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RECENT LITERATURE

Edited by Danny J. Ingold

RESEARCH TECHNIQUES

(see also 11, 24)

1. **Controlled tests to determine if European Starlings can pass through various hole sizes.** D. M. Lehmann. 1997. Sialia 19:125–131.—The management of North American bluebirds has focused on providing artificial nests sites and preventing competition from other hole nesting species, especially the European Starling (*Sturnus vulgaris*). In this study, experiments were conducted to see if starlings could escape from an experimental test box that had two different size openings. The 19/16″ opening is of the size recommended for use in boxes designed for the larger Mountain Bluebird (*Sialia currucoides*) and the 1 3/8″ × 2 1/4″ oval opening is used in the new Peterson bluebird box. The test box was 8″ × 8″ × 9″ with a wire mesh enclosure on the front to contain the birds if they were successful in leaving the apparatus. The openings were drilled through plastic to prevent warping and maintain opening size throughout the experiment. Ten birds were captured, sexed, weighed, and their girth at the shoulders were measured. Each bird was given a chance to escape through the different holes, in separate trials. Only two birds were able to escape through the small hole, the others got stuck in the hole at the shoulders. One bird reduced its escape time by 91% between the first and second trial. All birds were able to pass through the larger hole. The author suggests that his results show that one should use Eastern Bluebird nest boxes with the smaller entrance 1 3/8″ even though there is some indication that starlings may avoid nesting in the Peterson nest box even with its larger opening. [P. O. Box 83, South Berlin, NY 13843, USA.]—James L. Ingold.

2. **Corroboration of the North American Breeding Bird Survey for Eastern Bluebirds.** P. Arcese and V. M. Bauldry. 1997. North American Bird Bander 22:169–172.—The authors tested the hypothesis that "the Breeding Bird Survey" is an accurate predictor of real changes in population size of Eastern Bluebirds (*Sialia sialis*)". Population size information for Eastern Bluebirds using nests boxes on a 70 km^2 study area near Green Bay, WI (1968 to 1996) were compared to Breeding Bird Survey (BBS) data for Wisconsin and Region 3 (WI, MI, MN, IL) for the same time period. The number of breeding females (124) remained constant in the study area during the period of the study and 90% of all nests found were in boxes. Extensive searches were made to find birds nesting in natural cavities but only 7 such nests were found. A comparison of the BBS and nest box data was performed with Pearson correlation and linear regression analysis. The correlation coefficients between the nesting data and the BBS data for Wisconsin (pre-1980 0.84, $P < 0.0001$; post 1979 0.89, $P < 0.0001$; 1968–1994 0.89, $P < 0.0001$) and between the nesting data and the BBS data for Region 3 (pre–1980 0.73, $p < 0.005$; post 1979 0.96, $p < 0.0001$; 1968–1994 0.90, $p < 0.0001$) show a close and positive relationship. The authors concluded that the Breeding Bird Survey "can be exceptionally useful for assessing long–term trends in breed bird numbers". [P. Arcese, Dept. of Wildlife Ecology, Univ. of Wisconsin, Madison, WI 54706, USA.]—James L. Ingold.

3. **A modular tunnel–and–blind system to reduce investigator disturbance of breeding colonial waterbirds.** T. Kuiken, G. Wobeser, F. A. Leighton, I. Shirley, and L. Brown. 1997. Colon. Waterbirds 20:532–536.—The authors report on a tunnel–and–blind (TAB) system that they used from 1994–1996 in a study of nesting White Pelicans (*Pelecanus erythrorhynchos*) and Double–crested Cormorants (*Phalacrocorax auritus*) on Island A, Dore Lake, Saskatchewan. The tunnel was made of 3.5 m modules of woven polyethylene attached to metal band and wood frames, and blinds were made of plywood. The main 72 m TAB consisted of 7 blinds with 6 tunnel modules leading to the first blind from the water's edge, 2 or 3 modules between blinds, and was put in place before cormorants and pelicans arrived each spring. In addition, an 8 m side branch included a terminal blind. Investigator disturbance was restricted to about 20 m from the tunnel entrance, where observers arrived by canoe, causing temporary nest abandonment and predation by gulls and ravens. This eventually led to desertion of 5 pelican and 25 cormorant nests. A telescopic rod which could be extended

6 m with various attachments was used to collect eggs, carcasses, and adult and fledgling birds from within the TAB. The advantages of the TAB system were the flexibility in design due to the modular nature of the system and ease of adjustment to topographic features of the island. The details of TAB construction are presented in words and diagrams. [Dept. of Veterinary Pathology, Univ. of Saskatchewan, 52 Campus Drive, Saskatoon SK S7N 5B4, Canada; e-mail: kuiken@admin3.usask.ca.]—William E. Davis, Jr.

BEHAVIOR

(see also 1, 7, 8, 9, 12, 14, 19, 27)

4. **Response to playback of nestling begging in the Red-winged Blackbird,** *Agelaius phoeniceus.* J.E. Burford, T.J. Friedrich, and K. Yasukawa. 1998. Anim. Behav. 56:555–561.—The authors manipulated a potential proximate cue, nestling begging vocalizations, in an attempt to alter the feeding rates of male and female Red-winged Blackbirds. Playback of begging calls (5-min in duration) from Red-winged Blackbird nestlings was conducted at 30 nests with nestlings 3–7 days old. Normal background noise was used as a control at 13 nests. Both males and females increased brood provisioning rates after the 5-min playback than before. No increase in provisioning was observed at the control nests. The authors suggest that provisioning rates in Red-winged Blackbirds are mediated by begging vocalizations, at least over the short term. The authors compare their results with a similar study of the same species in which playback did not result in a significant increase in nestling provisioning. [K. Yasukawa, Beloit College, Dept. of Biology, 700 College Street, Beloit, WI 53511, USA, e-mail: yasukawa@beloit.edu.]—Jeffrey P. Duguay.

