there are no known hybrids among cormorants and shags, only to contradict this on p. 252 by citing observations of hybrids between the Guanay (*L. bougainvillii*) and *L. atriceps* and *albiventer* (the latter name is used without explanation or prefix here, although it is not given specific status in the next account).

On p. 171, the species account for the Pallas' Cormorant (*P. perspicillatus*) does not mention its poor flight capabilities; instead this is noted obliquely under the "Evolutionary Relationships" section of the Brandt's (*P. penicillatus*); incidentally this specific epithet is consistently misspelled throughout the volume, even in the glossary). The Indian Cormorant (*P. fuscicollis*) is stated to be "one of the commonest and most widely distributed cormorants of the Indian subcontinent" (p. 211), although it may be the least common of the three regularly occurring species there.

Johnsgard states on p. 257 that the blue eye-ring of the Imperial Shag "would not, however, serve to distinguish it from the allopatric Campbell [*L. campbelli*], Bounty [*L. ranfurlyi*], and Auckland Island [*L. colensoi*] shags . . ." when in fact the latter three have reddish or purplish eye-rings. In the same paragraph he states that *L. atriceps* can be easily distinguished from the Guanay (*L. bougainvillii*) by its "bicolored black-and-white plumage . . .," although both species are pied. In paragraph 5, he states without clarification that *L. atriceps* is a coastal species, despite having mentioned that there are several freshwater populations (p. 253). Paragraph 6 states that "no good evidence exists" on whether postbreeding dispersal occurs in this species; in fact there are nearly annual records of this species north to Uruguay, far from the nearest breeding colonies. In paragraph 7, the Guanay is not listed among the species likely to compete with the Imperial Shag, despite their occurrence in the same breeding colonies in Chubut, Argentina.

On p. 261, one reads that "Devillers and Terschuren (1978) argued that the white-cheeked *atriceps*, in Argentina and Tierra del Fuego ("imperialis"), is a morph of mainland *atriceps*. . ." Beside the point that the mainland referred to here is Argentina, and that much of Tierra del Fuego is Argentine, the original authors' meaning (that black-cheeked South American *albiventer* is a morph of South American *atriceps*) is totally lost here. The New Zealand King Shag (*L. carunculatus*) is said to have "entirely dark adult facial skin . . ." (p. 268), but in the same paragraph that the Stewart Island Shag (*L. chalconotus*) is differentiated from it by the lack of "reddish orange on the face. . ." On p. 274, while Johnsgard states that the Stewart Island

Shag has been considered "as a subspecies of *carunculatus*, a view to which I would subscribe . . ." he did not adopt that treatment. On p. 288, the "red to brownish iris" is used as an identification character for the Rock Shag (*L. magellanicus*); adults of this species exhibit extraordinary variability in iris color, which may even be whitish!

As to the goal of illustrating well all the species of the groups covered: the color plates section consists of 50 often excellent color photos (all unnumbered and unreferenced in the text) illustrating most species. Of these, four are misidentified to taxon, three others are attributed to the wrong sex, and at least one to the wrong age class, as follows: the "Pygmy Cormorant" (*P. pygmaeus*) is a Javanese Cormorant (*P. niger*); the "Javanese Cormorant" is an Indian Shag; the "Chat-ham Island Shag" (*L. onslowi*) is a juvenile Spotted Shag (*L. punctatus*); and the photo of two "Peruvian Brown Pelicans" (*Pelecanus occidentalis thagus*) apparently shows birds of either the Atlantic or Caribbean race. The Anhinga (*Anhinga anhinga*) "adult male" is an adult female; the Australian Darter (*A. melanogaster novaehollandiae*) "adult male" is a female and the "adult female" a male. The King Shag "adults" are in fact subadults. It is disheartening to think of the confusion these avoidable errors will cause. Despite the ready availability of photos of the Socotra Cormorant (*P. nigrogularis*), White-breasted Cormorant (*P. [carbo] lucidus*), the Bounty Island Shag, and the Oriental Darter (*Anhinga [rufa] melanogaster*), none are presented in this book.

The book is profusely illustrated by the author with outline drawings mostly depicting behavioral sequences and morphology. Those illustrating skeletal structure are oversimplified to the point of lacking many diagnostic osteological characters. Figures 8 and 9 have unlabelled scale bars! Most figures, however, simply lack any sort of orientation aids or labels, and the captions are often very unclear. On Figure 1, the Argentine coastline is shown as having only two coastally nesting cormorants, when in fact there are five in the most conservative taxonomy. In the same figure, due to unclear labeling it appears that there are five or more species both in the Falkland Islands and the Mediterranean, both areas that actually have only two species. Appendix 3 consists of 78 "Head Profile Identification Drawings," which show a lack of attention to the structural details that they are presumably intended to show (see for example Fig. 117, in which anhingid bill structure and facial feathering are misleading).

