J. Field Ornithol., 61(3):356–374

RECENT LITERATURE

Edited by Jerome A. Jackson

MISCELLANEOUS

1. **WORLD BirdBase.** Santa Barbara Software Products, 1400 Dover Road, Santa Barbara, CA 93103. (805)963-4886. $99.00.—WORLD BirdBase is a database program for managing personal bird sighting records. It is available for IBM/PC class computers, requires 640K RAM, a hard disk, and one 5¼″ or 3½″ disk drive. Documentation is provided in a 76-page user's manual.

The WORLD BirdBase system allows bird sightings to be entered into a database. Each sighting record is composed of species name, information on when and where the sighting occurred, and personal comments. In addition, the system maintains 9 life lists to which sightings may be added: an inclusive life list, containing the names of all birds the user has ever seen, country, region, local, and home life lists, and up to 4 user-defined special life lists.

An interesting feature of the system is the way species names are handled. When new sightings are recorded, the user draws the bird's name from a built-in list of names. This list contains approximately 9300 entries and is based on James Clements' *Birds of the World: A Checklist,* 3rd ed., 1989. Common, family, and species names are provided as well as scientific Order, Family, Genus, and species names. Search facilities are provided to help the user locate entries, and it is possible to update the list to reflect the addition of new species or changes in taxonomic assignment.

Information in the database may be accessed in several ways. It is possible to display the various life lists on-line or generate printed output. Sighting records can be accessed one at a time or assembled into summaries based on dates or locations. In addition, the system provides several useful utilities for deleting and modifying records, and it is possible to create output files that can be used by other application programs.

The major drawbacks of the system concern its user interface. A significant amount of the system's functionality is invoked through single key presses. Several of the menus explaining the operation of the keys are long and confusing. In other contexts, information provided on the screen was insufficient to perform a given task, making it necessary to refer frequently to the user's manual. There are also contexts from which it is difficult to escape if the user decides to abort an operation. The system enforces a rigid format for recording information, which is particularly annoying in a personal database system. Since the system is PC-based, it lacks the power and flexibility required for many types of scientific applications.

I found the WORLD BirdBase program to be interesting and potentially useful. The software performs well, and the documentation is complete and easy to understand. I recommend the system to serious birders interested in developing a simple database for their sightings.—John L. Schnase.

BANDING AND LONGEVITY

(see 15)

MIGRATION, ORIENTATION, AND HOMING

2. **Simulated navigation based on unreliable sources of information (Models on pigeon homing, part 1).** H. G. Wallraff. 1989. J. Theor. Biol. 137:1–19.—Using a simulation model, the author examines how unreliable sources can be used for orientation. The model assumes that homing is a two-step process in which the bird uses one strategy until it reaches a familiar area (assumed to be 10 km from home), when it switches to a different strategy. For the distant strategy, the author concludes that several unreliable sources provide about the same accuracy as a few reliable sources; this accuracy is within the range of accuracy shown by homing pigeons (*Columba livia*). However, the model is very simplistic in that the bird can either head towards or away from home. Consequently, any bias to a random process will result in the bird eventually reaching the home area. The results of

the simulation are not completely convincing that such a mechanism would work for navigation. However, as the author points out, there is no reason to assume that birds would only use a two co-ordinate system for position fixing. Instead, several sources could be used. Such redundancy would allow the use of less reliable cues, although it might result in an indirect path home. [Max-Planck-Institut für Verhaltensphysiologie, D-8130 Seewiesen, Federal Republic of Germany.]—Robert C. Beason.

3. Simulated navigation based on assumed gradients of atmospheric trace gases (Models on pigeon homing, part 2). H. G. Wallraff. 1989. J. Theor. Biol. 138:511–528.—In this paper the author extrapolates from his previous paper on unreliable cues (above) to atmospheric odors for use in olfactory navigation. Based on his deterministic model, Wallraff concludes that olfactory navigation seems possible, but incorporation of stochastic factors to make the model more realistic has not been attempted. Such factors could nullify the deterministic model. In one example, the author used three odor sources and their gradients for navigation by a simulated pigeon. He has the pigeon comparing the actual concentrations of the odors where the pigeon is with the remembered concentrations at the home loft. Although he considers the three odors to be independent sources of information, they are subject to the same atmospheric phenomena, and therefore cannot be considered to be independent. Most significantly, he ignores wind in his model. The use of olfactory orientation by homing pigeons is being strongly questioned. Although these papers show how multiple, independent, unreliable cues can be used for navigation, they do little to clarify the impasse regarding olfactory navigation. [Max-Planck-Institut fur Verhaltensphysiologie, D-8130 Seewiesen, Federal Republic of Germany.]—Robert C. Beason.

POPULATION DYNAMICS

(see also 36, 40, 41, 42)

4. Changes in the population sizes of some scarce winter visitors. C. F. Mason. 1989. Bird Study 36:145–146.—The annual reports of the Leicestershire and Rutland Ornithological Society over the period of 1957 to 1986 were used in order to gain information on the changes in population sizes of scarce winter birds in Leicestershire County. The surveys showed a decline in several species since the early 70s, with peak numbers occurring in the late 60s and early 70s. Similar findings were reported from an earlier study in Derbyshire. Possible causes are discussed. Additionally, the author describes an index which can be used to compensate for the increase in number of observers participating in censuses in recent years. [Dept. of Biol. Univ. of Essex, Wivenhoe Park, Colchester, Essex CO4 3SQ, UK.]—Robin J. Densmore.

5. The numbers of autochtone population of the White Storks, *Ciconia ciconia*, in the area of the community of Grubisno Polje. [Brojnost Zavičajnih bijelih roda, *Ciconia ciconia*, na Području općine Grubišno Polje.] A. Delic and I. Matijevic. 1988. Larus 40:1–5. (Croato-Serbian, English summary and table captions.)—The local population of White Storks remained stable at 39–42 nesting pairs during 1985-1987 and productivity of fledglings steadily increased over the period from 2.4 young/nest to 2.8 young/nest. Suitable nest sites are declining in numbers and the storks are being forced to use utility poles which expose the birds to the danger of electrocution. Artificial nesting platforms are recommended. [43290 Grubišno Polje, Yugoslavia.]—Jerome A. Jackson.

NESTING AND REPRODUCTION

(see also 5, 16, 29, 30, 31)

6. Duration of fertility in Capercaillie hens after separation from males. H. Parker, H. Mjelstad, and J. T. Solheim. 1989. Ornis Scand. 20:307–310.—The Capercaillie (*Tetrao urogallus*) is a forest-dwelling lek species. Females may renest following loss of a first clutch. Radio-tagged females known to have lost a clutch have visited leks 2–4 weeks later, presumably to remate prior to renesting. Are new matings required for production of fertile eggs late in the nesting season?

Grouse were housed individually in an aviary in western Norway. Beginning in April,

single females were placed with two displaying males for about 24 h each meeting. Eggs were collected daily and checked for fertility after 10 days in an incubator. Fifteen females were allowed intermittent access to males until laying began (experimentals); 15 others were allowed access to males prior to and throughout the laying period (controls). Four experimental females laid fertile eggs for an average of 24 days (range = 22–26 days), and four controls for an average of 22 days (range = 19–29 days), after separation from males. In the wild, an average clutch contains 7 eggs laid over a 9-day period. Egg-laying begins 4 days after mating, and a typical hen takes 12 days to complete a clutch after copulating. A fertile second clutch without renesting is possible if the first nest was lost at clutch completion, and if the renest began within a few days after the loss. However, the typical Capercaillie female that has lost a clutch does not renest until 3–4 weeks after the main breeding period for the population, suggesting that new matings are needed to produce fertile second clutches.

Apparently, Capercaillie store sperm long enough to fertilize a first clutch but not a renest. This trait may be adaptive, allowing females to choose a new mate following clutch failure. Indeed, Capercaillie and Greater Prairie-Chickens (*Tympanuchus cupido*) have been seen re-mating at new leks after losing a first clutch. [Thormohlensgt 12, N-5006, Bergen, Norway.]—Jeff Marks.

7. Consequences of variation in brood size on the allocation of parental care in Common Terns (*Sterna hirundo*). D. A. Wiggins. 1989. Can. J. Zool. 67:2411–2413.—Parental care in Common Terns was studied to determine if there were differences in parental care with changes in brood size. Primary roles of the parents at the nest did not change with brood size. Nest attendance among females did not change with brood size, but male attendance was higher for 3-chick broods than for 1-chick broods. As brood size increased, the number of chick feeds increased, but the number of feeds per chick per hour did not. No correlation was found between the rate of delivery and the size of prey delivered. Therefore, the parents increased their foraging efforts as brood size increased, but chicks were fed at similar rates regardless of brood size. More data are necessary to determine if the allocation of food within the brood is biased. [Dept. Biol. Sci., Brock Univ., St. Catharines, Ont., Canada L2S 3A1.]—Lori A. Willimont.