FOOD AND FEEDING

(see also 8, 9, 12)

5. **Diet of the White-tailed Eagle *Haliaeetus albicilla* in Finland.** 1997. S. Sulkava, R. Tornberg and J. Koivusaari. Ornis Fennica 74:65–78.—Prey remains of White-tailed Eagle nests from 3 regions in Finland were collected between 1978–1990. These regions, the Åland archipelago, the Quark archipelago and central Lapland differ topographically. The Åpland Island and surrounding SW archipelago off Turko are high and rocky, with steep shores and deep waters. The islands are primarily dominated by pine forests. The Quark region consists generally of low, stony islands with an unstable shoreline surrounded by shallow water. The dominant vegetation is mixed deciduous on the smaller, outer islands and spruce dominated on the larger inner islands. This archipelago has experienced more extensive forest clearing and development, resulting in disturbance to breeding eagles. In the third region, central Lapland, the eagles breed around two reservoirs. The area is relatively flat with small natural lakes and large open bogs. Dominant forest species include pine (*Pinus* sp.) and some spruce (*Picea* sp). Territories consist largely of coastal regions, but at inland sites, lakes are a minor portion of the hunting area. Regional and temporal differences in diet composition were examined and compared to results from other countries. Overall, the diet of White-tailed Eagles consisted primarily of birds (51.1%) and fish (42.1%), with some mammalian prey (6.9%). Pike (*Esox* sp.) were found to be the most prevalent of all prey species with Goosanders (*Mergus merganser*), eiders (*Somateria* sp.), *Aythya* sp., and Mallards (*Anas platyrhynchos*) being the principal avian prey. Muskrats (*Ondatra zibethicus*) were the most important mammalian prey. Considerable differences in prey composition were found among the regions, as well as temporally within regions. With regard to avian prey, pronounced regional differences in the number of eiders, Velvet Scoters (*Melanitta fusca*), Goldeneyes (*Bucephala clangula*), diving ducks and gulls that were consumed were noted. Medium-sized waterfowl were the preferred prey of the outer archipelago birds. In the Åland archipelago region, fish constituted 27% of the diet, while birds (primarily Anatidae) composed 65% of the diet. Fish constituted 32% and 67% of the diet in the Quark and Lapland regions respectively, while birds comprised 59% (Quark) and 29% (Lapland) of each. The authors proposed that temporal differences in the diets are attributable to some anthropogenic changes (e.g., land protection, land-fills) resulting in population increases of some species. Increases in the prevalence of eiders in the diet were paralleled by increases in eider populations only in the

1980s. Gull populations within the breeding areas of the eagles have increased in the Åland and Quark regions and the percentage of gulls in the diet of White-tailed Eagles within these two regions was found to essentially parallel increases of these populations. [Planeetankatu 2 D 24, FIN-00210 Espoo, Finland.]—Sue Bennett Canale.

6. **Barn Owl prey use in Chihuahuan Desert foothills.** Eric E. Jorgensen, Scott M. Sell, and Stephen Demarais. 1998. Southwest. Nat. 43(1):53–56.—The authors studied the prey availability and selection of the Barn Owl (*Tyto alba*) at three nest sites in the Chihuahuan Desert foothills in 1993. From late January to mid-May, 725 pellets from nest sites were collected and analyzed. Concurrently, small mammals were live trapped in six different habitat types presumed accessible to Barn Owls. Prey was reported by genus only. Comparisons of prey consumed to prey abundance indicated that the Barn Owls were selective regarding the species on which they fed. For example, *Sigmodon* sp. comprised only 1% of the prey available and was found only in localized habitat away from owl nesting sites; however, 13% of the owl pellets consisted of members of this genus. Members of the genera *Reithrodontomys* and *Peromyscus* represented 14% and 22% of the available prey respectively and were consumed by owls 13% and 5% of the time respectively. This suggests a clear preference for one type of prey over another within the same habitat type. Additionally, Barn Owls appear to discriminate among habitat patches and among prey within favored patches. In addition to these results, there is a continued need to interpret Barn Owl diet and foraging behavior in the context of prey availability and foraging habitats. [US EPA, P.O. Box 1198, Ada, OK 74820]—Tom Leiden.

SONGS AND VOCALIZATIONS

(see also 8, 9, 12, 24)

7. **Cultural variation in Savannah Sparrow, *Passerculus sandwichensis*, songs: an analysis using the meme concept.** K. Burnell. 1998. Anim. Behav. 56:995–1003.—A meme is defined as a song pattern that is transmitted from one bird to another during the learning process and can be an individual syllable, a group of linked syllables, or an entire song. Burnell used the meme concept to investigate patterns of cultural variation among the songs of eight geographically distinct populations of Belding's Savannah Sparrows. Most two-, three-, and four-syllable memes were found only in one population, whereas one-syllable memes were distributed among most populations. Larger memes (three- and four-syllable) were more memetically similar for geographically proximate populations than for geographically distant populations. Burnell suggests the presence of memes in a population is a result of a series of founder events. [Dept. of Ecology, Evolution and Marine Biology, Univ. of California, Santa Barbara, CA 93106, U.S.A.; e-mail:burnell@lifesci.ucsb.edu.)—Jeffrey P. Duguay.

NESTING AND REPRODUCTION

(see also 1, 3, 4, 19, 22, 27, 29, 30)

8. **Brood reduction and the insurance-egg hypothesis in Double-crested Cormorants.** J. D. Hunt and R. M. Evans. 1997. Colon. Waterbirds 20:485–491.—The authors report on experiments designed to test the insurance-egg hypothesis in Double-crested Cormorants (*Phalacrocorax auritus*), which usually lay clutches of 3 or 4 asychronously hatching eggs. The authors compared nest productivity among natural 3 and 4 egg clutches in 1991 and 1992 at Kaweenakumik Lake, Manitoba, and removed 1 egg from some 4-egg clutches to randomize potential effects of parental quality. Hatchibility did not differ among groups. Brood size was significantly larger in the 4-egg clutches, both at hatching and at age 12 days. In four-egg clutch nests D-chick (forth hatched) survival was only 20% compared to about 80% for the 3 older siblings, and D-chicks survived only when predeceased by an older sibling, an obligate brood reduction pattern. Survival of C-chicks in natural 3-egg clutch nests was 17%, a facultative brood reduction pattern. At age 12 days, 84% of 4-egg nests had 3 chicks, while only 33% of the experimental 3-egg nests (1 egg removed) had 3 chicks. However, in only 3 of 16 4-egg nests where 3 chicks survived was the D-chick one of the survivors, which may be an example of sibling facilitation, where possibly the presence of the 4th chick stimulated greater feeding effort by the parents. A confounding problem is

that in the experimentally reduced clutches one of the remaining eggs might be a late-hatching D-egg, thus reducing its chance of survival. In nests observed from a blind, aggressive pecking or biting among siblings was never observed, and hence the authors conclude that brood reduction was by starvation, not siblicide. They observed that the chick closest to the adult bird at the time of feeding received food and older chicks were better able to achieve this position. The authors conclude that brood reduction in both 3 and 4-egg nests suggests that both nestling behavior and clutch size are adaptively tuned to a facultative brood reduction strategy, tending towards clutch size-dependant obligate brood reduction, and that there may be some insurance value in the 4th egg. [Dept. of Zoology, Univ. of Manitoba, Winnipeg, MB R3T 2N2, Canada; e-mail: evans@bldgduff.Lan1.umanitoba.ca]—William E. Davis, Jr.