The maps are a major feature of the book, taking up 36 entire pages. Most of the maps are reproduced as full-page figures, although they would have been much better at half the size. Even where the total range of a species is very small, full-page maps are used (e.g., Figs. 45, 47, 48, 62, 63). The line quality is poor, and even minor rivers are included at the same line weight as all other features. The virtual lack of scales, latitude-longitude marks, and other labeling, as well as the odd projections chosen, makes recognition of some of the maps a challenge even for the geographically literate (e.g., Figs. 38, 45, 61, 62). "Inset" maps (of mysterious sections of coastline) lack borders and are frequently crammed up against the main maps. Figure 105 contains four of these insets; that on the center left might

be recognizable only to midwestern college students on spring break. Despite the large size of the maps, it was evidently considered necessary to use one-to three-letter codes for subspecies (which in some cases are not consistent between the figure and its caption; i.e., Fig. 69), where full names would have easily fit and been much more readily interpretable. Figure 53 lacks several significant island groups: the Maldives, Lakshadweep, Andamans, and Nicobars.

The caption of Figure 65 (the range map of the Guanay) states that arrows "indicate location of twentieth-century breeding sites off Peru (after Murphy, 1936)." Not only is there an unidentified arrow indicating its limited breeding range in Argentina, but that range is stated incorrectly on the facing page (p. 249) to be "between Puerto Deaeado [sic] and Santa Cruz, Chubut, Argentina." This species instead occurs in Chubut Province; Puerto Deseado is a city in neighboring Santa Cruz Province. The casual occurrence of this species north to Panama and south to Tierra del Fuego is overlooked, and certainly more recent literature than Murphy (1936) should have been consulted here.

Appendix 1 consists of "Keys for Species Identification." Potential users should be very cautious; for example, under "AA. CC. Legs blackish, underparts black or mostly black" the first entry is the Galapagos Cormorant (*P. harrisi*), which is actually light brown below. Under "BB. DD. E. Feet coral to scarlet; red facial skin lacks caruncles; eye ring green or lacking" are listed the Rock Shag (which has an orange-red eye ring and pink feet) and the Guanay Shag (again with pink feet). On p. 403, under "A. Body mostly dark brown; pouch blackish . . ." one finds the Brown Pelican, with no provision for the California race's bright red pouch (incidentally shown well on the dust jacket) in breeding plumage, or the Peruvian form's powder blue pouch.

Typographical and transcriptional errors are frequent (p. xiii, "Jenkins" should read "Jenkinson", p. 38, "tibo-tarsus"; p. 312, "Rumbull" should read "Rumboll"). In a quick look at the Literature section the following were noted: on p. 422, in Behn et al. *Phalacrocorax atriceps* should not be abbreviated; *Madoqua* is spelled *Modoqua*; on p. 423, in Browning (1989) "maiaque" is misspelled; on p. 439, both Weimerskirch and Jouventin are misspelled in the same citation, as well as in the text (p. 255). The name Olivaceous Cormorant is used on p. 61 instead of Neotropical Cormorant, the name used in the remainder of the text, and the former name is not referenced in the index.

The selection criteria for literature cited is baffling; a major recent paper on the Bounty Island Shag is lacking (Robertson and van Tets, 1982, *Notornis* 29: 311-336) and the vast foreign literature on species such as the Great Cormorant (*Phalacrocorax carbo*) is virtually unrepresented. Statements are made that "Wing molt patterns in cormorants . . . are less well studied" (p. 30) and "few details are yet available" (p. 31), although several recent papers on molts of South American cormorants are not cited. On p. 82 Johnsgard states that "Surprisingly little information is available on the possibility that sexual differences in foods taken or foraging methods used might exist among these birds . . .," but he does not cite Bernstein and Maxson (1984,

Condor 86:151-156), which has the telling title "Sexually distinct daily activity patterns of Blue-eyed Shags in Antarctica." The Bernstein and Maxson (1982) citation in the Literature section is a different publication from that referred to on p. 255.