8. Parental care by male-female and female-female pairs of Ring-billed Gulls. M. R. Conover. 1989. Colonial Waterbirds 12:148–151.—Female-female pairs of nesting Ring-billed Gulls (*Larus delawarensis*) often occur in colonies where females outnumber males, but reproductive success is usually low compared to male-female pairs. The author tested the hypothesis that high egg and chick mortality results from lower levels of parental care. In the Washington State colonies studied, female-female pairs attended 79% of 5–6 egg clutches while male-female pairs attended 98% of 2–3 egg nests, but there was no difference in the number of chicks per nest between the groups. All adult birds were individually marked and their presence on territory and behavior observed from blinds. There was no significant difference between female-female and male-female pairs in percentage of time in the incubation period when adults were on territory, eggs were incubated, or territory was defended. During the chick-rearing period female-female pairs were on territory significantly more often than male-female pairs. Comparisons during the incubation period of female behavior from female-female pairs with both male and females from male-female pairs showed no significant differences. Females from female-female pairs in the chick-rearing period spent significantly more time brooding than did females from male-female pairs, and more time in territorial defense than either males or females. The author concludes that female-female pairs provide as much parental care as male-female pairs. [Dept. of Plant Pathology and Ecology, Connecticut Agricultural Experiment Station, Box 1106, New Haven, CT 06504.]—William E. Davis, Jr.

9. Breeding biology of Linnets *Carduelis cannabina* under subalpine conditions. [Brutbiologie des Hänflings *Carduelis cannabina* unter den Einflüssen des Gebirgsklimasü.] M. Frey. 1989. Ornithol. Beob. 86:265–289.—Subapline breeding Linnets occupy dwarf shrub habitat in Switzerland. Linnets begin establishing territories in mid-April when about 90% of the ground is still snow covered. Egg laying begins around 20 May regardless of snow cover. Nest building, incubation, and rearing of young take longer in subalpine habitats than at lower elevations. Overlapping broods allow the production of second broods. Clutch

size is influenced by the amount of food (seeds) available. Before seeds of the year are available, the male feeding contributes significantly to the energy obtained by the female. Nest success is largely determined by weather conditions. All nests may be lost in bad weather. [Pourtalésstrasse 25, 3074 Muri b. Bern, Switzerland.]—Robert C. Beason.

10. Contributions to the ecology and ethology of the Goshawk (*Accipiter gentilis*) in southeastern Yugoslavia. [Prilozi za ekologiju i etologiju jastreba kokošara (*Accipiter gentilis*) u jugoistočnoj Jugoslaviji.] B. Grubac. 1988. Larus 40:97–110. (Croato-Serbian, English summary and figure captions.)—Data on habitat, nest-sites, nest construction, clutch and brood size, hunting behavior, prey selection, and interspecific interactions are presented for the period 1975–1986. Eleven nesting pairs were found in deciduous forest habitats. All nests were on older branches of trees at a height of 6–14 m. Egg-laying occurred 1–20 April; clutch size for 10 nests averaged 3.3 (2–4) eggs. Fledging was from late June through July and included an average of 2.8 young from five nests. Prey included domestic chickens (*Gallus*), pigeons (*Columba livia*), Blackbird (*Turdus merula*), Jackdaw (*Corvus monedula*), and a reptile (*Lacerta* or *Anguis*). The Barn Swallow (*Hirundo rustica*), Hooded Crow (*Corvus corone*), and Lanner (*Falco biarmicus*) were noted mobbing or attacking Goshawks. One Goshawk was killed by an Eagle Owl (*Bubo bubo*). [37254 Konjuh, Yugoslavia.]—Jerome A. Jackson.

BEHAVIOR

(see also 7, 8, 10, 37, 43)

11. Sexual and antagonistic behavior of Bar-tailed Godwits on the breeding grounds. I. Byrkjedal, T. Larsen, and J. Moldsvor. 1989. Ornis Scand. 20:169–175.—Based on one season's research in northern Norway, this paper presents the first detailed account of the breeding behavior of Bar-tailed Godwits (*Limosa lapponica*). Nine different vocalizations and their functions are described. Also depicted are ground and aerial courtship, copulation, nest-scraping, and aggressive behaviors. [Museum of Zoology, Univ. Bergen, N-5007 Bergen, Norway.]—Jeff Marks.

12. Winter roosting patterns of Bald Eagles (*Haliaeetus leucocephalus*) in north-central Arizona. T. G. Grubb, S. J. Nagiller, W. L. Eakle, and G. A. Goodwin. 1989. Southwest. Nat. 34:453–459.—Between 12 February and 5 April 1986, 98 nocturnal observations were made of four immature, transmitter-equipped Bald Eagles at 28 roost locations in Coconino and Yavapai counties. This preferential use of roosting habitat (89% of the roosting occurred in 66% of the roosts) was most notable in areas clustered around the three lakes on the study area. Locations of roosts and frequency of use varied significantly among the four radio-equipped eagles, and two or more of the marked birds roosted together at the same site less than one third of the time. No roost was occupied by any of the eagles for more than four consecutive nights. Their mean minimum seasonal home range was 401.2 km^2. These eagles continually ranged throughout the study area, a pattern perhaps indicative of their diurnal foraging patterns for ephemeral prey in the area. [USDA Forest Serv., Rocky Mt. Forest and Range Exp. Sta., Forestry Sci. Lab., Arizona State Univ., Tempe, AZ 85287 USA.]—Danny J. Ingold.

13. Northern Harriers on feeding territories respond more aggressively to neighbors than to floaters. E. J. Temeles. 1990. Behav. Ecol. Sociobiol. 26:57–63.—It has been generally noted that multi-purpose territorial owners respond more aggressively towards floaters than towards established neighbors, an observation termed the "dear enemy phenomenon." One hypothesis in explanation of this phenomenon is that familiar neighbors fight very little because they have little to learn about one another, whereas strangers fight more since they must determine whether there is anything to gain from interacting with a particular opponent ("fighting to learn" hypothesis). From late November through January of two winters, the responses of nine adult female Northern Harriers (*Circus cyaneus*) towards three types of intruders (neighbors, female floaters, and male floaters) were observed on their feeding territories in Yolo County, California. Data from these observations suggest that responses favoring the "dear enemy hypothesis" did not occur. Although the nine territorial owners did not differ significantly from each other in the way they responded to

the three intruder types, the owners' responses to neighbors involved flight more often than did the responses to either female or male floaters. Owners acted less aggressively towards female floaters (mostly calls and flights), and even less aggressively toward male floaters (mostly calls and no response).

Duration and intensity of interactions of territorial owners over time further weaken hypotheses supporting the "dear enemy phenomenon." Interactions involving owners and neighbors were significantly longer ($P < 0.05$) than interactions involving either owners and female or male floaters. In addition, the proportions of the three types of responses involving owners and the three intruder types were consistent over time. These data suggest that owners and neighbors may have more to gain or lose from interactions, since such interactions were often over the locations of their borders rather than a single prey item taken by floaters. Thus, whether owners interact more aggressively with neighbors than with floaters, or whether neighbors are "dear enemies" may be determined by the potential payoffs from interactions with these groups. [Dept. Zool., Univ. of Tennessee, Knoxville, TN 37996 USA.]—Danny J. Ingold.

14. Bi-coordinate sound localization by the Barn Owl. A. Moiseff. 1989. J. Comp. Physiol. A 164:637–644.—The behavioral responses of two hand-reared Barn Owls (*Tyto alba*) to dichotic auditory stimulation was investigated using earphones. The difference in sound arrival time to the two ears (intraural time difference = ITD) was important in the owls' determination of horizontal azimuth of the sound source, and the difference in sound intensity (interaural intensity difference = IID) was used by the owls to detect differences in elevation of the sound source. The final orientation of the owls' heads was uniquely defined by an ITD and an IID, resulting in a bicoordinate system localizing sound. Although each axis was not perpendicular to the other, each spatial location had a unique set of ITD and IID values. [Dept. Physiol. & Neurobiol., Univ. Conn., Storrs, Conn. 06269-3042.]—Robert C. Beason.

15. Daily activity of birds based on results of the Operation Baltic in the Krkonose Mountains. J. Flousek and M. Smrcek. 1984. Opera Corcontica 21:103–126. (Czech, English and Russian summaries, table and figure captions.)—This study summarizes daily activity of 8 passerine species during the breeding season, pre-migratory dispersal, and fall migration. Data were collected at two permanent banding stations located near the top of the Krkonose mountain ridge over the course of 10 years. Daily activity was evaluated by recording the number of birds mistnetted at 11 time points throughout the day. During the breeding season, the activity was relatively well-balanced throughout the day, with maximum prevailing in the morning and minimum at noon. During the fall migration, most birds migrated during the morning hours, just after the sunrise (Robin *Erithacus rubecula,* Dunnock *Prunella modularis,* Redpoll *Carduelis flammea,* Siskin *Carduelis spinus*) or late in the morning (Chiffchaff *Phylloscopus collybita,* Willow Warbler *Phylloscopus trochilus,* Chaffinch *Fringilla coelebs,* Red Crossbill *Loxia curvirostra*). The migration activity rapidly declined before noon and remained low in the afternoon. Only the Robin and Dunnock exhibited increased activity before sunrise.—Jaroslav Picman.

