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# RECENT LITERATURE

Edited by John A. Smallwood

## NEW JOURNAL

1. **Ornis Hungarica.** This new periodical is the official journal of the Hungarian Ornithological and Nature Protection Society. *Ornis Hungarica* will be published twice yearly, and will include "research reports and short articles on the ecology, behaviour and biogeography of birds. The geographical emphasis of *Ornis Hungarica* is on Hungary, East- and Central-Europe but papers from other regions will also be considered." The contents of Vol. 1, No. 1 (51 pp.) includes four major articles, "Bird community changes in different-aged oak forest stands in the Buda-hills (Hungary)," by Z. Waliczky, "Guild structure and seasonal changes in foraging behaviour of birds in a Central-European oak forest," by T. Székely and C. Moskát, "Effect of environmental factors on tits wintering in a Hungarian marshland," by A. Báldi and T. Csörgő, and "Monitoring of abundance and survival rate of Sand Martin (*Riparia riparia*) population in the upper reaches of the river Tisza, 1986–1990," by T. Szép, as well as one short communication, "Winter homing of the Greenfinch (*Carduelis chloris*)," by T. Csörgő and Z. Molnár. These five papers are in English, with Hungarian summaries, except for the paper by Szép, which is in Hungarian, with an English abstract.

Also included in this first issue are three book reviews (two in Hungarian and one in English), societal news (in Hungarian), and a set of instructions for contributing authors. Manuscripts submitted for publication "should be written in English or Hungarian (preferably English)," and will be reviewed by at least two referees. Authors should send manuscripts to the editor, Csaba Moskát, Ecological Research Group, Hungarian Natural History Museum, Budapest, Boross u. 13. H-1088, Hungary. Annual subscription price is $25 (US), paid to the Hungarian Ornithological and Nature Protection Society, Budapest, Költő u. 21. H-1121, Hungary. Membership inquiries also may be sent to this address.—John A. Smallwood.

2. **Ornis Svecica.** The Swedish Ornithological Society, which also produces *Vår Fågelvärld,* has just (1991) published the first issue of its new journal, *Ornis Svecica.* While the former publication appeals to a diverse audience with many popular articles and beautiful color photography, the new periodical is geared toward a more formal scientific and technically focused readership. "The aims and scope of the journal are to provide a forum for original research reports, communications, debate and letters concerning the Swedish bird fauna and Swedish ornithology. Contributions based on material that does not originate in Sweden may be published if they otherwise are of particular interest from a Swedish perspective. Reports from all fields of ornithology will be considered." The premier issue (63 pp.) contains five major articles, "Crossbill (Genus *Loxia*) evolution in the West Palearctic —a look at the fossil evidence," by T. Tyrberg, "Distribution, population size and long-term changes in population size of wintering waterfowl in Sweden," by L. Nilsson, "Territory economics and population stability—can populations be socially regulated?", by T. von Schantz, "Distribution, reproductive success, and population trends in the Dunlin *Calidris alpina schinzii* on the Swedish west coast," by D. Blomqvist and O. C. Johansson, and "Autumn migrating Bluethroats *Luscinia s. svecica* [*Erithacus s. svecicus*] orient in an east-southeasterly direction at Gävle, East Sweden," by H. Ellegren and K. Wallin. Five short communications include articles on false incubation by Great Tits (*Parus major*), sex and age determination in Black Redstarts (*Phoenicurus ochrurus*) and Robins (*Erithacus rubecula*), breeding biology of the Barred Warbler (*Sylvia nisoria*), and nest height preferences of Starlings (*Sturnis vulgaris*). Eight of the papers were in English, the other two in Swedish. Each had a comprehensive summary in the other language.

Instuctions for contributing authors are included in this issue. Manuscripts should be sent to the co-ordinating editor, Sören Svensson, Ekologihuset, S-223 62 Lund, Sweden. "External reviewers will be used if necessary." Direct membership and subscription inquiries to Sveriges Ornitologiska Förening, Box 14219, S-104 40 Stockholm, Sweden.—John A. Smallwood.