9. **Red-winged Blackbird females fail to increase feeding in response to begging call playbacks.** A.B. Clark and W.H. Lee. Anim. Behav. 56:563–570.—Begging behavior by nestlings could serve as an honest indicator of hunger levels or may serve to 'extort' care from parental birds. The authors conducted playback experiments using begging calls of Red-winged Blackbirds (*Agelaius phoeniceus*) at nests of young (mean nestling age of 4.1 days) and older (6–8 days) Red-winged Blackbird nestlings to determine if parents would respond differently to an increase in begging calls based on nestling age. Parents did not increase feeding rates or the amount of food brought to nestlings on each trip in response to increased frequencies of begging calls for young or older nestlings. The authors compare the results of their study with the results of others investigating the same question but obtaining different results, and offer possible explanations for the discrepancies. [Dept. of Biological Sciences, Binghamton Univ., Binghamton, NY 13902–6000, USA, e-mail: aclark@binghampton.edu.]—Jeffrey P. Duguay

10. **The proportion of Snail Kites attempting to breed and the number of breeding attempts per year in Florida.** R. E. Bennetts, K. Golden, V. J. Dreitz, and W. M. Kitchens. 1998. Fla. Field Nat. 26:77–83.—Radio telemetry was used to monitor the breeding activity of 23 adult and 9 subadult Snail Kites (*Rostrhamus sociabilis*) throughout the 1995 breeding season. All adults attempted to breed at least once with an average of 1.4 (±0.6 SD) breeding attempts per individual. In contrast, only 3 of 9 (33%) subadults attempted to breed. Seven adults (30%) made two breeding attempts, and one (4%) made three breeding attempts in the season, yet in only one instance was a second brood raised successfully. Previous population models for the Snail Kite in Florida have used values ranging from 2.2 to 2.7 for the number of breeding attempts per individual per year; these data were obtained primarily from counts during aerial surveys and suffer from various sampling biases. Further, previous workers assumed that all subadults breed. This is the first study to use radio-tagged individuals to obtain empirical data on the number of breeding attempts per year. The authors conclude that more conservative estimates of breeding attempts per year need to be used in population viability analyses for the Snail Kite. [Dept. of Wildlife Ecol. and Conservation, Univ. of Florida, P.O. Box 110450, Gainesville, FL 32611, USA.]—Karl E. Miller.

11. **Reproductive success of cavity-nesting birds breeding under high-voltage powerlines.** Paul F. Doherty, Jr. and Thomas C. Grubb, Jr. 1998 Am. Midl. Nat. 140:122–128.—The authors studied the reproductive biology of Tree Swallows (*Iridoprocne bicolor*) and House Wrens (*Troglodytes aedon*) nesting in boxes directly under high-voltage transmission lines during the 1993 breeding season. The three treatment sites along with the corresponding control sites were located in different counties in Ohio. All six study sites (treatments and controls) consisted of similar vegetative characteristics and were located in old-field communities in which pesticides and herbicides were not used. Two sites were below 69,000-volt transmission lines and one was below a 765,000-volt transmission line. The transmission lines had no measured effect on the reproductive success of House Wrens. The reproductive success of Tree Swallows, however, was significantly lower at all three treatment sites versus the controls. The authors had no definitive explanation why Tree Swallows were more sensitive to the effects of transmission lines than House Wrens, although they discussed several potential hypotheses. Their results do raise concern over the suitability of nesting habitat for Tree Swallows and perhaps other animal populations under high-voltage powerlines. [Dept.

of Zoology, Ohio State Univ., 1735 Neil Ave., Columbus, OH 43210; e-mail: doherty.20@osu.edu.]—Tom Leiden.

12. **Effect of predation on clutch size in Prothonotary Warblers.** C. R. Blem, K. L. Rossignol, and N. N. Bundick. 1988. Sialia 20:3–7.—The senior author has been studying a population of Prothonotary Warblers (*Protonotaria citrea*) in Virginia since 1987. During the study nest boxes were placed on trees with a predation rate of 30%. In 1994 and 1995, nest boxes were moved to metal poles in order to restrict access by certain predators. The present paper analyzes the effect of reduced predation on nest initiation and clutch size. Prothonotary Warblers in Virginia lay two clutches. For this study, the first clutch was any in which eggs were laid between 25 April and 20 May, and second clutches were any in which the first egg laid after 20 May. Some second clutches may have actually been replacement clutches. Nests were visited at intervals frequent enough to determine clutch size and initiation date. Initiation date was the date the first egg was laid. Results were divided into two treatments: tree boxes (1987–1993) and metal pole boxes (1995–1996). Nest success increased with the movement of nest boxes to metal poles, however, Brown-headed Cowbird (*Molothrus ater*) parasitism rose (24 of 26 cases of parasitism occurred) after the move to metal poles. Mean nest initiation date moved from 14 May for tree nest boxes to 7 May for nest boxes placed on trees ($P < 0.0001$; Wilcoxon 2 sample *t*-test). First clutches laid in nests boxes on metal poles were larger [5.16 ± 0.65 (mean ± SD), N = 196] than first clutches laid in nest boxes on trees [4.75 ± 0.75 (mean ± SD), N = 345]. No difference was seen in second clutches between the two treatments. The authors suggest that reduced predation, as a result of moving nest boxes from trees to metal poles, has resulted in earlier initiation of egg laying as well as a significant increase in use of nest boxes and large clutch sizes. They also discuss the measurement of "natural" clutch size in this species and suggest that it may not be possible to determine. [Virginia Commonwealth Univ., Dept. of Biology, 816 Park Ave., Richmond, VA 23284-2012, USA.]—James L. Ingold.

13. **Breeding biology of Savi's Warbler *Locustella luscinioides* at Lake Neuchatel. [Brutbiologie des Rohrschwirls *Locustella luscinioides* am Neuenburgersee.]** A. Aebischer and D. Meyer. 1998. Ornithol. Beob. 95:177–202.—One hundred and thirty-two nests on 58 territories were studied on the south shore of Lake Neuchatel, Switzerland from 1958–1997. Nest activitity (first egg to last fledging) ranged from 20 April to 26 August. Each year 21–41% of the males were unmated. Paried males defended significantly larger territories (1929 m^2) than unmated males (1497 m^2). One male mated bigamously in two successive years. All pairs that were successful with their first brood immediately began a second brood. Three pairs were able to rear 3 successful broods in one year. Mean clutch size was 4.74 eggs and 81% of all broods were successful, and 70% of all young fledged. The major cause of mortality was drowning caused by rising water levels. Reproductive success and survival of adults was higher at Lake Neuchatel than other locations in Europe and probably serves as a source population for the species. [Zoologisches Institut, Univ. Freiburg, Bd. Pe'rolles, CH-1700 Freiburg, Switzerland.]—Robert C. Beason.