ECOLOGY

(see also 10, 20, 21, 32, 33, 38, 39, 46)

16. Habitat availability and suitability for Loggerhead Shrikes in the upper midwest. B. L. Brooks and S. A. Temple. 1990. Am. Midl. Nat. 123:75–83.—The authors examined Loggerhead Shrike (*Lanius ludovicianus*) breeding habitat from mid-April through mid-August 1986–1987, in southern and central Minnesota. The study sites were centered on 48 breeding pairs of shrikes in nine counties. Loggerhead Shrikes nested in 13 tree species, and most frequently used trees that were shrubby or bushy in nature (i.e., redcedars, *Juniperus virginiana*; 44%). Sixty-one percent of the nests were in isolated trees (trees with no overlapping canopies), and the mean nest height was 2.3 m. Most nests (45%) were located between agricultural fields in open grassland habitat, and none was nearer to buildings than would be expected by chance ($\chi^2 = 0.228$).

The authors formulated habitat suitability indices based on relationships among various habitat parameters and measures of reproductive performance such as fledging rate, nestling success, or nestling growth. Their data suggest that: (1) nestling growth rate was positively correlated with percent cover of grassland and percent of potential foraging habitat, (2) nesting success was positively correlated with percent cover of grassland, and (3) fledging success was positively correlated with the percent of herbaceous ground cover and with the percent cover of grassland.

Loggerhead Shrike frequencies in suitable and unsuitable habitat were estimated by collecting data at 312 road-transect sites. Based on the authors' habitat suitability index models, 139 (45%) of these sites were classified as suitable shrike habitat. However, shrikes were observed on only 20 of these sites (14%), suggesting that this species is well below its carrying capacity and is perhaps not limited by the availability of suitable breeding habitat in Minnesota. [Dept. of Wildlife Ecol., Univ. of Wisconsin, Madison, WI 53706 USA.]—Danny J. Ingold.

17. "Killer clams" in Sarasota Bay. R. E. DeLynn, G. W. Patton, and H. F. Anderson. 1989. Underwater Naturalist 18(3):20.—A Great Egret (*Casmerodius albus*) died and a Brown Pelican (*Pelecanus occidentalis*) was rescued after each apparently pecked at average-sized quahogs (Mollusca: *Mercenaria* sp.) which closed tightly onto each bird's beak in coastal Florida.—Jerome A. Jackson.

18. Long-term ecological studies of seabirds. I. C. T. Nisbet. 1989. Colonial Waterbirds 12:143–147.—In this provocative editorial Nisbet examines the success of North American ecological seabird studies of at least 15 years in which the same "populations, colonies, and/or marked individual seabirds" have been investigated. Long-term studies are necessary in long-lived species in order to determine important population parameters, and seabird populations are subject to sporadic catastrophic events such as hurricanes or El Niño events, the importance of which may be overlooked in short-term studies. Nisbet suggests that seabird populations are generally unstable and that short-term studies, without complementary long-term studies, can be misleading. He contends that in general, the productivity of long-term studies in North America has been unimpressive, and documents how few studies on the ecology of seabirds use data from long-term studies. Lack of stable funding and institutional support are cited as major problems in long-term studies. In addition, the orderly succession of investigators is inhibited by lack of long-term institutional commitments, as well as by human personality factors.

Nisbet sees little hope of major funding agencies changing their short-term biased policies, but offers two other solutions. First, referees of papers and grant applications should be hesitant to recommend studies which are flawed because they are short-term in duration. Second, there should be closer cooperation between individuals conducting long-term studies and "mainstream" scientific institutions, in which personnel from graduate students to senior researchers could take advantage of the availability of populations of known-age marked birds. Cooperation of this sort would help to bring North American long-term work on seabirds up to world standards. The author concludes, "The alternative to cooperation, however, is continued mediocrity of the 'mainstream' programs."

This provocative essay has a sharply critical tone and should be read by all seabird biologists. [I. C. T. Nisbet & Company, Inc., 72 Codman Road, Lincoln, MA 01773.]—William E. Davis, Jr.

19. Relative abundance and habitat preferences of Least Bitterns (*Ixobrychus exilis*) in the Everglades. P. C. Frederick, N. Dwyer, S. Fitzgerald, and R. E. Bennetts. 1990. Fla. Field Nat. 18:1–9.—Least Bitterns were most often found in association with pure sawgrass (*Cladium jamaicencis*) or mixed sawgrass/cattail (*Typha* spp.) and were most often found along airboat trails rather than along canals or in open grassland. Less than 3% of the bitterns censused were hit and killed by the authors' airboat, but they note that since they were looking for bitterns and did everything they could to avoid hitting them, the level of bittern mortality due to recreational airboating is likely higher. [Dept. of Wildlife and Range Sciences, 118 Newins-Ziegler Hall, Univ. of Florida, Gainesville, FL 32611.]—Jerome A. Jackson.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 5, 32, 36)

20. Waterfowl of the "Končanica" Fishery. [Ptice mõčvarice Ribnjačarstva "Končanica."] A. Delic. 1988. Larus 40:25–33. (Croato-Serbian, English summary.)—Add this paper to the growing body of literature dealing with birds at fish farms/aquaculture facilities. Thirty-eight bird species were recorded in the vicinity of the fish farm, 14 of which nested in the area. Great Cormorants (*Phalacrocorax carbo*) were among the more numerous visitors and nested in the area in 1985. Although considered an important ornithological biotope because of its location on major migratory routes, that value is somewhat diminished by the work activities at the facility and by hunting of Mallards (*Anas platyrhynchos*) and Eurasian Coots (*Fulica atra*) from August through February. [43290 Grubišno Polje, Yugoslavia.]—Jerome A. Jackson.

21. First data on ornithofauna of the fish pond near Srpski Miletić and its surroundings (western Bačka). J. J. Purger. 1988. Larus 40:155–161.—Destruction of natural aquatic habitats has resulted in increased use of fish ponds by birds. The fishery facility in this study included two large ponds (about 370 ha), 14 smaller ponds, and a 2-km canal; the facility was established in 1971. During the 1980–1986 period of study, cattails (*Typha*) and reeds (*Phragmites*) covered about 80 ha. One-hundred-thirty-five species of birds were recorded during 43 visits and more than 60 species nested in the region. Data presented include frequency, status, and timing of occurence of species observed. [Petefi Sandora 12, 25243 Doroslovo, Yugoslavia.]—Jerome A. Jackson.

22. Plant and animal community responses to restored Iowa wetlands. T. G. LaGrange and J. J. Dinsmore. 1989. Prairie Nat. 21:39–48.—Four previously drained wetland basins were studied to determine plant and animal responses to reflooding. The study area in central Iowa is at the southernmost extent of the Prairie Pothole Region. Eleven species of wetland birds were observed. Confirmed nesters were Pied-billed Grebe (*Podilymbus podiceps*), Mallard (*Anas platyrhynchos*), Blue-winged Teal (*A. discors*), American Coot (*Fulicia americana*), Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*), and Red-winged Blackbird (*Agelaius phoeniceus*). The number of bird species observed in the restored wetlands was comparable to the number of bird species observed in other studies of unaltered Iowa wetlands. [Iowa Dept. Nat. Res., 1203 No. Shore Dr., Clear Lake, IA 50428 USA.]—Lori A. Willimont.

23. Use of cornfields by birds during the breeding season: the importance of edge habitat. L. B. Best, R. C. Whitmore, and G. M. Booth. 1990. Am. Midl. Nat. 123: 84–99.—Birds were censused in the centers and perimeters of cornfields and in adjacent edge habitats in Iowa and Illinois to determine how edge habitat affects cornfield use by birds during the breeding season. The mean number of bird species recorded per farm in the Illinois field edges was more than twice that of the Iowa farm edges (34.3 vs. 15.0, respectively); bird abundance in woodland edges (Illinois) was more than seven times that of herbaceous edges (Iowa). In contrast, the mean number of bird species observed in Illinois vs. Iowa cornfields was similar (9.3 vs. 11.3 in field centers and 18.3 vs. 16.0 in field perimeters, respectively), although species composition within those fields differed (only 8 of 30 species observed in fields were recorded at both sites). More bird species and about five times more birds used the perimeters of cornfields rather than their centers, demonstrating a significant edge effect. This edge effect (i.e., high bird abundance) is diminished as linear field edges decrease proportionally with overall increases in field size.

Cornfields were used most frequently by ground-feeding omnivorous birds that nest either on the ground or in low herbaceous vegetation. Conversely, most species that used cornfields only rarely were insectivores that forage on woody vegetation and nest in trees. The continuing trend in the Midwest of eliminating fence rows and woody vegetation and increasing field sizes will likely negatively alter bird species richness and abundance. [Dept. of Animal Ecol., Iowa State Univ., Ames, IA 50011 USA.]—Danny J. Ingold.