## RESEARCH TECHNIQUES

### (see also 9, 26, 32)

**3. Use of aerial videography in wildlife habitat studies.** J. G. Sidle and J. W. Ziewitz. 1990. Wildl. Soc. Bull. 18:56–62.—The authors' techniques for quantifying nesting habitat of Piping Plovers (*Charadrius melodus*) and Least Terns (*Sterna antillarum*) along the Platte River, Nebraska are discussed. The authors discuss methods of aerial videography and describe components needed for custom manufacture of a system. Their off-the-shelf system costs about $2900 (1988 prices) plus about $700 for plane mounts and modifications to house the system. Computer hardware needed for measuring and mapping from the system also is discussed as well as other "extras" and their approximate costs.

The authors have taken a lot of the guess-work out of creating a custom system and report that these systems can be pieced together for much less than similar package system costs. Reported costs should be similar to or even higher than today's prices given the recent trend in electronics price reductions. [U.S. Fish and Wildlife Service, 203 West Second St., Grand Island, NE 68801, USA.]—James P. Key.

**4. Footpad dimorphism as a possible means to determine sex of adult and juvenile Northern Spotted Owls.** T. L. Fleming, J. B. Buchanon, and L. L. Irwin. 1991. N. Am. Bird Bander 16:66–68.—Like most other owls, Northern Spotted Owls (*Strix occidentalis*) are sexually monochromatic. Behavioral cues (e.g., vocalizations, reproductive behavior) currently are considered the most reliable noninvasive criteria for determination of gender in this species. In this study, the authors explored the possibility of using footpad length as a morphometric means of determining sex. Sixty Northern Spotted Owls (40 adults, 20 juveniles) were captured in the Wenatchee National Forest in the state of Washington between 18 June and 28 August, 1989–1990. Gender of the adult birds was determined by behavior, brood patches, and size (weight and wing length). Footpad length was measured from the tip of the middle toe to the tip of the hallux of a fully spread foot—this procedure required two people, one to extend the toes and another to handle the calipers, and multiple measurements were taken to ensure that the foot was fully extended.

For adults, the 21 males had significantly smaller feet than the 19 females (means of 67.5 $\pm$ 1.3 SD and 71.0 $\pm$ 0.8 SD, respectively; $t = 9.83$, $P < 0.001$). Eighteen (85.7%) males had footpad lengths < 69 mm, while 17 (89.5%) females had footpad lengths ≥70 mm. Thus, footpad length alone was used to correctly distinguish 87.5% of the sample of adults. For the 20 juveniles, in which gender was not able to be determined, 17 (85%) had footpad lengths either <69 mm or ≥70 mm.

A 12.5% error rate in assigning gender is rather high, and may be unacceptable for most studies in which gender is an important factor. The authors suggest that a discriminant function analysis that includes additional morphometric variables (weight, flattened wing chord, fourth primary length, tail length, bill length, tarsal width, bill depth, tarsus length, number of complete tail bars, and maximum width of head) be used to develop a sex determination model. [National Council of the Paper Industry for Air and Stream Improvement, 720 S.W. 4th, Corvallis, OR 97339, USA.]—John A. Smallwood.

## BEHAVIOR

### (see also 25)

**5. Dominance, prior occupancy, and winter residency in the Great Tit (*Parus major*).** M. Sandell and H. G. Smith. 1991. Behav. Ecol. Sociobiol. 29:147–152.—Dominance in birds may be a function of age, prior residency within either a territory or flock range, or a combination of both. The authors conducted a study using captive Great Tits to determine whether older birds have a dominance advantage not related to prior residency or whether prior residency could explain the fact that older birds generally are dominant over younger ones. In all instances, juveniles that were established first within an aviary (for two days) became dominant over later-arriving juveniles; however, when juveniles were opposed by late-established adult birds, juveniles became dominant in only 40% of the cases. Moreover, the effect of prior residency depended on whether there was a female in the aviary (i.e., increased resource holding potential). When first-established juveniles were accompanied by females, they dominated late-arriving adult males in seven out of eight trials. When juvenile and adult males were released simultaneously into an empty aviary (to examine the effects of age alone), the adults established dominance in seven of nine trials. This study demonstrates that not only age, but prior residency within a territory significantly affects the dominance behavior in winter-flocking birds. In particular, the data suggest why older birds may be dominant so often over younger ones since in natural conditions older birds generally are present in an area for a longer period of time than juveniles. The authors argue that since dominance is affected by prior residency, selection likely operates in favor of winter residency in the Great Tit. [Dept. of Ecology, Ecology Bldg., Lund Univ., Helgonavagen 5, S-223 62 Lund, Sweden.]—Danny J. Ingold.