To whom would I recommend this book? Birders may buy it; hopefully they will recognize the mislabeled photos for what they are. However, the book is certainly not geared toward or adequate for field identification, despite the abundant material on identification, keys, and head drawings. Despite its large format, this is not really a coffee table book, and I suspect that most armchair naturalists would find the book neither particularly interesting reading due to its turgid style and scientific terminology, nor visually appealing. Conservation biologists will find that very little of the more recent information on status is presented, and much more useful summaries are available elsewhere. While undoubtedly most university and museum libraries will purchase the book, it serves only marginally as a reference work because of the abundant inaccuracies and omissions. A carefully edited and thoroughly revised version of the book would, however, be of considerable value. Until this is done, however, the major benefit of this book lies in its partial coverage of the literature of these three families. This may be worth the nearly \$50 investment for a few readers and for large institutional libraries.—PAMELA C. RASMUSSEN, NHB MRC 114, Smithsonian Institution, Washington, DC 20560.

ZOOGEOGRAPHY AND NATURAL HISTORY OF SIBERIAN BIRDS

Birds of the Chukchi Peninsula and Wrangel Island, Volume 2.—L. A. Portenko, 1989 [1973]. Smithsonian Institution Libraries Translation Series TT-8152178, Douglas Siegel-Causey, Scientific Editor. 379 pp. Washington, D.C. Price gratis [see below].

As the belated interest in biodiversity increases, basic information about species distributions and abundances is becoming more critical. The arctic regions have a relatively lower diversity of animals, particularly birds, but this has not meant a correspondingly better understanding of what is there, where they are found and in what numbers, and the nature of their ecology, interactions with other species, and other basic details of natural history. This is especially true in the eastern Palearctic, where almost all of the information is in Russian, or extremely dated, or both.

Portenko was one of the intrepid band of early Soviet ornithologists who braved great personal hardship to gather natural history data about the breeding avifauna of eastern Siberia, Wrangel Island, and the Chukchi peninsula. He spent nearly 50 years in the Russian Far East and helped train most of the Russian arctic ornithologists who followed. This monograph, published in two volumes and both in English translation, is the summation of his ornithological studies in this biogeographically important area of the Arctic. It was published soon after his death in 1972 and served as a

basic reference on Russian arctic birds of Beringia since then. Even though somewhat dated and incomplete, marred by lapses, inconsistencies, and omissions, and characterized by what can only be described as a 19th century omniscience that has not been allowed in print since the days of Ridgway and Coues, it remains a valuable resource for anyone interested in study of Beringian avifauna.

All of volume 1 and two-thirds of volume 2 is occupied with species accounts of 146 taxa that Portenko considered to be the breeding species of Russian Beringia. The species accounts read like that in A. C. Bent's *Life Histories of North American Birds*, and Portenko's striving for accuracy and detail sometimes litters the page with enough Russian names of authors, dates, localities, personal reminiscences, and opinions that it is akin to struggling through an unedited version of *War and Peace*. Putting aside the writing style, the species accounts introduce the reader to a rich scientific literature otherwise unavailable to most Western scientists and a wealth of natural history information rarely encountered.

The last one-third of volume 2 is devoted to a zoogeographic analysis of the avifauna of the Palearctic, and Beringia in particular. Portenko offers a summary of Russian synthesis on Beringian biogeography current at the date of writing [1972] and introduces the reader to the competing hypotheses on the origin of the arctic fauna and flora. Perhaps because of the immense geographic scale of Siberia, Russian zoogeographers have a long history of broad-scale surveys and synthesis of animal distributions, and their writings represent some of the most original thoughts on the subject. Portenko's thesis has to be viewed in the context of when it was written, as it is quite dated in some respects. For example, he expends a fair amount of prose defending the concept of a Beringian landbridge, when most Western scientists had accepted this decades earlier. The author develops, however, very convincing arguments on the role of geography and history in determining the nature of the current arctic fauna, and offers many novel (to Western readers) concepts concerning the dynamics of arctic biodiversity. Typically, Portenko bogs himself down in erecting an elaborate typology of biogeographic provinces, subregions, and areas, but these are not central to his arguments.

As scientific editor and translator of this volume, I am perhaps more aware than most of the shortcomings and anachronisms. This monograph, however, is a valuable addition to our understanding of the distributions and abundances of high-latitude birds and is at present the only English-language entry into Russian ornithology of this region. Careful reading will reveal its importance and uniqueness.