24. Researcher disturbance in colonies of wading birds: effects of frequency of visit and egg-marking on reproductive parameters. P. C. Frederick and M. W. Collopy.

1989. Colonial Waterbirds 12:152–157.—Studies of investigator disturbance in waterbird colonies suggest that disturbance before and during egg-laying may reduce reproductive success, while later disturbance may not. The effect of visit frequency, however, is not adequately documented. The authors investigated the effects of visit frequency on nesting Tricolored Herons (*Egretta tricolor*) and of egg-marking on 4 species of Ciconiiformes at 2 similar south Florida colonies in 1986–1987. One colony was visited frequently (16 visits, once every 4 days) and the other infrequently (7 visits, once every 8 days), and eggs of Tricolored and Little Blue herons (*E. caerulea*), Great Egrets (*Casmerodius albus*), and White Ibises (*Eudocimus albus*) marked on one side. The visits began after most nests contained eggs. There were no significant differences between frequently and infrequently visited samples in any reproductive parameters, including young fledged per successful nest. Marked eggs showed a significantly higher instance of eggs in "down" position in all species but Great Egrets, where the sample size was small.

The authors suggest that the relatively high reproductive success of Tricolored Herons in this study, and the fact that new nests were begun after initial investigator visits, indicate that investigator disturbance did not cause substantial reproductive problems. They caution, however, that the study has not been replicated, that species other than Tricolored Herons were not studied, and that there were few predators present to take advantage of investigator disturbance. The authors further suggest that deviation from normal egg-turning behavior could affect hatching success, and hence eggs should be marked, if at all, inconspicuously on the ends, or by a continuous circle around the short circumference. [Dept. of Wildlife and Range Sciences, 118 Newins-Ziegler Hall, Univ. Florida, Gainesville, FL 32611-0304.]—William E. Davis, Jr.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see also 16, 29, 31, 36)

25. Red-cockaded Woodpecker colony status and trends on the Angelina, Davy Crockett and Sabine national forests. R. N. Conner and D. C. Rudolph. 1989. U.S. Dep. Agric., Forest Service, Southern Forest Experiment Station, Research Paper SO-250. 15 pp.—Data are presented which document a severe decline in populations of the endangered Red-cockaded Woodpecker (*Picoides borealis*) on the national forests of east Texas between 1981 and 1988. Between 1983 and 1988, there has been an approximately 50% decline in the number of active colonies on each of these forests. By 1988, only 19 active colonies remained on the Angelina National Forest. By 1987, 27 active colonies remained on the Davy Crockett, and only 13 remained on the Sabine National Forest. By 1987, nine of the remaining active colonies included only one bird each.

Factors contributing to this decline are ones related to forest management. One very serious problem throughout the range of this species has been a lack of fire in the ecosystem and the resultant development of a dense hardwood understory—a habitat characteristic which Red-cockaded Woodpeckers do not tolerate. Extensive hardwoods within a colony area seem to result in increased competition from other cavity nesting species [but data from other studies also suggest possible negative influence on the foraging ecology of the birds]. Conner and Rudolph also attribute the decline to clearcutting which has resulted in isolation of colonies. Management suggestions provided which might help stabilize these populations and provide opportunities for recovery include maintenance and management of abandoned colony sites, an aggressive prescribed burning program, thinning of dense stands to reduce the hazard from southern pine beetle infestation, and drastic reduction in the size of clearcuts. [A recent court order has asked for elimination of clearcutting and institution of a selective cutting system of forest management in order to maintain forest integrity.]

As with other old growth forest species, the big question that remains is not whether or not we can learn what is necessary to manage the Red-cockaded Woodpecker in order to bring it back to a non-endangered status. We know what the species needs and, indeed, may know more about the Red-cockaded Woodpecker than about any other woodpecker species in the world. The real question is, are we willing to do what is needed? [Southern Forest Experiment Station, Box 7600 SFA Station, Nacogdoches, TX 75962.]—Jerome A. Jackson.

26. Endangered and rare birds in the alluvial wetlands of the Sava River on the Posavina/Croatia. M. Schneider. 1988. Larus 40:167–178.—Flood control projects in the past 15 years have inundated nearly 7900 km^2 of the Sava River Valley, and additional projects are underway. Thus far about 7% of the original alluvial wetlands have been saved and it is hoped that additional areas can be saved as the projects continue. One purpose of this 2-year study was to draw attention to the ornithological significance of the wetlands. Work in the Posavina included 269 days afield and resulted in observation of 218 bird species, including three species which are considered endangered over a broad area: White Stork (*Ciconia ciconia*), White-tailed Eagle (*Haliaetus albicilla*), and Corn Crake (*Crex crex*). All of these were breeding in the area. White Stork populations have declined since the beginning of flood control. About 15 pairs of eagles occur in the alluvial forests and 7 nests are known. Population changes of the eagles and Corn Crake are not discussed. Some annotation is given for 48 additional species. The Corn Crake is mentioned only in the summary! [Max-Planck-Institut für Verhaltensphysiolgie, Vogelwarte Radolfzell, Am Obstberg, 7760 Radolfzell 16, West Germany.]—Jerome A. Jackson.

27. Food habits and organochlorine contaminants in the diet of Black Skimmers, Galveston Bay, Texas, USA. K. A. King. 1989. Colonial Waterbirds 12:109–112.—In order to determine food habits and organochlorine contamination in Black Skimmers (*Rynchops niger*), 10 adults, 20 eggs, and food samples from chicks were collected from Galveston Bay colonies in 1980–1982. Seven fish species comprised 85% of the chick diet by weight and samples of the 5 most frequently encountered were subjected to chemical analysis. DDE levels were very low in the fish samples but all contained PCBs in concentrations up to 0.54 ppm. DDE levels were 650 times greater in skimmer carcasses and 320 times greater in eggs than in fish. Chlordane was not detected in fish but was present in a majority of carcasses and egg samples. DDE concentrations in skimmer carcasses were higher than in cormorant carcasses from the same area. Since skimmers were collected soon after their migration to Galveston Bay, King suggests that high DDE levels may reflect contamination on the wintering grounds. Much of the skimmer population winters on the coast of Mexico. PCB concentrations in skimmer carcasses were similar to those found in cormorants and gulls nesting in the Galveston Bay area. King concludes that the skimmer wintering areas were high in DDE, and had equal or lower concentrations of PCBs compared to the Galveston Bay area. DDE/PCB ratios in skimmer eggs appear to reflect local land use, since the eggs from the highly industrialized Galveston Bay showed lower DDE/PCB ratios (0.8/1) than eggs from agricultural areas (4/1; 4.6/1; 5/1). [U.S. Fish and Wildlife Service, Gulf Coast Research Station, P.O. Box 2506, Victoria, TX 77902.]—William E. Davis, Jr.

PHYSIOLOGY

(see 6)

MORPHOLOGY AND ANATOMY

(see also 33, 34)

28. The results of biometrical investigation of Coot (*Fulica atra* L. 1758) on the "Končanica" Fishpond. [Rezultati biometrijskih istraživanja vrste crna liska (*Fulica atra*, L. 1758) na ribnjačarstvu "Končanica."] A. Delic. 1988. Larus 40:7–10. (Croato-Serbian, English summary and table captions.)—Simple statistics for morphometric characteristics of 169 Eurasian Coots shot at the Končanica fish farm in Yugoslavia are presented by sex and compared with similar data from Austria and Germany. Measurements include bill, tarsus, tail, total length, and weight. Males were larger than females in all parameters. [43290 Grubišno Polje, Yugoslavia.]—Jerome A. Jackson.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 20, 21, 47, 48, 49)

29. Ringed Plover breeding population of the United Kingdom in 1984. A. J. Prater. 1989. Bird Study 36:154–159.—Data are presented from a 1984 census of Ringed

Plovers (*Charadrius hiaticula*) in the United Kingdom. Coastal and inland counts are given, inland being at least 0.8 km or one field from the coast line. Comparisons are made to a similar census in 1973/1974. A total of 2389 pairs was recorded in England, a 19.6% increase from the 1973/1974 census. Inland breeders increased by 123.8%, compared to an 8.1% increase in coastal breeders. An estimated 224 pairs bred in Wales, representing a 21.1% increase from the previous survey. One hundred thirty-four pairs were recorded in Northern Ireland, of which 35.1% were inland. The number of pairs estimated in Scotland was 5796, or about two-thirds of the total estimated number in the United Kingdom.

All inland habitats had an increase in the number of breeding pairs, with the greatest increases occurring on gravel pits and industrial sites. The inland habitats most often used by the Ringed Plovers were reservoir/lakeshore (28.5%), industrial (20.0%) and riverbed (19.5%). The coastal habitats most often used were beach (48.2%) and machair (27.5%). Overall, open beaches throughout most of the UK and the machair in the Western Isles were the most important. The importance of protected nesting areas for Ringed Plovers is exhibited through their heavy use of restricted nature reserves along the low coasts of eastern and southern England, even though this area of England is highly developed. [Aldwych House, Bethel St., Norwich, Norfolk, NR2 1NR, UK.]—Robin J. Densmore.