6. **Spring movements, roosting activities, and home-range characteristics of male Merriam's Wild Turkey.** R. W. Hoofman. 1991. Southwest. Nat. 36:332–337.—Radio equipped adult and subadult male Merriam's Wild Turkeys (*Meleagris gallopavo merriami*) were monitored from April through mid-June 1986, 1988, and 1989 in south-central Colorado and north-central New Mexico. Subadult males moved significantly greater distances from winter to breeding areas than did adults (8.7 ± 3.1 (SD) km vs. 5.2 ± 3.3 km, respectively; $P < 0.05$), and occupied larger spring home ranges than adults, based on two distinct methods of estimation (28.7 + 13.8 $km^2$ vs. 13.9 + 8.2 $km^2$, respectively, calculated using the minimum convex polygon procedure). No significant differences were detected between median distances of morning and evening roosts on the same day in subadult vs. adult males (996 m vs. 1074 m, respectively), or in the median distance between roost sites located 1–3 days apart (1041 m vs. 1272 m, respectively). Median distances between roost sites did increase significantly for both groups during the hunting season (about 16 April to 15 May, $P < 0.05$). Subadult males returned to previously-used roost sites more often than adult males (29% vs. 19%) although the difference was not significant ($P = 0.14$). Arrival and departure times of males at roost sites during the hunting season suggest that in order to discourage roost shooting and promote ethical hunting practices, legal shooting hours should start at sunrise and end at 0.5 h before sunset (versus the current practice of 0.5 h before sunrise to sunset). [Colorado Div. of Wildlife, Wildlife Research Center, 317 West Prospect Rd., Ft. Collins, CO 80526, USA.]—Danny J. Ingold.

7. **Depth utilization by penguins and Gentoo Penguin dive patterns.** R. P. Wilson, B. Culik, H. J. Spairani, N. R. Coria, and D. Adelung. 1991. J. Ornithol. 132:47–60.—Comparisons of data among studies of the diving behavior of penguins and other birds are difficult because of different methods of study. Wilson et al. compare data derived from four methods of measuring diving depth: use of (1) capillary depth gauges, which measure only the maximum depth reached; (2) multiple maximum depth gauges, which measure the frequency of maximum depths reached during foraging trips; (3) autoradiographic and film densimetric depth gauges, which record the cumulative time spent at each depth; and (4) time-based depth gauges, which sequentially record diving depths.

Using accumulated knowledge of penguin diving behavior and their original studies of Gentoo Penguin (*Pygoscelis papua*) time-at-depth data collected with a film densitometric depth gauge, the authors provide an approach to concordance among variously collected data via reconstruction of the proportion of time spent per depth.

Their Gentoo Penguin data suggested two different types of dives: (1) bounce dives, dives to a specific depth followed by quick return; and (2) flat-bottomed dives, where the bird dove to a specific depth, leveled off, and remained there for a period of time. Multiple maximum depth data for other species were analyzed in an effort to reconstruct proportional time-at-depth. Results were then related to species mass, with the resulting suggestion that depths used were mass-dependent, with larger species making greater use of greater depths. [Inst. fur Meereskunde, Dusternbrooker Weg 20, DW-2300 Kiel 1, Germany.]—Jerome A. Jackson.