14. **Variable social mating system in the Sedge Warbler, *Acrocephalus schoenobaenus*.** D. Hasselquist and A. Langefors. 1998. Ethology 104:759–769.—This study documents a variable mating system within a population of Sedge Warblers in south central Sweden. Among the 58 territorial males studied, 59% were socially monogamous, 14% were socially polygynous, and 27% were unpaired. Polygynous males generally began to court secondary females once their primary females had started egg laying or incubation. Extra-pair copulation frequency, as revealed by DNA fingerprinting, did not differ among socially monogamous or socially polygynous males. Of the 47 females studied, 6.4% were sequentially polyandrous. Sequentially polyandrous females were invariably paired with polygynous males, and when these females initiated their second broods, the males (mates for the first broods) began to care for the young of their secondary females. Sequentially polyandrous females invariably selected unpaired males as mates for their second broods. All sequentially polyandrous females were successful in rearing both broods, making the reproductive success of these females slightly higher than that of polygynous males. The results are compared to data on the mating systems of other populations of sedge warblers and an evaluation of sequential polyandry and its relative rarity among passerines is provided. [Dept. of Animal Ecology,

Lund Univ., Ecology Bld., 223 62 Lund, Sweden; e-mail: dennis.hasselquist@zooekol.lu.se]—Jeffrey G. Kopachena.

MIGRATION, ORIENTATION, AND HOMING

15. **Towards a broader view of Neotropical migrants: consequences of a re-examination of Austral migration.** L. Joseph. 1997. Ornithol. Neotrop. 8:31–36.—The author attempts to explain Neotropic and Nearctic bird migration patterns and their evolution. Although the focus in the introduction is on Austral migrants, the later sections of the paper are directed at migration within temperate regions (north and south), tropical regions, and between these various regions. The proposed evolutionary origins of migration are the same ideas that have been in the literature for decades but with no additional documentation. The labels proposed for the migration patterns are not always obvious (e.g., Pan New World Migration for birds that migrate from the North Temperate zone to the South Temperate zone). Unfortunately, in spite of its title, this paper adds little to our understanding of Nearctic–Neotropic bird migration. [Dept. of Ornithology, Academy of Natural Sciences, Philadelphia, PA 19103.]—Robert C. Beason.

16. **Intensity, height, and directions of diurnal and nocturnal autumn migration in southwestern Germany. [Intensität, Höhe und Richtung von Tag–und Nachtzug im Herbst über Südwesdeutschland.]** B. Bruderer and F. Liechti. 1998. Ornithol. Beob. 95:113–128.—Using an x-band (3 cm) tracking radar with a peak pulse power of 150 kW, the authors tracked the direction and elevation of migrants from sites near Stutgart and Nuremberg, Germany. Birds were identified to general type based on their radar signatures (fluctuations in the amplitude of the radar echoes). The direction taken by diurnal migrants was almost identical to the direction of nocturnal migrants at each site. The tracks (flight path over the ground) of nocturnal migrants below 1000 m was the same for the two sites, but the headings (direction the bird's head was aimed) differed somewhat, perhaps because of differences in the shelter from the wind provided by the mountains. Most of the migrants (90%) were passerines, especially late in the season; 20–30% were swifts early in the season; and less than 10% were shorebirds and waterfowl. The greatest density of migrants aloft occurred early in the evening, followed by a gradual decline in numbers. Similarly the altitude of migration was highest early in the evening and decreased during the night. Dirunal migration was lower (median = 175 m) than nocturnal migration (median = 450 m). [Schweizerische Vogelwarte, CH–6204 Sempach, Switzerland.]—Robert C. Beason.

17. **The role of daytime cues in the development of magnetic orientation in a night-migrating bird.** P. Weindler, F. Böhme, V. Liepa, and W. Wiltschko. 1998. Behav. Ecol. Sociobiol. 42:289–294.—Previous experiments with handraised young migratory birds have demonstrated that in some instances cues from the magnetic field alone provide sufficient information to assure appropriate migratory orientation. Conversely, in two additional experiments, one focusing on Blackcaps (*Sylvia atricapilla*) and the other on Pied Flycatchers (*Ficedula hypoleuca*), the birds oriented themselves bimodally along their migratory axis when they were not exposed to celestial cues. The authors examined the migratory behavior of hatching-year Pied Flycatchers during the autumn migration, in order to determine more precisely the relationship between celestial and magnetic cues and what aspect of the celestial rotation (day- or nightime cues) affords birds the ability to orient themselves in the appropriate direction. The experimental birds were divided into three groups: (1) those that remained indoors in the local geomagnetic field with no access to celestial cues, (2) those that were exposed to the natural daytime sky in the local geomagnetic field, and (3) those that were exposed to the natural daytime sky in which the magnetic field was altered such that the vertical field did not provide compass information. Group 1 and group 3 birds showed a significant bimodal orientation along their northeast-southwest migratory axis, while group 2 birds showed a significant unimodal preference for the seasonally appropriate southwesterly direction. These data demonstrate that simultaneous access to daytime celestial as well as magnetic field cues allows Pied Flycatchers to orient themselves in the appropriate seasonal direction along their migratory axis. Migratory flycatchers in the absence of celestial cues, were able to use the local geomagnetic fields to orient themselves in a bimodal fashion only

along their migratory axis. The authors put forth that the necessity for having both types of cues suggests that birds are able to transfer information directly from celestial cues to their magnetic compass.[Fachbereich Biologie der J. W. Goethe-Universität, Zoologie, Siesmayerstrasse 70, D-60054 Frankfurt a.M., Germany; e-mail: wiltschko@zoology.uni-frankfurt.d400.de]—Danny J. Ingold.