This English translation was done under the auspices of the Smithsonian Institution Libraries Translation Program and is available in hardcover for the cost of shipping. Contact Publications Secretary, Museum of Natural History, University of Kansas, Lawrence, KS 66045-2454. Volume 1, published in 1981 in English, is available in microform from the National Technology Information Service, United States Department of Commerce.—DOUGLAS SIEGEL-CAUSEY, Univ. of Nebraska State Museum, Lincoln, NE 68588-0514.

THE NATURAL HISTORY AND ECOLOGY OF HOLARCTIC GALLIFORMES

Tetraonidae and Phasianidae of the USSR: Ecology and Morphology.—M. A. Kuz'mina. 1992. Smithsonian Institution Libraries Translation Series TT-81-52004, Washington, D.C. Price gratis [see below].

This volume reviews the natural history and morphology of two important galliform families—the Phasianidae and Tetraonidae, pheasants and grouse. Galliformes are typically tropical and subtropical, thus this particular treatment is restricted to only the northernmost members of the order. Two groups, however, are Holarctic endemics: the Snowcocks (Phasianidae: *Tetraogallo*) and the grouse (family Tetraonidae), and for these groups, this monograph is a particularly valuable resource. This monograph is filled with detailed and comprehensive sections for each species on diet, feeding behavior, habitat selection, locomotory morphology, and zoogeography. Kuz'mina summarizes a large (and unknown for the most part to Western scientists) body of scientific literature from the republics of the former Soviet Union (FSU) and Eastern Europe. For some, this may be one of the more important aspects of the book.

The monograph is organized into five sections. The first and least helpful is focused on the origin and taxonomy of galliform birds. This topic unfortunately is outside of the author's expertise and her discussion is derivative and dated [even by 1977 when the monograph was originally published in Russian]. The second section reviews the distribution, habitat preferences, and behavior of the Galliformes of the former Soviet Union. This information is organized by genus, which allows Kuz'mina to bring in a strong comparative aspect to her discussion. Western authors will discover a wealth of information based on the work of many Russians and FSU ornithologists that is otherwise unattainable in English. The author stresses the importance of zoogeography and ecology as factors affecting the distribution of populations, and does a fair job of comparing knowledge based on her study species with that known from extralimital forms. As a result, her treatment of the larger aspects of pheasant and grouse ecology and behavior is quite successful and puts the detailed information which follows into a broader context of general galliform biology.

The next section is based on her multiyear studies on the diet and feeding ecology of twelve galliform species resident in Kazakhstan. Galliform diets tend to be diverse and treatment is detailed to the point of exhaustion; latin and common names of plant species are appended, however, to the text. The fourth section addresses the relation of locomotory morphology to the natural history and ecology of pheasants and grouse. Roughly half of the monograph is devoted to this subject and her arguments are supported by many detailed figures and tables of anatomical research.

Kuz'mina successfully integrates these seemingly disparate subjects in the last section, which explores her ideas on ecological groups of Galliformes. She concludes that food specialization was the basic force be-

hind galliform evolution. Winter diets are a strong evolutionary factor for non-migratory birds of the Holarctic, and Kuz'mina feels that the result of most morphological adaptation in this group has been to specialize in feeding on coarse twigs in winter. Morphological diversification is well-developed in the upper limb, and flight characteristics differ greatly among tetraonids. By contrast, the author feels that holarctic phasianids are less constrained by food specializations and the likely evolutionary forces acting strongest in pheasants should be adaptations to montane and alpine habitats.

Viewed in the context of when this monograph was written, the author does a credible job of exploring some important evolutionary questions on the role of morphology and ecology in adaptation and lineage diversification. This book is valuable for the review and summary of otherwise unattainable work on palearctic galliformes as well as the author's own studies on diet and locomotion. This English translation was done under the auspices of the Smithsonian Institution Libraries Translation Program and is available in hardcover for the cost of shipping. Contact Publications Secretary, Museum of Natural History, University of Kansas, Lawrence, KS 66045-2454. — DOUGLAS SIEGEL-CAUSEY, University of Nebraska State Museum, Lincoln, NE 68588-0514.

DEMOGRAPHIC ANALYSIS OF MARKED BIRDS

Marked Individuals in the Study of Bird Population.—J.-D. Lebreton and Ph. M. North [eds.]. 1993. *Advances in Life Sciences*, Birkhäuser Verlag, Boston. 397 pp. \$50. ISBN 0-8176-2780-4.