8. **Winter roost-site selection by urban Merlins (*Falco columbarius*).** I. G. Warkentin and P. C. James. 1990. J. Raptor Res. 24:5–11.—Roost site characteristics of Merlins

wintering in Saskatoon, Saskatchewan, were studied from 1983 to 1988. Data were collected on 41 roost trees and 44 randomly selected trees. All observed Merlins roosted solitarily in conifers. Roost trees were significantly taller and had greater crown volume than random trees. Tree height, distance to nearest conifer greater than 5 m in height, and number of surrounding trees greater than and less than 5 m in height within a 10-m radius were the most important variables in distinguishing between roost trees and random trees. There was no significant difference in roost-site selection between male and female Merlins. The authors suggest that the relatively recent availability of conifers in Saskatoon may in part explain the northward expansion of the wintering range of Merlins. [Dept. of Biology, Univ. of Saskatchewan, Saskatoon, SK S7N 0W0, Canada.]—Robin J. Densmore.

## FOOD AND FEEDING

**(see also 7, 17)**

9. **Mammalian prey of the Common Barn-Owl (*Tyto alba*) along the Texas Coast.** R. H. Baker. 1991. Southwest. Nat. 36:343–347.—The author examined barn-owl pellets from roosts located along an extensive transect through six Texas coastal counties. A total of 17 native small mammal species (as well as three introduced species) were identified from the pellet remains. Although hispid cotton rats (*Sigmodon hispidus*) were by far the most prevelant prey item (found in pellet remains from all six counties), four other species, least shrews (*Cryptotis parva*), fulvous harvest mice (*Reithrodontomys fulvescens*), northern pigmy mice (*Baiomys taylori*), and marsh rice rats (*Oryzomys palustris*) also were commonly found among the pellet remains. Barn-owl prey species diversity increased markedly from the humid upper coastal counties to the more arid lower coastal region. The author suggests that a good way to monitor relative densities of inconspicuous small mammal populations, including threatened or endangered species, would be by periodic analyses of barn-owl pellets from long-used roosts. [302 North Strickland St., Eagle Lake, TX 77434, USA.]—Danny J. Ingold.

10. **No need to compromise between food and safety for Vinous-throated Parrotbills.** L. L. Severinghaus. 1991. Bull. Inst. Zool. Acad. Sin. (Taipei) 30:183–200.—Vinous-throated Parrotbills (*Paradoxornis webbianus*) are babblers that form relatively stable flocks of up to about 75 individuals outside of the breeding season. Severinghaus has been studying their flocks on the Tunghai University campus in central Taiwan since 1983. Although omnivorous, and the author indicates that 36.7% of their diet is insects, this study focuses only on the flowers, seeds, and fruits used by the parrotbills. Vegetation was mapped and vertical structure quantified; available flowers, seeds, and fruits were sampled at two-week intervals; and flock movements among grid squares and plant materials used were recorded.

Various univariate and multivariate approaches were used to interpret data, but data interpretation must be tempered by factors not considered—such as availability of insect food and the fact that the favored area also frequently had standing water.

The parrotbills foraged primarily in the understory, and the birds tended to avoid areas of human disturbance and feed where plant food was most abundant. There were small but positive and significant correlations of amount of food available with number of stems present and interbranch distance. Major predators in the area included feral cats and Brown Shrikes (*Lanius cristatus*), both of which seemed more likely to be thwarted in predation attempts by dense vegetation. Hence the title of the paper—the area of greatest food availability also appeared to be the safest. [Inst. of Zoology, Academia Sinica, Nankan, Taipei, Taiwan 11529, Republic of China.]—Jerome A. Jackson.