HABITAT USE AND TERRITORIALITY

(see also 1, 6, 11, 12, 13, 20, 21, 30)

18. **Habitat associations of coastal birds in Panama.** R. W. Butler, R. I. G. Morrison, F. S. Delgado, R. K. Ross, and G. E. J. Smith. 1997. Colon. Waterbirds 20:518–524.—In this paper the authors examined the relationship among January densities of shorebirds, wading birds, and coastal seabirds with habitat. Fixed wing aircraft surveys of 107 homogeneous habitat sectors along both coasts of Panama coincided with the period when Nearctic shorebirds were not migrating. All birds were identified to species or group (e.g., small shorebirds) and counted or estimated in large flocks. Habitats were categorized as: (1) mudflat/mangrove (mudflats backed by mangroves), (2) mudflat (no mangroves), (3) mangrove (no mudflats), and (4) other. Linear densities of birds were compared with habitat, and mudflat/mangrove density for all birds was 26 times the density for the next highest category, mudflat, and >100 times greater than mangrove or other. Density of shorebirds in mudflat/mangrove was 32 times the density on mudflat and >1000× greater than on mangrove or other. Most species followed this pattern, but Sanderling (*Calidris alba*) and White Ibis (*Eudocimus albus*) had their highest densities on mudflats (including mudflats backed by sandy beaches). Birds of all groups probably prefer the mudflat/mangrove habitat because of high food availability. The Pacific coast Gulf of Panama area is particularly rich because of nutrient-rich upwelling currents that produce phytoplankton blooms that feed a diverse fish and invertebrate community, and is bordered by extensive mudflat/mangrove systems. Mudflat/mangrove systems and nutrient-rich upwelling water are important to wintering shorebirds in South America, tropical east Asia, Australasia, and Africa. The authors suggest that habitats used by large numbers of coastal birds in the tropics are limited by geographical and oceanographic conditions that create rich feeding zones, exemplified in Panama by mudflat/mangrove systems and their associated upwelling currents. The conservation implications are striking. [Pacific Wildlife Research Centre, Canadian Wildlife Service, 5421 Robertson Road, RR 1, Delta, BC V4K 3N2, Canada; e-mail:rob.butler@ec.gc.ca]—William E. Davis, Jr.

19. **Territorial behaviour and hormones of Pied Flycatchers in optimal and suboptimal habitats.** B. Silverin. 1998. Anim. Behav. 56:811–818.—Pied Flycatchers (*Ficedula hypoleuca*) breed in higher densities in deciduous (high quality) than coniferous (low quality) forests. Silverin used a Pied Flycatcher decoy with playback to determine if aggression of flycatcher males differed between high and low quality habitats. In addition, blood samples of unmanipulated males was collected to determine if hormone levels differed between males in high versus low quality habitats. Males in high quality habitats spent more time near the decoy and attacked the decoy more frequently than males in low quality habitats. Males in high quality habitats had higher levels of testosterone and corticosterone than males in lower quality habitats. It is suggested that the high testosterone and corticosterone levels are the result of repeated territorial challenges to males occupying the best territories. Differences in aggressive motivation between these males are purported to reflect the value of the nest boxes defended. [Dept. of Zoology, Univ. of Goteborg, Box 463, SE 405 30 Goteborg, Sweden, e-mail: bengt.silverin@zool.gu.se.]—Jeffrey P. Duguay.

ECOLOGY

(see also 5, 6, 8, 10, 12, 14, 18, 28, 30)

20. **Spruce budworm outbreaks and the incidence of vagrancy in eastern North American wood-warblers.** M.A. Patten and J.C. Burger. 1998. Can. J. Zool. 76:433–439.—Several bird species respond functionally to outbreaks of the spruce budworm, a defoliating insect with a cyclic pattern of population growth. In addition, some species may respond numerically, although the data are not conclusive. One way to test for a numerical response is to

look for patterns in numbers of fall vagrants well away from their breeding range, in relation to budworm outbreaks in the breeding range. The authors compared records of vagrants in California with budworm population figures from eastern Canada over a 23-year period. The numbers of Cape May (*Dendroica tigrina*) and Bay-breasted Warblers (*D. castanea*) were positively correlated, and Magnolia Warblers (*D. magnolia*) negatively correlated, with budworm densities. Numbers of Tennesee Warblers (*Vermivora peregrina*) showed no correlation. Results for other species (Black-throated Green Warblers, *D. virens*; Blackburnian Warblers, *D. fusca*; and Ovenbird, *Seiurus aurocapillus*) were inconclusive. The authors conclude that examining numbers of fall vagrants provides a clearer picture of numerical responses to budworm outbreaks than do censuses on the breeding grounds, which are complicated by local population changes as birds are drawn into outbreak areas (a functional response). [Dept. of Biology, Univ. of California, Riverside, CA 92521, USA; e-mail: patten@citrus.ucr.edu]—Scott W. Gillihan.

21. **Effects of fire on savanna birds in central Brazil.** R. B. Cavalcanti and M. A. S. Alves. 1997. Ornithol. Neotrop. 8:85–87.—The populations of five avian species were compared before and after burning a grass-scrub-tree woodland (cerrado) that had been partly burned 3 yr previously. Birds were mist netted and banded before and after the area was burned to determine site fidelity. All individuals banded before the fire were still present after the fire for four species: White-banded Tanager (*Neothraupis fasciata*), Narrow-billed Woodcreeper (*Lepidocolaptes angustirostris*), Suiriri Flycatcher (*Suiriri suiriri*) and Rufous-fronted Thornbird (*Phacellodomas rufifrons*). The Coal-crested Finch (*Charitospiza eucosma*) invaded the area only after the fire. All 14 banded adults had left the area within nine months. These results indicate that the avifauna of the area are adapted to the effects of fire on the habitat, especially the Coal-crested Finch which seems to be a fire specialist. [Dept. de Zoologia, Univ. de Brasilia, 70910-900 Brasilia, DF, Brasil.]—Robert C. Beason.

22. **Bronzed Cowbirds hosts: new records, trends in host use, and cost of parasitism.** S. G. Sealy, J. E. Sanchez, R. G. Campos R., and M. Marin. 1997. Ornithol. Neotrop. 8:175–184.—Within the southern part of its range from Honduras to Colombia, the Bronzed Cowbird (*Molothrus aeneus*) has been reported to parasitize 87 species with 32 species documented as rearing cowbird young. In this paper the authors report on five additional host species from Costa Rica: House Wren (*Troglodytes aedon*), Olive-crowned Yellowthroat (*Geothlypis semiflava*), Gray-crowned Yellowthroat (*G. poliocephalus*), White-lined Tanager (*Tachyphonus rufus*), and Buff-throated Saltator (*Saltator maximus*). A review of the literature indicates that hosts feeding cowbird young rarely produce host fledglings, but there are only limited data. Many formerly unparasitized host species are expected to be parasitized in the future in Costa Rica and other locations because of the habitat modification by humans that allows cowbirds to move into new areas and contact new host species. [Dept. of Zoology, Univ. of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada.]—Robert C. Beason.