30. The Black Swift in the Chiricahua Mountains of Arizona. O. A. Knoor and M. S. Knoor. 1989. Southwest. Nat. 34:559–560.—On 14 July 1988, six Black Swifts (*Cypseloides niger*) were observed feeding at Cave Creek Road in the Chiricahua Wilderness Area in southern Arizona. The following day, at least one confirmed nest was found behind a waterfall west of the initial sighting. This is the first report of the Black Swift as a breeding bird in Arizona, and is exceptionally unique since there was a group of nesting White-throated Swifts (*Aeronautes saxatalis*) near the nesting Black Swifts (about 20 m from the falls on the same rock ledge over which the waterfall flows). [Inst. of Alpine Ecol., 4535 Lakewood Court, Reno, NV 89509 USA.]—Danny J. Ingold.

31. A case of competition between European Starlings and West Indian Woodpeckers on Abaco, Bahamas. L. A. Willimont. 1990. Fla. Field Nat. 18:14–15.—Add one more corner of the world where introduced starlings (*Sturnus vulgaris*) are becoming a problem for local species. West Indian Woodpeckers (*Melanerpes superciliaris*) are largely restricted to towns as a result of removal of the original native forest and forest management practices which have left few potential nest trees. In towns the woodpeckers nest mostly in coconut palms (*Cocos nucifera*) and now have to contend with starling competition for those sites. [Dept. of Biological Sciences, Box GY, Mississippi State University, Mississippi State, MS 39762.]—Jerome A. Jackson.

32. The status and habitat of the Nightjar in coastal Suffolk. N. O. M. Ravenscroft. 1989. Bird Study 36:161–169.—The purpose of this study was to collect data on the status and ecology of Nightjars (*Caprimulgus europaeus*) in the coniferous plantations and heathlands of coastal Suffolk. The study area was in the Sandlings region, which was once an extensive belt of lowland heath but has been greatly reduced by conifer plantations, agriculture, and urban development. Nightjars were widespread in the Sandlings prior to these changes. Censuses were conducted in 1981 and 1983 to 1987. The number of male Nightjars annually recorded continually increased during this period, from 34 in 1981 to 93 in 1987. Although some of this increase may have been due to increased coverage, most was attributed to the numbers breeding in coniferous plantations. The large increase in Nightjars in coastal Suffolk represents the colonization of a new habitat, which only recently became available due to the clearcutting and replanting of large areas of mature plantations.

Nightjars preferred the 1- to 5-year age-classes of restocked plantations, with the highest densities occurring in age-classes 3 and 4. Preferred tree height was between 0.5 and 1.75 m. Birds would not occupy clearings under 10 ha. Nightjar densities were higher in circular and square-shaped clearings than in clearings of irregular shape.

The suitability of the preferred habitat may be maintained for longer periods of time through the application of herbicides in order to suppress invading ground flora. [Suffolk Wildlife Trust, Park Cottage, Saxmundham, Suffolk IP17 1DQ, UK.]—Robin J. Densmore.

SYSTEMATICS AND PALEONTOLOGY

33. Future challenges of systematic ornithology. E. Mayr. 1989. J. Yamashina Inst. Ornithol. 21:154–164.—In this essay on the future of ornithology, Mayr reflects on the growth of ornithology as a science, noting a world-wide trend to increased professionalism and supplementation of descriptive material with causal analysis. While acknowledging the continued contributions of superb amateurs, he points out that they are now a minority. Ornithology is becoming much more integrated into the field of biology.

Because birds are better known taxonomically, ecologically, and biogeographically "This splendid factual foundation permits the establishment of more secure inferences from birds than from any other group of organisms." Mayr notes that ornithologists can "claim an important share in the development of three major basic concepts in biology. . . . the development of population thinking, . . . the recognition of the dual causation of all biological phenomena (proximate or physiological, and ultimate or evolutionary causations), . . . and . . . the realization that observation is of equal importance as a tool of scientific investigation as the experiment." [I'm afraid many biologists have still failed to grasp this latter concept!]

The available data base has been underexploited and Mayr provides insight into the opportunities available for future ornithological researchers. He separates the field of evolutionary biology into "microtaxonomy" and "macrotaxonomy," pointing out that while ornithology leads the way in species-level taxonomy, the classification of birds at higher levels has lagged behind until recent years.

In the field of microtaxonomy, Mayr suggests that we continue to carefully describe trends in variability of geographically variable species, but that we should assign subspecies names only to populations that are clearly distinct. At the species level Mayr notes that "What is needed now is a more systematic analysis of the population structure of species." At the genus level he suggests that we may "still recognize too many genera. . . ." It is the role of the genus to "bring together groups of species sharing common descent and . . . derived characters." But he decries a recent tendency to "place in a different genus every species that has a unique derived character."

At the macrotaxonomic level, Mayr praises the work of modern anatomists and molecular ornithologists in identifying new characteristics to examine. He acknowledges Charles Sibley in particular, pointing out that the newly established foundation based on DNA-DNA hybridization has made "the testing and improving of previously proposed classifications . . . now the most challenging and exciting task of the avian taxonomists."

Mayr points out that in spite of the promise of DNA-DNA hybridization and other molecular techniques, basic morphological research is still important. Other areas discussed include the problems presented by the concept of "mosaic ecolution"—the "uneven rate of evolution of different character complexes," the recognition of "successful" and "unsuccessful" families, paleoornithology, and avian ecology. On the latter topic, Mayr notes that "a good ornithologist must be a good naturalist." We must delve deeply into the interrelationships between birds and all aspects of their environment. [Museum of Comparative Zoology, Harvard Univ., Cambridge, MA 02138.]—Jerome A. Jackson.

34. Bird types in the National Museum of Natural History: a critical catalogue. [Tipos de aves en el Museo Nacional de Historia Natural: catalogo critico.] J. C. Torres-Mura and M. L. Lemus. Publicaciones Ocasionales, Museo Nacional de Historia Natural (Chile) 44:1–31. (Spanish, English abstract.)—Chile's National Museum of Natural History, located in Santiago, harbors 128 primary types of birds, most of them endemic to the country. These types represent 78 taxa, 19 of which are currently valid species, 9 are currently valid subspecies, 49 have been considered junior synonyms of other species, and one is a hybrid. The authors list each type, providing the complete reference to the publication where the taxon was first described (including author, date, title, and publication outlet), and the currently accepted name for the taxon. They also provide data on the museum catalog number, sex of the specimens, locality, date, and collector of the specimens, and current condition (e.g., in good shape, wing damaged). Comments are also made about taxonomic disagreements between different authorities, about the correspondence (or lack thereof) between written descriptions, drawings, and specimens, about types that were supposed to be among the Museum holdings but have disappeared, and other anecdotal but

important information. The authors also measured these type specimens, and in a table they document the following linear dimensions: bill length, wing chord, tarsus length, and length of the middle toe. Over sixty references are cited and listed. Although the entire text is written in Spanish, this catalog is easy to understand because it refers to standard ornithological taxonomy and technical nomenclature. This important document should be duly appreciated by taxonomists interested in Neotropical birds. [Secc. Zoologia, Museo Nac. Hist. Nat., Casilla 787, Santiago, Chile.]—Fabian M. Jaksic.

35. Status of *Larus* gulls at Home Bay, Baffin Island. R. R. Snell. 1989. Colonial Waterbirds 12:12–23.—This paper deals largely with a reassessment of the experimental work done by N. G. Smith in the early 1960s, particularly at Home Bay, Baffin Island in 1961, the results of which led to Thayer's Gull (then *Larus argentatus thayeri*) being assigned species status (*L. thayeri*). Smith had reported complete reproductive isolation for Thayer's Gull. However, Knudson reported interbreeding between Thayer's Gull and Kumlien's Gull (*L. glaucoides kumlieni*) at Home Bay in 1975 and 1976, and Snell reports similar 1985 observations. Snell visited 9 of 15 of Smith's Home Bay gull colony sites, and found 3 colonies active. Snell investigated a number of parameters, e.g., comparisons of iris and wingtip melanism and bill length and wingtip melanism, and in several instances got results which conflicted with those of Smith. Snell proposes a series of explanations for the apparent abandonment of some gull colonies reported by Smith and for hybridization in gull species, including Thayer's and Kumlien's gulls reported by Smith as reproductively isolated. One explanation suggests that Smith may have overlooked interbreeding and that the degree of melanin in irides and wingtips does not function as a reproductive isolating mechanism in these gulls. Snell then assesses the technical problems which would have been encountered in Home Bay in July 1961 when Smith was conducting his study. An aerial photo, taken 16 July 1961, illustrates the difficult terrain and ice conditions in the fjords, and Snell details the difficulties of ground travel under these conditions. He then concludes (references deleted): "I question the accuracy of Smith's . . . conclusion that contrast between eye and head functions as a reproductive isolating mechanism in gulls, as I do not understand how Smith's . . . extensive and complicated research protocols at Home Bay in 1961 could all have been done in the time available. I suggest future workers view Smith's . . . conclusions cautiously."