## NESTING AND REPRODUCTION

**(see also 20, 22, 27)**

11. **Factors affecting Piping Plover productivity on Assateague Island.** M. E. Patterson, J. D. Fraser, and J. W. Roggenbuck. 1991. J. Wildl. Manage. 55:525–531.—Piping Plovers (*Charadrius melodus*) were studied on Assateague Island in Virginia and

Maryland in order to estimate population size, nest success, and chick survival; identify factors influencing chick survival; and examine the influence of habitat on nest predation. During 1986 and 1987, 125 nests were found and 54% were successful. The majority of nest failures were due to predation (91% of known causes) and the primary predators were red foxes (*Vulpes vulpes,* 47.6%), followed by raccoons (*Procyon lotor,* 28.6%). No consistent relationship was found between predation and nesting substrate. Chick survival ranged from 8% to 60%, and reproductive rates varied from 0.19 to 1.50 chicks/pair. Reproductive rates in both Maryland and Virginia were lower than what is necessary to maintain a stable population. Fledging success did not differ between areas with and without off-road vehicle use. However, fledging success did differ by types of foraging habitat used, and chicks which foraged on bayside sand and mudflat habitats had higher fledging success (mean 69%) than chicks foraging on ocean beach habitats (mean 19%). The possible causes of high predation pressures are discussed, as well as future research and management. [School of Forestry and Wildlife Resources, Virginia Polytechnic Inst. and State Univ., Blacksburg, VA 24061, USA.]—Robin J. Densmore.

12. **Mate choice in the Willow Warbler—a field experiment.** B. L. Arvidsson and R. Neergaard. 1991. Behav. Ecol. Sociobiol. 29:225–229.—It is often unclear whether females choose mates based on specific male traits or on territorial characteristics. By removing territorial male Willow Warblers (*Phylloscopus trochilus*) from experimental plots in southwest Sweden the authors set out to test: (1) if settlement order of males and mating order were correlated, (2) if male size, condition, or singing rate was correlated with female choice, and (3) if time from mating to egg laying was correlated with territory settlement date. Mating order was significantly correlated with male arrival order on both the control and experimental plots ($P < 0.03$ and $P < 0.007$, respectively), but no correlation was detected between mating date and the date territories were first established. Song rate in the control population increased significantly with the duration of territorial possession, and the time males allocated to singing was inversely correlated to the time they spent feeding. Moreover, there was a strong correlation between male settlement date and the number of days from mating to egg laying on the control plot. These findings suggest that the proximate cue for female choice in Willow Warblers is some male trait (possibly song rate, which increased significantly with duration of territory possession) even though no significant correlation was detected between measures of male size and arrival order. Territorial quality (which was correlated with male song rate) may be the ultimate benefit since the time required for egg production was related to the order in which territories were established. [Dept. of Zoology, Div. of Animal Ecology, Univ. of Gothenburg, P.O. Box 25059, S-40031 Gothenburg, Sweden.]—Danny J. Ingold.

13. **Low repeatability of laying date and clutch size in Tengmalm's Owl: an adaptation to fluctuating food conditions.** E. Korpimäki. 1990. Ornis Scand. 21:282–286.—Repeatabilities of laying date (0.03) and clutch size (0.15) of banded female Boreal Owls (*Aegolius funereus*) were not significantly different from zero, suggesting little heritable variation in these traits. Laying dates from year to year averaged 7.3 days apart for females. The flexible adjustment of these traits to the prevailing food supply is adaptive, as owls inheriting a trait to lay small clutches cannot benefit from good vole years, whereas owls laying only large clutches cannot breed in poor vole years. [Dept. of Biology, Univ. of Turku, SF-20500 Turku 50, Finland.]—Jeff Marks.

## MIGRATION, ORIENTATION, AND HOMING

**(see also 21, 24, 33)**

14. **The relationship between latitude and the timing of spring migration of North American landbirds.** J. M. Hagan, T. L. Lloyd-Evans, and J. L. Atwood. 1991. Ornis Scand. 22:129–136. Migratory birds generally can be placed into one of two categories based on the mechanisms that control the onset of vernal migration. The timing of migration of "weather" migrants differs from year to year, presumably in response to changes in

weather and/or food availability. In contrast, "calendar" migrants are largely unaffected by external factors, arriving at the breeding grounds at about the same time each year. When exposed to constant external conditions in the laboratory, weather species do not initiate migration, whereas calendar species exhibit typical migratory behavior. Thus, calendar species seem to have an endogenous circannual clock, whereas migration in weather species is controlled by exogenous cues. Gwinner (1977, Ann. Rev. Ecol. Syst. 8:381–405) proposed that birds under endogenous control tend to winter in environments that offer few precise external cues (e.g., the tropics). To test this idea, Hagan et al. examined timing of spring migration in a large sample of birds netted at Cape Cod, Massachusetts, between 1970 and 1987.