POPULATION DYNAMICS

(see also 20, 28, 30)

23. **Population trends of Black Terns from the North American Breeding Bird Survey, 1966–1996.** B. G. Peterjohn, and J. R. Sauer. 1997. Colon. Waterbirds 20:566–573.—The authors summarize Breeding Bird Survey (BBS) trend estimates for Black Terns (*Chlidonias niger*) from 1966–1996. They examine temporal and geographic changes for states, provinces, physiographic strata, and regions. The BBS consists of annual counts along about 4000 39.4 km routes, but is not designed to effectively deal with semi-colonial nesting birds, so trend estimates are likely to be imprecise. However, trends indicate significant population declines for the Eastern BBS Region, Canada, and North America, particularly in the prairie provinces of Canada where the largest populations occur. Declines survey-wide are most pronounced from the mid-1960s through the 1970s, with some increases in the 1990s. Increases in the northern Great Plains since 1991, particularly in North Dakota, have produced an overall increase since 1980 for the United States. The positive correlation between data on Mallards (*Anas platyrhynchos*) collected by the U.S. Fish and Wildlife Service and the Canadian Wildlife Service, and the BBS data on Black Terns, particularly in the prairie provinces, suggests

that breeding habitat loss may have contributed to the declines in both species. Counts of pond correlations with Black Tern numbers also support the hypothesis that habitat loss has been influential in Black Tern population declines. The authors discuss ways to improve the precision of the BBS data, e.g., increase the number of routes in wetlands or by using stratified random sampling procedures, point out the current deficiencies in our knowledge of Black Tern population dynamics and breeding ecology, and the need to identify "source" and "sink" regions. [USGS, Biological Resources Division, Patuxent Wildlife Research Center, Laurel, MD 20708, USA; E-mail: Bruce_Peterjohn@nbs.gov]—William E. Davis, Jr.

ZOOGEOGRAPHY AND DISTRIBUTION

(see 15, 22, 30)

SYSTEMATICS AND PALEONTOLOGY

(see 32, 33)

PHYSIOLOGY AND DEVELOPMENT

(see also 26, 29)

24. **Salt tolerance of nestling Laughing Gulls: an experimental field investigation.** J. J. Dosch. 1997. Colon. Waterbirds 20:449–457.—Laughing Gulls (*Larus atricilla*) are coastal nesting marine birds with well developed salt glands. However, in young birds salt glands do not perform as well. Laughing Gull chicks on salt marsh islands have no access to fresh water, and rely on their parents for food. The author hypothesized that Laughing Gulls feed their chicks inland food in order to reduce osmotic stress and thus enhance chick growth and probability of survival. He predicted that experimentally enhanced salt loads would reduce chick growth rates and decrease the probability of survival. In 1993 three groups of nestlings were given different levels of salt (NaCl) supplement (20, 40, and 60 mg) three times a week and a control group none. In 1994, one group received a salt supplement of 500 mg kg^{-1} of body weight, a second group was given a water supplement, and a control received nothing. In 1993, salt supplements significantly affected chick growth. The 60 mg group weighed less, had shorter culmen and head length measurements, and grew more slowly than the controls. The effect of salt on growth was greater for younger chicks than older ones, suggesting that chicks' ability to process the salt supplement increased with age. There were no significant treatment effects in the 1994 experiments, perhaps because the salt dosages were too low. The author concluded that the 1993 experimental results indicate that Laughing Gull development is impaired by a high salt diet. Excreting salt is energetically expensive and hence reduces the energy available for growth. Because survival rates are correlated with growth rates, adult gulls should provide low salt food to enhance the probability of chick survival. Since adult Laughing Gulls do not feed their chicks food from the surrounding marine environment, but forage inland, the experimental results are consistent with the hypothesis that the adults forage inland to provide low-salt food. The author suggests that colony site selection may be influenced by low-salt food availability. [Dept. Biological Sciences, Benedictine Univ., 5700 College Road, Lisle, IL 60532, USA; E-mail: jdosch@ben.edu]—William E. Davis,

25. **Avian body masses from the Cerrado Region of central Brazil.** M. A. Marini, J. C. Motta-Junior, L. A. S. Vasconcellos, and R. B. Cavalcanti. 1997. Ornithol. Neotrop. 8:93–99.—The major part of this paper is a table of the mean body masses of 103 species of birds from central Brazil. The means are based on 878 specimens and subdivided by sex and age where the information is available. This should be a valuable resource for researchers seeking body mass data on tropical species. [Univ. Federal de Minas Gerals, Dept. de Biologia Geral, ICB, Belo Horizonte, MG 30161-970, Brasil.]—Robert C. Beason.

PLUMAGES AND MOLT

26. **Farbabweichungen beim Schwarzspecht (*Dryocopus martius*). [Color deviations in the Black Woodpecker (*Dryocopus martius*).]** W. Thiede. 1996. Mitteilungen des Vereins Sach-

sischer Ornithologen 8:23–25. (German, English summary).—Thiede reviewed all known reports of albinistic Black Woodpeckers and concludes that there is no evidence for true albinism in the species. Leucistic individuals were also rare and four of the six cases involved white feathers associated with sites of past injuries. In addition to these, Thiede found two cases of chlorism, one of melanism, and one of schizochroism. [An der Ronne 184, D–50859 Cologne, Germany].—Jerome A. Jackson.

PARASITES AND DISEASE

(see also 22, 29)

27. **Breeding Great Tits *Parus major* avoid nestboxes infested with fleas.** S. Rytkönen, R. Lehtonen, and M. Orell. 1998. Ibis 140:687–690.—Fleas have a negative impact on Great Tit reproductive performance, both in the quantity and quality of offspring produced. In this study, the authors tested whether Great Tits used either (1) the number of fleas in a nest box, (2) the presence of old nest material in a nest box, or (3) the age of a nest box, as cues when selecting nest sites. These factors were measured separately because old, cleaned nest boxes may still contain fleas, and new nest boxes may acquire fleas carried by birds searching for nest sites. The study was conducted in an 8-km^2 area of coniferous and deciduous forest in northern Finland. Breeding density of Great Tits was estimated at 3.4 pairs per km2, and each pair could choose, on average, from among four nest boxes. Nest boxes were checked for fleas in May at the onset of breeding and categorized as having either no fleas, <10 fleas, 10–100 fleas, or >100 fleas. The number of fleas in a nest box significantly affected nest–site selection. Nest boxes with high numbers of fleas were avoided, and sites with low (<10 fleas) infestation were selected only occasionally (11% of all nests). None of the other factors affected nest–site selection. These results suggest that Great Tits make their decision by direct observation of flea numbers and not by some other cue that may relate to the presence of fleas (e.g., presence of old nest material). The authors caution that local differences in adaptations to ectoparasite loads should be considered in nest box studies, and that these differences may account for some of the contradictory findings on the influence of ectoparasites on nest-site selection. Finally, the results of the present study provide support for nest boxes as a legitimate method for measuring the breeding parameters of cavity-nesting birds. Some have criticized the routine of cleaning nest boxes after fledging, claiming that parasite loads are thus artificially eliminated or kept at atypical low levels. However, this study demonstrates that removing old nest material does not necessarily result in the removal of fleas. [Dept. of Biology, Univ. of Oulu, P.O. Box 333, FIN–90571 Oulu, Finland.]—Karl E. Miller.