Clearly, this is an unusual and provocative paper. It is essential reading for anyone interested in gull taxonomy. [Dept. of Zoology, Univ. of Toronto, Toronto, Ontario, Canada M5S 1A1.]—William E. Davis, Jr.

36. Perspectives of DNA techniques for game biology. J. Fjeldsa and P. Arctander. 1989. Finnish Game Res. 46:4–16.—This paper reviews DNA-DNA hybridization work and emphasizes developments in the use of "Restriction Fragment Length Polymorphism" (RFLP), suggesting that this technique can now be used routinely for problems ranging from higher level taxonomy to genetic "fingerprinting" of individuals. Suggested uses of the technique include (1) phylogenetic studies such as those of Charles Sibley and others, (2) identification of populations of origin of birds on wintering or staging areas, stray individuals, or those killed by striking man-made structures; (3) revealing of illegal animal trade, (4) studies of genetic variation within populations, and (5) studies of population ecology and the evolution of life history strategies. The authors conclude the review with a plea for the establishment of national or international DNA specimen collections. [Zoological Museum, Universitetsparken 15, DK-2100 Copenhagen Ø, Denmark.]—Jerome A. Jackson.

EVOLUTION AND GENETICS

(see also 33, 35, 36, 44)

37. Evolution of reversed sexual size dimorphism: sex or starvation? H. C. Mueller. 1989. Ornis Scand. 20:265–272.—Two recent papers have attempted to explain reversed size dimorphism (RSD) in owls. Using data from Europe, Lundberg (Ornis Scand. 17:133–140, 1986) proposed the starvation hypothesis, stating that RSD results from selection for larger mass females (to withstand starvation during incubation) and for shorter wings in males (to improve aerial agility). Lundberg supported his hypothesis by showing that northern owl species have the greatest RSD. Drawing upon data from North America,

Mueller (Wilson Bull. 98:387–406, 1986) concluded that RSD evolved to facilitate pair formation. In this paper, Mueller re-examines the starvation hypothesis using data from European owls.

The starvation hypothesis hinges on two assumptions: (1) smaller males are more maneuverable and thus better-suited to capture agile prey (i.e., birds), and (2) larger females are more resistant to starvation. Wing loading is a major determinant of maneuverability. Yet, an allometric *decrease* in wing length results in a relative *increase* in wing loading, and thus a decrease in maneuverability. Moreover, most birds caught by owls are probably taken at night roosts, requiring no special aerial abilities by the owls. Mueller states that "it is unlikely that selection for differences between the sexes in the ability to pursue avian prey . . . is of any importance in the evolution of RSD in owls." Mueller also notes that body fat, rather than body size, is the important factor in resistance to starvation, and that the amount of fat stored by owls is independent of lean body mass. The greater RSD of northern owls results from them being fatter rather than larger.

Mueller's points are important ones. On balance, the assumptions of the starvation hypothesis are questionable, and the predictions are not supported strongly by the European owl data. But what about Mueller's pair-formation hypothesis? If RSD evolved to expedite pair formation, then early nesting pairs should be the most dimorphic. Indeed, Mueller admits that this is not the case for the owls studied to date. Mueller suggests that biologists seeking to understand the factors involved in RSD ". . . pay more attention to female choice of mate and the formation and maintenance of the pair bond." [Dept. Biology, Univ. North Carolina, Chapel Hill, NC 27599 USA.]—Jeff Marks.

FOOD AND FEEDING

(see also 9, 10, 17, 37)

38. Comparative food habits of the Eagle Owl *Bubo bubo* and the Great Horned Owl *Bubo virginianus* in six Palearctic and Nearctic biomes. J. A. Donázar, F. Hiraldo, M. Delibes, and R. R. Estrella. 1989. Ornis Scand. 20:298–306.—The *Bubo* owls are among the largest and most powerful in the world. Within their respective faunal regions, Eagle Owls (Palearctic) and Great Horned Owls (Nearctic) occupy all biomes except tundra. Donázar et al. analyzed published information on owl diets from six biomes (Mediterranean shrubland, deciduous forest, conifer forest, grassland, desert, and mountain) to determine whether intraspecific differences exist across biomes and whether diets converge interspecifically within biomes. Diets were compared at three levels: (1) taxonomic composition, (2) trophic diversity, and (3) mean body mass of prey.

Three prey assemblages dominated the owl diets, but their frequencies differed between owl species and among biomes. Lagomorphs were the main prey in Mediterranean shrubland (Eagle Owl) and deciduous forest (Great Horned Owl), voles dominated the diets of both owls in conifer forest, and invertebrates and saltatorial rodents (Dipodidae and Heteromyidae) dominated the diets of both owls in deserts. Trophic diversity was higher for Great Horned Owls than for Eagle Owls, and for both species was highest in deciduous forest and deserts. Mean body mass of prey was lowest in deserts.

Not surprisingly, the authors conclude that differences in the trophic niche of the two owls are due to differences between the two regions of prey species composition and availability of preferred prey. [Estación Biológica de Doñana, 41013 Sevilla, Spain.]—Jeff Marks.

39. Patch selection by Dunlin on a heterogeneous mudflat. M. G. Kelsey and M. Hassall. 1989. Ornis Scand. 20:250–254.—The distribution of Dunlins (*Calidris alpina*) foraging on an intertidal mudflat in eastern England was nonrandom with respect to substrate. Dunlins foraged selectively in the wetter, softer substrates and avoided firm substrates even though densities of preferred prey (oligochaetes) were highest in the firm substrates. Softer substrates were more easily penetrated by a Dunlin's bill, suggesting that prey availability was higher in soft vs. firm substrates. The authors suggest that Dunlins select foraging patches based on physical characteristics of the substrate rather than on absolute prey densities. [Edward Grey Inst., Dept. Zool., South Parks Rd., Oxford OX1 3PS, United Kingdom.]—Jeff Marks.

40. The carnivorous predatory guild of central Chile: a human-induced community trait? J. A. Simonetti. 1988. Revista Chilena de Historia Natural 61:23–25.—Three accipitrids, the Black-chested Eagle (*Geranoaetus melanoleucus*), the Harris' Hawk (*Parabuteo unicinctus*), and the Red-backed Buzzard (*Buteo polyosoma*), together with a canid (*Pseudalopex culpaeus*) make up the carnivorous predatory guild in central Chile. All four species are diurnal, hunt in open patches of scrub, have very similar diets (food overlaps >90%), and prey primarily on a single rodent species, the octodontid fence rat (*Octodon degus*). This prey species alone makes up 41–65% of the diets (by number) of the carnivorous guild. It has been argued that the four predators converge opportunistically on the fence rat, simply because it is the most abundant rodent in the open scrub. This species thrives only in such habitat, which results from the human-driven degradation (clearing) of the pristine shrublands. Simonetti consequently adds one and one and comes up with the following syllogism: major premise, predators opportunistically consume the most abundant prey species (the fence rat in this case); minor premise, the fence rat becomes abundant owing to human disturbance (clearing of the originally dense scrub); conclusion, the carnivorous predatory guild forms because of human disturbance. Although the two premises have not been adequately substantiated by data, Simonetti garners indirect evidence from the literature that lends support to his claims. In my opinion, the author abuses a little of inferences (if A, then B, then I am right) in his search for support, but the logic sounds plausible. More impressive are Simonetti's attempts to point the way for putting his hypothesis to trial: he proposes crucial tests using both current ecological information on the predators and their prey, and zooarcheological evidence. The latter is very interesting: if the fence rat has indeed increased in abundance owing to human disturbance, this should be reflected in Holocene deposits. Simonetti is currently working on this topic and he should be able to provide an answer to this question in the near future. [Depto. Cs. Ecologicas, Fac. Ciencias, U. de Chile, Casilla 653, Santiago, Chile.]—Fabian M. Jaksic.