Mean and variance in the timing of migration were calculated for 27 species based on captures of 28,590 individuals. Of these 27 species, 10 wintered primarily in North America, nine in Central America or the Caribbean, and five in South America (the remaining three wintered in more than one region). Species wintering in temperate latitudes migrated earlier than the tropical species, and variation in timing of migration (both within and among years) was significantly lower for the tropical species. These data support the hypothesis that migration in species wintering in the tropics is largely under endogenous control. Presumably, survival is higher in "benign" tropical habitats than in temperate ones. Hagan et al. suggest that one strategy is to remain in the tropics for as long as possible until conditions on the breeding grounds are suitable. The longer the stay in the tropics, however, the more crucial it becomes to migrate rapidly; thus, when it's time to go, migration should proceed with little influence from external factors. Alternatively, migration might be under endogenous control because external cues that indicate time of year are either unreliable (e.g., weather) or difficult to perceive (e.g., photoperiod changes) in the tropics. The authors conclude that the mechanism that controls a species' migration ". . . might be ultimately determined by wintering latitude and associated environmental cues." This paper is a fine example of how long-term studies at banding stations can help answer intriguing evolutionary questions. [Manomet Bird Observatory, P.O. Box 936, Manomet, MA 02345, USA.]—Jeff Marks.

**15. For how long do trans-Saharan migrants stop over at an oasis?** D. Lavee, U. N. Safriel, and I. Meilijson. 1991. Ornis Scand. 22:33–44.—Duration of stopover during spring and fall migration was assessed by intensive netting at a 2-ha desert oasis within a monastery in the Sinai Peninsula. More than 2500 individuals of 43 insectivorous species were caught; 79% were encountered only once (i.e., they probably stopped for only one day). Observed mean stopover lengths were 1.96 days in fall (maximum = 35 days, Willow Warbler, *Phylloscopus trochilus*) and 1.75 days in spring (maximum = 15 days, Redstart, *Phoenicurus phoenicurus*). By species, mean stopover length ranged from 1–5 days, with 30% of the fall species and 54% of the spring species having a mean stopover of only one day. Thus, turnover was quicker during spring than fall. Of the two species whose sex could be determined in both seasons (Blackcap, *Sylvia atricapilla,* and Redstart), males stopped for significantly shorter periods than females in spring but not fall.

Seasonal differences in stopover length are consistent with refueling and reproductive needs. Birds stopping in fall have completed only 300 km of a 2300-km journey across the desert; they may need to stay longer to refuel. In spring, birds may have adequate fuel reserves even when close to the end of their trip across the desert. Selection for early arrival on the breeding grounds may result in large fat stores, making it unnecessary for individuals to use small oases en route. Thus, the birds seem to pursue a strategy that minimizes both energy consumption during fall migration and travel time during spring migration. [Dept. of Zoology, The Hebrew Univ. of Jerusalem, Jerusalem 91904, Israel.]—Jeff Marks.

**16. Evidence for a fall raptor migration pathway across the South China Sea.** D. H. Ellis, A. K. Kepler, and C. B. Kepler. 1990. J. Raptor Res. 24:12–18.—A number of east Asian bird species breed on the continent and winter in Indonesia (Borneo, Sumatra, Java, and the associated Sunda Islands). There are three routes by which continental migrants may reach Indonesia. The eastern route involves crossing the Formosa Strait from mainland

China to Taiwan, and then island-hopping through the Philippines, on to Borneo. Migrants along the western route travel south through the Indo-China Peninsula, southward along the Malay Peninsula, and cross the Straits of Malacca to arrive in Sumatra. Both of these routes have been shown to be important corridors for fall migrants. A third possible route would involve an 800-km crossing of the South China Sea between Vietnam and Borneo. In this paper the authors provide evidence that a substantial number of migrants follow this oversea route.