WILDLIFE MANAGEMENT AND ENVIRONMENTAL QUALITY

(see also 1, 2, 20, 21, 22, 23)

28. **Status, biology and management of the Black Tern: symposium summary and overview.** I. C. T. Nisbet. 1997. Colon. Waterbirds 20:622–625.—This paper reviews the 8 papers and 6 posters on aspects of the biology of Black Terns (*Chlidonias niger*), mostly in North America, presented at a symposium at the 20th Annual Meeting of the Colonial Waterbird Society at Charleston, South Carolina, October 1996. There is an emphasis on the limitations of the symposium and an analysis of what needs to be done in North America before effective management decisions can be made. The scope of the symposium was restricted to studies of terns on their temperate breeding grounds, but Black Terns spend most of the year on salt water at tropical wintering grounds. In Europe population declines have been greatest in the west in more degraded habitats suggesting that local factors on the breeding grounds have been important. The trends in North America are not as clearly related to local events and hence other factors, including those on the wintering grounds, may be important. It appears that the major declines of Black Terns occurred in the 1960s and 1970s, a pattern shared by other aquatic birds. North American studies have provided information regarding distribution, habitat and nesting requirements, and contaminant levels, but not much about productivity, survival, recruitment or dispersal that can be used to assess population viability. The author outlines the types of studies that will be needed to identify management and

restoration options. These include: better assessment of the numbers and trends in the main breeding range; productivity measurements; foraging, diet, and nutrition in relation to habitat variables; behavioral ecology; and metapopulation dynamics. The author suggests that many European studies could serve as models for research in North America. This is a provocative analysis of the status of research on Black Terns in North America. I recommend this paper to anyone interested in conservation biology. [I.C.T. Nisbet & Co., Inc., 150 Alder Lane, North Falmouth, MA 02556, USA.]—William E. Davis, Jr.

29. **DDE still high in White-faced Ibis eggs from Carson Lake, Nevada.** C. J. Henny. 1997. Colon. Waterbirds 20:478–484.—Twenty White-faced Ibis (*Plegadis chihi*) eggs collected in 1996 were analyzed for organochlorine pesticides and their metabolites, PCBs, and mercury. The author makes comparisons with contaminant levels from eggs collected in 1985 and 1986 in the same locality. DDE and DDT levels had not decreased from 1985–1986 levels, and the DDE mean (2.7 ppm), the 45% incidence of DDE > 4 ppm, and the 60% occurrence of DDT > 0.1 ppm were all higher. DDT was found in all eggs which suggests recent ibis exposure. Eggshell thickness was significantly negatively correlated with DDE and was 18% thinner than in pre-DDT era eggshells. The author suggests that 45% of eggs with >4 ppm DDE could produce a loss of 20% of the population's expected reproduction. No PCBs were detected but the mean mercury level was 0.7 ppm and 20% had >1.0 ppm, which are consistent with 1985–1986 numbers suggesting no change in mercury concentration during the decade. These levels probably do not effect reproductive success. The source of DDT and DDE is of concern. Ibises collected in 1985 had no DDT or DDE in their food, and hence the likely source of the contaminants is on the wintering grounds in Mexico or in staging areas in the Imperial Valley and Colorado River Valley, both known sources of DDT and DDE. The author suggests that it is important to locate the DDT/DDE source and that this might be accomplished by using satellite transmitters to locate wintering grounds. The source is likely to reflect localized current agricultural use or heavy historic use of DDT. This paper underscores the importance of information about the wintering habitat of migratory birds. [U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, 3080 SE Clearwater Drive, Corvallis, OR 97333, USA; e-mail: hennyc@fsl.orst.edu]—William E. Davis, Jr.

30. **Avifaunal and habitat changes resulting from conversion of native prairie to crested wheat grass: patterns at songbird community and species levels.** G.C. Sutter and R.M. Brigham. 1998. Can. J. Zool. 76:869–875.—Grassland birds as a group are demonstrating faster and steeper population declines than birds of any other ecological or taxonomic group. Habitat loss is generally implicated in the declines; one agent of habitat loss is conversion of prairie from native to exotic grasses such as crested wheat grass, used for livestock forage. The authors examined differences in habitat structure and bird populations in native mixed-grass prairie and prairie converted to crested wheat grass. They found significant differences in plant species richness, diversity, and evenness, and several measures of vegetation structure. They found no significant differences in bird community parameters or in abundances of individual species. However, based on the results of principal components analysis, the authors conclude that conversion of native prairie to crested wheat grass may affect grassland birds because of the differences in vegetation structure. [Royal Saskatchewan Museum, 2340 Albert St., Regina, SK S4P 3V7, Canada]—Scott W. Gillihan.

BOOKS AND MONOGRAPHS

31. **An overview of the field guides to Neotropical birds with remarks on their role in the development of Neotropical ornithology.** F. Vuilleumier. 1997. Ornithol. Neotrop. 8:195–236.—The overly long title says it all. This paper is not only a detailed comparison of all the field guides on Neotropical birds since 1928 but also a history lesson. The first part of the paper is an interesting historical overview of the field. Most of the remainder of the paper is an annotated list of the various guides listing not only their strengths and weakness, but also a little of the history of each book. The reviews are divided by geographical regions: Mexico and Central America, South America including adjacent islands, West Indies, and Galapagos Islands. This is certainly a paper to read if one is selecting field guides for Latin

America, and has the time to read it. The author's conclusion is that there is no one book that is "the best" field guide to birds in any part of the Neotropical Region. There are several excellent guides, several poorer ones, and some that are not adequate. Some countries have several guides available, others only one. [Dept. of Ornithology, American Museum of Natural History, Central Park West at 79th St., New York, NY 10024.]—Robert C. Beason.

32. **Parrots: A Guide to Parrots of the World.** T. Juniper and M. Parr. 1998. Yale University Press, New Haven, Connecticut. Hardcover, 584 pp., 88 color plates. $55. A field guide this is not—although touted as one by the publisher. It is simply too big and too limited in scope (psittacines) to be of much use as a field guide. This is, however, a very useful "popular" monograph focusing on the parrots of the world. The book begins with a 37-page introduction that outlines the layout, discusses the origin and evolution of parrots, describes problems associated with parrot systematics, reviews basics of parrot behavior, diet, breeding, ecology, and conservation. The conservation section lists CITES-listed species, recently extinct species, and then launches into a discussion of threats to parrots. Correctly topping the discussion is habitat loss; correctly placed next is the live bird trade, and the authors note that for some species the live-bird trade is the biggest problem. Other problems addressed include competition with introduced species, persecution and hunting, and stochastic effects of violent weather on small isolated populations.