Almost all surveys and experimental studies of wild populations of birds are hampered by the problem of incomplete samples. Without estimating the proportion of birds missed in sampling, we can never be sure whether changes in counts reflect changes in the population or are simply differences in the proportion of birds detected. Even if birds are marked, we only encounter a portion of the marked birds in later sampling periods. However, marking provides the opportunity for estimating the proportion missed in sampling and allows estimation of survival, migration, and recruitment in populations. Few ornithologists have had more than a cursory introduction to the sophisticated statistical methods that are now available for the estimation of demographic parameters. This book, a consequence of the EURING 92 Conference in Montpellier, France, reflects the exciting recent advances in modeling the demographics of marked bird populations, and contains many interesting applications of the new methods.

In the introductory paper, Jolly summarizes the current state of research into demographic analysis using data from marked birds as "The increasing flexibility of models and the possibility of combining techniques—mark-recapture, re-sighting, recovery and ra-

dio tagging—have been well utilized; the importance of specificity and parsimony is recognized; a versatile body of software now exists for model differentiation" (p. 4). The 28 contributed papers in the book accurately reflect the complexity and multidisciplinary inherent in application of statistics to ornithology. Consequently, the papers differ widely in their accessibility to non-statisticians, and if likelihood equations give you nosebleeds, you may want to avoid this book. However, there is a good selection of accessible papers that should be required reading for any ornithologist who wants to estimate demographic parameters from a population.

One of the important results that has emerged from recent statistical developments is that models are extremely flexible, and studies of marked animals can be used to address a wide range of ecological hypotheses. Experiments to test hypotheses about temporal variation, spatial variation, or covariates of survival and other demographic parameters can be designed completely within these models, which include tests to compare models with additional parameters (e.g., with year-specific survival rates) to simpler models (e.g., with one survival rate). Many of the papers in the book explore this flexibility in modeling. In particular, the papers in the first section emphasize defining parameters and testing between models. Skalski, Hoffman, and Smith discuss appropriate tests for the effects of both individual and group covariates of survival in field studies. Pradel provides an interesting example of the philosophy of modeling by comparing a model with a trap effect on capture to simpler models. Cormack places mark-recapture analyses into the framework of general linear models, and demonstrates in this context how to test for model fit and compare models.

This flexibility in modeling also allows for definition of new parameters. Several papers discuss modeling of movement probabilities, which are an important component of metapopulation dynamics. Nichols, Brownie, Hines, Pollock, and Hestbeck describe estimation of movement probabilities from resighting data. Schwarz discusses a framework for estimating migration rates from tag-recovery data, and Manly and Chatterjee discuss a mark-recapture model that allows for locations of releases and recaptures to be taken into account.

Estimation of recruitment is considered in several papers. Clobert, Julliard, and McCleery provide a good example of defining recruitment in terms of immature survival, return rate, and age-specific breeding probability, incorporating the parameters into a model, then applying the model to data for Great Tits (*Parus major*). Pollock, Kendall, and Nichols estimate recruitment by using the robust design, in which several sampling periods close together in time are repeated at intervals. By estimating population size from the short-term samples and survival and recruitment between intervals, the design has several advantages over traditional sampling procedures.

The new approaches to modeling allow for combining information from mark-recapture, mark-recovery, or radio tagging studies to define new parameters and estimate parameters with increased precision. Burnham and Catchpole, Freeman, and Morgan discuss the

details of combining recovery data with recapture or radio-tracking data. Nichols and Hines discuss how adding recapture data allows for estimation of survival rates in resighting studies when tag loss occurs.

Several authors pay particular attention to some of the more vexing aspects of selecting and implementing an experimental design using marked birds. For example, Bunck and Pollock provide a useful discussion of the issues related to analysis of survival from radio-tagging data, Peach discusses how to handle sparse data in mark-recapture modeling, and Conroy discusses issues of statistical power and experimental design in associating survival with habitat.

The final section contains two review articles. Existing software for analysis of vertebrate population dynamics is summarized by Lebreton, Reboulet, and Banco, in which they reveal how JOLLY, SURGE,

RELEASE, CAPTURE, SURVIV, and other software packages are related. Anderson, Wotawa, and Rexstad provide a useful discussion of what are currently the topics of most active research, and predict what will happen in the field in the next decade.

The book appeared very quickly after the conference due to the editorial decision to have authors provide camera-ready copies of the manuscripts. Unfortunately, the blessing of quick turnaround is accompanied by the curse of inconsistencies in formats and notation among papers. The strain of preparing all the manuscripts in English also occasionally shows. However, these cosmetic deficiencies are a minor price to pay for the early availability of this eminently useful book.—
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