41. Are predator diets a consequence of human disturbance in central Chile? A reply to Simonetti. P. L. Meserve. 1988. Revista Chilena de Historia Natural 61:159–161.—Meserve takes issue with the underlying weaknesses of Simonetti's syllogism: given that central Chilean predators are opportunistic taking the most abundant prey in the region (the fence rat), and given that the fence rat thrives only in human-disturbed scrub, then the carnivorous guild that converges on this prey is ultimately dependent on (or, is an epiphenomenon of) human disturbance. Meserve notes that the connection between fence rat abundance and human disturbance is not well established, and that this weakens one of Simonetti's premises. But the strongest criticism that Meserve has is that there are two published accounts which demonstrate that the fence rat is a preferred prey of at least one of the members of the predatory guild (the canid *Pseudalopex culpaeus*), regardless of its abundance. That is, this predator does not take the fence rat opportunistically, but selects it despite its having lower abundance than other sympatric rodents. Meserve then argues that if this is the case with the canid, and provided that no data exist to the contrary, it is more plausible to consider that the remaining three accipitrid members of the predatory guild behave similarly as the canid (i.e., not opportunistically). Meserve also states that Simonetti's syllogism is not logical, and that the hypothesis derived from it is untestable as stated, and provides guidelines for framing it in a testable form. For example, he proposes to study avian predators the same way that the canid's feeding ecology has been assessed, by comparing what is in their diet as compared to what is available and in what abundances (i.e., comparing proportions of rodents in the diet versus their respective proportions in the field, using goodness-of-fit tests). [Dept. Biol. Sci., No. Illinois Univ., DeKalb, IL 60115-2861.]—Fabian M. Jaksic.

42. Predator diets, guild structure and human disturbance: a rebuttal to Meserve's criticisms. J. A. Simonetti. 1988. Revista Chilena de Historia Natural 62:13–17.—As in all rebuttals, the defendent tends to address the form of the criticisms rather than their substance. Of course, because if he would accept the criticisms as valid, he would not be writing a rebuttal! In this case, Simonetti takes pains to demonstrate that the logic in his syllogism is correct, that a distinction must be made between proximate (predator diets) and ultimate factors (human disturbance), that his hypothesis is actually falsifiable (sure, Meserve

tried to falsify it with real data), and that the two reports that refute his claim that central Chilean predators are opportunistic apply only to one of the four members of the guild and should not be extended to the remaining species. Funny as it may seem, Simonetti asks and answers himself: "Do guilds emerge as an indirect effect of human disturbance? A definitive answer will not arise if we follow the advocacy method." And advocacy is the main theme in his rebuttal to Meserve! To be fair, however, it must be conceded that by dissecting so finely Meserve's cirticisms, the main problems in this controversy come into sharp focus. Simonetti does a good service here for active researchers and students alike in pointing out what and how parameters must be measured in order to test his provocative hypothesis. Indeed, field work underway dealing with food-niche relationships of central Chilean predators facing fluctuating prey resources should address Simonetti's hypothesis and finally settle the issue. Researchers interested in how to determine whether a predator is opportunistic or selective may check Jaksic, F. M. 1989. Opportunism vs. selectivity among carnivorous predators that eat mammalian prey: a statistical test of hypotheses. Oikos 56: 427–430. [Depto. Cs. Ecologicas, Fac. Ciencias, U. de Chile, Casilla 653, Santiago, Chile.]—Fabian M. Jaksic.

43. Chick hatching as a trigger for dietary switching in the Western Gull. C. Annett and R. Pierotti. 1989. Colonial Waterbirds 12:4–11.—*Larus* gulls have diverse diets and sometimes switch food types during the breeding season. The authors examined the question of whether such shifts result from change in the availability of specific food types, or from factors related to the breeding cycle. They suggest that if dietary shifts occur at a particular stage in the breeding cycle rather than at some particular time, intrinsic factors, rather than prey availability changes, probably trigger the shift. They collected data from 1983–1985 on nesting Western Gulls (*Larus occidentalis*) at Alcatraz Island, California. Regurgitated food and pellets were analyzed to ascertain the diet of individual nesting pairs and chicks.

The primary food during April and May of all years was garbage, but a significant shift to fish occurred during June, several months after commercial fishing data suggest that small fish were locally available. The shift was more pronounced when data were analyzed by stage of reproduction rather than by calendar date. A dramatic shift to fish occurred at time of hatching (mid-May through late-June). Garbage was the more common food during the pre-hatching period, but in 91 of 97 nests recently hatched chicks were fed fish. A switch from garbage to fish occurred at 18 of 19 nests that were followed 2 days before and after hatching. In 13 nests where egg clutches were manipulated to produce early or late hatching, 11 pairs fed newly hatched foster chicks fish. Young chicks cannot ingest chicken bones and other large items of garbage and need the digestible calcium provided by fish. The authors suggest that adults may not shift to fish before the nutritional demands of chicks trigger the switch because fish occur in scattered schools and are thus a more unpredictable resource in time and space. [Dept. of Zoology, Univ. of Arkansas, Fayetteville, AR 72701.]—William E. Davis, Jr.

SONGS AND VOCALIZATIONS

(see also 11)

44. Sexual selection and the evolution of bird song: a test of the Hamilton-Zuk hypothesis. A. F. Read and D. M. Weary. 1990. Behav. Ecol. Sociobiol. 26:47–56.—Hamilton and Zuk predicted that sexual selection would play a prominent role in those avian species most vulnerable to parasites by favoring enhanced development of showy characters in males (including song repertoires) that would allow females to judge a male's past and present parasitic load. In support of their hypothesis, Hamilton and Zuk showed that across 109 North American passerine species, those with a high incidence of haematozoa tended to be brighter and have more variable and complex songs. The authors tested Hamilton and Zuk's hypothesis by reexamining their data, and by independently analyzing quantitative data on song variety and complexity in 131 species of North American and European passerine birds. Read and Weary's findings suggest that although there is an overall positive association between male song complexity and variety and parasite prevalence (in the data

that Hamilton and Zuk presented), within taxa there is no evidence of a consistent relationship. Thus, one or two species-rich higher taxa (*Turdinae* and *Fringillidae* most likely) could explain the across-species correlation. Indeed, when the authors controlled for the effects of phylogeny, they found significant negative relationships between haematozoa prevalence and a variety of song variables (song duration, inter-song interval, song rate, song repertoire size, and syllable repertoire size). They conclude that there is no evidence of an association between parasites and song complexity and showiness. [Zool. Dept., Univ. of Oxford, South Parks Road, Oxford OX1 3PS, UK.]—Danny J. Ingold.

45. Experimental acceptance of a recorded song by young Goldfinches (*Carduelis carduelis* L.). [Pokusi prihvaćanja napjeva s magnetofonske vrpce u juvenilnih češljugara (*Carduelis carduelis* L.).] A. Cvitanic and R. Tolic. 1988. Larus 40:129–136. (Croato-Serbian, English summary and figure captions.)—The authors exposed 50 juvenile Goldfinches to a recorded rare song of the Goldfinch for six hours daily for seven months. The song was ultimately accepted by eight of the birds and partially accepted by 34 others. The authors conclude that the character of a Goldfinch's song depends on heredity and an individual tendency to imitate songs to which the bird is exposed. [Filozofski fakultet, OOUR Prirodnih znanosti, Teslina 12, 58000 Split, Yugoslavia.]—Jerome A. Jackson.

BOOKS AND MONOGRAPHS

46. A Neotropical companion: an introduction to the animals, plants, and ecosystems of the New World tropics. J. C. Kricher. 1989. Princeton University Press, Princeton, New Jersey. 436 pp.—Ecological research in the Neotropics has blossomed in the past 40 years, as evidenced by a plethora of scientific publications. Unfortunately, much of this technical literature has been inaccessible to amateur naturalists, conservationists, and students, who are now traveling more frequently throughout tropical America and the Caribbean. Even for the biologist residing in the tropics, access to technical literature is often limited by poor or non-existent libraries. In *Neotropical Companion,* Kricher has successfully distilled the technical ecology literature and made it available to the student and amateur scientist, as well as to the specialist desiring a broader view of Neotropical biology. This book is intended as a contemporary primer to the ecological relationships, organisms, and ecosystems of the New World tropics.

The book opens with an overview of tropical ecosystems, including a very brief review of climates of tropical regions and a short description of different terrestrial, coastal, and coral reef ecosystems. The second chapter provides a nice description of the structure and composition of tropical rainforests. Here we find descriptions of the diverse plants and their characteristics which contribute to the structural diversity of tropical rainforests—tree buttresses and prop roots, trunk and canopy shape, epiphytes, vines, and leaf, flower, and fruit characteristics. Typical animals likely to be encountered in the rainforest are briefly mentioned and those most likely to cause pain or discomfort are noted. In addition, a cautionary note regarding common tropical maladies is provided. Chapter 3 provides a review of forest ecosystem functions—productivity, energy flow, and nutrient cycling with a summary of the role of soils in mineral cycling. Forest disturbance, too, is discussed here, with a good summary of the role of treefall gaps and ecological succession. Although somewhat out of place in a chapter on rainforest function, the discussion of farming methods of the indigenous people and the major crops in the Neotropics is nonetheless interesting.

Evolutionary patterns in the New World tropics are treated in chapter 4. This meaty chapter begins with a brief introduction to Darwinian evolution and tropical adaptations, and is followed by a thorough discussion of the factors postulated to explain the high species diversity of the tropics. The concept of adaptive radiation is introduced using Neotropical bats and flycatchers as examples. Speciation is discussed in terms of tropical issues—effect of topography; tropical refugia and the ice age; and the issue of species equilibrium. Coevolution, for which the tropics are famous, is discussed in terms of the plant-animal interactions involved in pollination and seed dispersal and the relations involved in the tending of fungal gardens by leafcutting ants. The chemical defenses of plants provide the theme for chapter 5. Discussed here is the role of secondary plant compounds in protecting

plants from herbivores and the methods which some herbivores have used to circumvent these defenses.