Assessment of the problem of trade in parrots is clear: " . . .it seems that, for some collectors craving ownership of rare parrots, the only deterrent against the further depletion of already critically endangered birds is the full force of the law. Whether governments will exercise their legal powers is a different question. The illegal international trade in drugs and arms tend to occupy the attention of intelligence and enforcement agencies more fully than that in rare wildlife, whilst within the exporting countries themselves the general incapacity to act is often matched by the absence of high-level political interest in bringing to book well-organised and amply resourced traders."

The authors' assessment of captive breeding is much more realistic than that presented in so many other parrot books: emphasis is placed on maintaining habitats for wild populations. Captive breeding is seen only as a tool and "Under virtually any circumstances, captive breeding of rare and endangered species should be seen as part of a conservation plan that is first and foremost concerned with maintaining a secure and viable population of birds in the wild."

The 88 color plates immediately follow the introduction. These include 14 by Dan Powell, 41 by Kim Franklin, 7 by Carl D'Silva, 17 by Robin Restall, and 9 presumably by David Johnston, who is listed as an artist, but is not identified on the plates. A brief text providing general range and age and sex characteristics faces each plate. For some bizarre reason their is a black-and-white illustration of a budgerigar on the text page facing each of the plates. This varies in size and intensity from a small, sharp illustration to a large, shadow illustration—rather unpredictably. Most plates offer only profiles and smaller illustrations of birds in flight. A few, such as that with the Kea (*Nestor notablis*) includes birds in a habitat scene. Although most species are fairly represented on the plates, the portrait of the Citron-crested Cockatoo (*Cacatua sulphurea citrinocristata*) (Plate 14, by Franklin) doesn't come close to portraying the beautiful, uniform citron crest of this race, instead portraying the bird with a yellow cheek and a yellow crest that is slightly streaked with orange.

Species accounts (341 pp) include synopses on identification, voice, distribution and status, ecology, a few measurements, and geographic variation. Numbers in parentheses following species and forms mentioned in the text refer to numbered figures on the plates. Literature citations are not provided at appropriate places within the accounts, but a few references are listed at the end of each account. A black-and-white range map accompanies each account.

The 11–page index includes only common and scientific names—no subject entries. Common names are indexed by the species rather than by the generic part of the name—for example, the Caica Parrot (*Pionopsitta caica*) is indexed under C. The bibliography of about 750 references will be very useful to those seeking additional information, but also reveals an almost total reliance on English language publications. One has to wonder what gems have been overlooked.

In sum, this is a parrot book that provides a great deal of information about the parrots

of the world in a concise fashion and with a strong conservation perspective. Illustrations are generally excellent and useful. This book will be useful to amateur and professional ornithologists, to aviculturists, and to those who simply love parrots.—Jerome A. Jackson.

33. **Nightjars. A guide to the nightjars, nighthawks, and their relatives.** N. Cleere and D. Nurney (illustrator). 1998. Yale University Press, New Haven, Conn. 317 pp.; 36 color plates; maps and black-and-white illustr. $40.00.—This is the latest installment in the Helm series of "mini handbooks" or "super field guides" which cover groups of birds related by blood or habitat. Goatsuckers and their allies might seem at first glance a good group for this treatment—a small cadre of obviously related birds we need and want to know more about. After studying Nightjars, I am not certain I still agree that they are—one is immediately struck by thumbing through the plates that this is a numbingly uniform order of birds. However, perusing through the text would indicate that this book could prove invaluable as a reference, and after a more careful look, I continue to think so, with a few reservations.

This is an often excellent book. Reams of information, published together for the first time, gives us a very detailed account of nightjar habits, plumages, biology and distribution. If you have any interest in nocturnal birds, or wish to keep your bookshelf complete, I encourage you to purchase this volume. If you do, you will get what you have come to expect. A wealth of beautifully illustrated plates juxtapose species with which we are familiar, with many more obscure or unheard of until now. Species accounts provide more information than most of you ever wanted to know on such minutiae as the exact size, shape and glossiness of eggs, and the scientific names of known prey items. These are bolstered by introductory chapters on such topics as structure and mechanics, plumages and molt, and the fossil record, and a plump bibliography. The author has obviously worked very hard to synthesize a plethora of information. You will probably not be disappointed. I wonder about the natural progression of such books, though; authors tend to want to better the last best attempt to put everything together in one place correctly and elegantly. Have we gone beyond what one human can properly synthesize in the span of time provided by a publisher? Why is it so easy to delve into such a book and locate silly errors that quickly begin to detract from the trustworthiness of the great bulk of not-easily-checkable facts?

The maps appear nicely detailed, but compare them to those in a current field guide (at least for North American species). What can be said of a book that draws the "breeding range" of Lesser Nighthawk neatly around the political boundaries of Louisiana based on "sporadic" records for that state (in reality a pattern of migratory vagrancy)? Will not those ignorant of such things assume that the Lesser Nighthawk breeds in Baton Rouge, simply because it is now published in Nightjars?

The artwork in the plates is uneven. Nurney's technique is fine enough for the larger-format sitting birds (although they are no equal to Chuck Ripper's feather detail in the National Geographic guide). Smaller depictions of flying birds defeat him, and often the facing-page written descriptions tell us to look for marks that we cannot see in the illustration—e.g., the differences between flighted males and females of Red-necked Nightjar on Plate 23. (A Nightjars game: Can you find a species for which sexual dimorphism differences for the aforementioned marks are depicted but not cited? Can you locate another that shows the nominate field mark on the resting bird, but not on the one in flight?) Some of the large-format illustrations, such as those for North American nighthawks, are too contrasting, with bold black-and-white patterns on wing coverts which do not agree with my experience or with other references. The Caprimulgus appear more true to form.

This book puzzles me. How can someone show great attention to detail only some of the time? Other criticisms such as the placement of a glossary here, the use of inappropriate jargon there, no longer bear mentioning in light of basic flaws in maps and illustrations. However, in balance, I must repeat that the content of Nightjars is too voluminous to pass up for some, and the chance to see all the goatsuckers illustrated together too tempting to dismiss. Caveat emptor—double-check information when possible, if it is important to you. While certainly much of this information-packed book is reliable, there is enough amiss here to annoy perfectionists.—Malcolm F. Hodges, Jr.