For those interested in Neotropical birds, Kricher provides an overview in chapter 6 of the natural history, ecology, and adaptations of the avian families likely to be encountered in tropical habitats. Avian families unique to the Neotropics are emphasized here, with noteworthy discussions of leking and ant-following by birds. However, avian biology is not confined just to this chapter, as the author frequently uses birds as examples for various concepts throughout the book (e.g., Oilbirds and frugivory, flycatcher adaptive radiation). The natural history and adaptations of the remaining beasts are summarized in chapter 7 and it is here that the author is finally overwhelmed by tropical diversity. The chapter starts with mammals, giving adequate thumb-nail sketches of the natural history of selected primate species, some rodents, peccaries, tapirs, sloths, anteaters, armadillos, marsupials, and felids, among others. Next, selected reptiles and amphibian species are briefly discussed. Finally, selected arthropods are discussed with the author's admission of the futility of providing most with adequate coverage, although the ecologically most important examples are discussed in other chapters. Here, as throughout the book, he has concentrated on the groups most likely to be visible to a visiter.

A short chapter (chapter 8) on tropical savannas summarizes the diversity of factors responsible for causing savannas and describes some of the typical savanna inhabitants. Chapter 9, provides a summary of the ecology of the more important organisms of coastal ecosystems—mangroves, seagrass beds, and coral reefs. The final chapter closes with a discussion of tropical deforestation, conservation, and the future of tropical rainforests.

The author has obviously done his homework in the preparation of this book. With over 400 literature citations, most from the primary literature, he has provided the reader with an up-to-date view of our knowledge of tropical biology. He has a firm grasp of this literature, as is shown by his discussion of controversial issues and his accurate portrayal of diverse hypotheses. He does not fall into the overgeneralization trap of many earlier tropical writers (e.g., lateritic soils are *the* soils of the tropics), but is careful to point out exceptions to what few generalizations do exist. His biases are evident, as his approach is that of an evolutionary ecologist, and the adaptationist theme is effectively woven throughout (with proper homage and citations to D. Janzen). These themes are organism-related and those readers desiring a more thorough ecosystem approach might be disappointed. The author's travel experiences contribute to the text by providing personal accounts of observations and experiences which nicely augment the material summarized from others. Also, these travels have contributed to balance, both in terms of geographic perspective (i.e., relatively little geographic bias) and examples of organisms most likely to be encountered by the tropical visitor (i.e., emphasizing flowering plants, vertebrates, and social insects). While I would have liked more discussion of tropical montane ecosystems, possibly at the expense of eliminating the brief account of coral reef ecology, the overall treatment of different ecosystems was reasonably balanced.

The book is generally well-written, with the author at his best when writing about ecological or evolutionary interactions. It is here that the author demonstrates an ability to interpret the technical literature for the educated layman. However, the short declarative sentences used for describing climate or in some of the species accounts suggest a sense of the author's frustration with condensing tropical ecology into 375 pages of text. Attractive illustrations, provided by Andrea S. LeJeune, help the reader to envision the diverse organisms and environments discussed in the text. A glossary and annotated list of general book-length references is provided and could prove useful to the uninitiated. Editorial effort could have been better, as typographical errors are scattered throughout and the mixing of metric and English units (even in the same paragraph, page 86) detract from an otherwise attractive and readable text.

In summary, this fine book should be required reading for all amateur naturalists and biologists intending to visit the tropics. *Neotropical Companion* provides an excellent introduction to tropical biology and could be effectively used as an introductory text for college classes intending to visit the tropics.—J. M. Wunderle, Jr.

47. Fauna CSSR: Ptaci, vol. 3(1–2). K. Hudec (ed.). 1983. Prague, Academia. 1234 pp., 29 color plates. Cloth, 180 Kcs. (Czech, German summary.) This volume concludes

the monumental handbook of Czechoslovak birds, the first comprehensive review ever attempted for the region. The first two volumes, published in 1972 and 1977, cover orders of Gaviidae through Pandionidae and Falconidae through Columbidae, respectively. The third volume covers Cuculiformes through Passeriformes, and is divided into two books to encompass the large number of species involved.

The books treat 7 orders. For each order basic information on plumage, morphology, anatomy, general breeding ecology, food, taxonomy, and distribution is given. This is then followed by a key to and description of families and genera which were recorded in Czechoslovakia. Emphasis of the books is put on accounts of individual species. Each account provides description of plumage, size, and key features for field recognition. The worldwide distribution and occurrence in Czechoslovakia are described and shown on maps. General ecological information is given on migration, habitat preferences, breeding biology, and food. Timing of migration and breeding, clutch size, and number of fledglings are frequently displayed in graphs and tables. In addition, for breeding species, a black-and-white photograph accompanies the description. Each account concludes with a list of parasites and key references. At the end of the volume, the most important information for each species is summarized in German and all species are shown on color plates. Following references cited, color photographs of eggs collected in the region are shown.

The text is well written and organized and the volume is a result of combined efforts by foremost Czechoslovak ornithologists and amateur birdwatchers. The high reliability of the data has been maintained by exclusion of unverified reports. In conclusion, this work has succeeded in its intent to bring together the wealth of information about the Czechoslovak bird fauna.—Jaroslav Picman.

48. The Greylag Goose *Anser anser* in Europe (I.). K. Hudec and E. Rutschke (eds.). 1983. Acta Sc. Nat. Brno, 16(12):1–49. (English or German, English and Russian abstracts.)

The Greylag Goose *Anser anser* in Europe (II.). K. Hudec and E. Rutschke (eds.). 1984. Acta Sc. Nat. Brno, 18(1):1–55. (English or German, with English and Russian abstracts.)—These monographs deal with breeding distribution and migration of the Greylag Goose in Britain, Denmark, Federal Republic of Germany, German Democratic Republic, Poland, Czechoslovakia, Austria and Hungary. Data with various degrees of completeness are given on (1) sizes of nesting populations and their long-term changes, (2) numbers of non-nesting young birds, (3) annual migrations to molting areas, summer gathering places and to wintering grounds, and (4) the ecological characteristics of the main gathering places. Three migratory pathways are recognized: the Atlantic flyway to wintering places in southern Spain (used by about 11,800 nesting pairs), the central European flyway to wintering places in north Africa (2750 pairs), and the Black Sea flyway to wintering places in the south of the Balkans and the west of Asia Minor (4100 pairs). The populations of the Greylag Goose in the British Isles are resident and isolated from the continental ones. On the basis of numbers of nesting pairs in individual European countries the numbers of geese are calculated for the whole of Europe in the various seasons. The findings are compared with the actual numbers found at individual gathering places (non-breeding birds, molting birds, summer and fall migration gathering places, wintering grounds, spring migration gathering places). The numbers best agree for the Central European flyway, followed by the Atlantic flyway, with much poorer correspondence for the Black Sea flyway. It is apparent that some gathering places, especially molting grounds and summer gathering places, are not yet known.—Stanislav Pribil.

49. The atlas of breeding birds in Czechoslovakia 1973/1977. [Atlas hnizdniho rozsireni ptaku v CSSR 1973/1977.] K. Stastny, A. Randik, and K. Hudec. 1987. Academia Praha. 484 pp., 204 maps, 233 illustrations. 90.00 Kcs. (Czech, English summary.)—So far one of the major shortcomings of Czechoslovak ornithology has been the lack of comprehensive quantitative data on distribution of breeding birds. This shortcoming has been overcome with publication of the *Atlas of Breeding Birds* which summarizes results of surveys conducted in 1973–1977 in 10-km^2 quadrats. Focus of the book is the 203 species accounts; each account consists of a narrative, full page map, ink sketch of the bird, and table with distribution data. The narratives are loaded with data, such as vertical and horizontal

distribution, migratory status, protective status, and past population changes, but the main emphasis is put on population size. For those species where population size can be accurately estimated, the total number of breeding pairs for the country is given. For common and widespread species, authors present population densities compiled from recent literature; for example, common *Acrocephalus* warblers are represented with 10 or more sources. The breeding range is effectively displayed on maps by dots of three sizes, where size reflects certainty of breeding record. An accompanying table gives the number (percent) of squares where the breeding was recorded.

The introductory chapters offer descriptions of planning, organization, field methods, and data analysis. The methods are also summarized in a one-page English summary. Following the accounts, the volume then concludes with maps of past distribution of eight species and with brief descriptions of 21 species which either occurred without proven breeding or which bred after escape from a zoo.

This atlas offers a considerable body of information presented in a well written, coherent way. A permanent record of this form will be invaluable for future comparison of bird distribution in the face of the rapidly deteriorating environment of this central European country.—Jaroslav Picman.