The authors made their observations while aboard the Soviet oceanic research vessel *R. V. Akademic Korolev,* which traveled indirectly from the Balabac Strait (between the Philippines and Borneo) to Singapore, 23–31 October, 1988. A total of 121 raptors and other land birds were observed; species included Japanese Sparrowhawk (*Accipiter gularis*), Shikra (*A. badius*), Peregrine Falcon (*Falco peregrinus*), Oriental Scops Owl (*Otus scops sunia*), Gray [Jungle] Nightjar (*Caprimulgus indicus*), Barn Swallow (*Hirundo rustica*), Reed Warbler (*Acrocephalus* sp.), and Brown Shrike (*Lanius cristatus*). Most (79%) of these birds were observed while the ship was anchored or drifting in the southcentral South China Sea, between Mui Bai Bung cape (the southern tip of Vietnam, southwest of the Mekong River Delta) and northwest Borneo. Fewer land birds were encountered early in the voyage, when the ship was in the vicinity of the eastern migration corridor, or later in the voyage, near the western route.

The authors suggest, then dismiss, two alternative explanations for the concentration of land birds over the South China Sea. First, the voyage took place while Typhoon Ruby was "ravaging the Philippine Islands . . ." This storm may have forced land birds out to sea or deflected eastern route migrants from their normal corridor. Second, the raptors (which represented only 26% of the land birds observed) may have been foraging at sea rather than migrating. Raptors frequently perched on the ship and captured other birds, particularly Barn Swallows and Brown Shrikes. The authors suggest that the observed flight direction of the birds was not consistent with the likely orientation of birds either blown off track by the storm or wintering at sea. [U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, MD 20708, USA.]—John A. Smallwood.

## HABITAT USE AND TERRITORIALITY

**(see also 21)**

**17. Roost-tree characteristics, food habits and seasonal abundance of roosting Egyptian Vultures in northern Spain.** O. Ceballos and J. Donazar. 1990. J. Raptor Res. 24:19–25.—Six Egyptian Vulture (*Neophron percnopterus*) communal roosts were studied from 1986 to 1988 in northern Spain in order to gather detailed information on roost-tree characteristics, food habits, and seasonal abundance. Four roosts were in pine (*Pinus* sp.) trees, one in European white poplar (*Populus alba*), and one on a clay cliff; tall, dead trees were strongly preferred. Roosts were occupied from the last week of February until late September, peaking in July and August. The maximum number of vultures observed in a roost was highly variable, ranging from 8 to 138 ($\bar{x}$ = 55). During 1988 a total of 1757 vultures were observed, 72.6% adults, 26.6% immatures, and 0.8% juveniles. Adult numbers were greatest during March–April and June–July, while immature numbers were greatest during May–June. Food habits varied among roosts and closely reflected the availability of different carrion types in the surrounding areas of each roost. [Sociedad de Ciencias Aranzadi, Pl. I. Zuloaga (Museo), 20003 San Sebastian, Spain.]—Robin J. Densmore.

**18. Home-range changes in raptors exposed to increased human activity levels in southeastern Colorado.** D. E. Andersen, O. J. Rongstad, and W. R. Mytton. 1990. Wildl. Soc. Bull. 18:134–142.—Home-range displacement due to human activities (military maneuvers) in the Piñon Canyon Maneuver Site in southeastern Colorado was monitored for Red-tailed Hawks (*Buteo jamaicensis*), Swainson's Hawks (*B. swainsoni*), Ferruginous Hawks (*B. regalis*), and Golden Eagles (*Aguila chrysaetos*). None of the birds were exposed to military activity in July. Displacement of individuals exposed to military activity in August was compared to that of individuals not exposed in August. Sample sizes were small and all species other than Red-tailed Hawks had to be pooled for statistical analysis. The results are predictable in that all individuals exposed to military maneuvers either shifted home-range or completely abandoned the study area. The results do suggest that Red-tailed Hawks and Golden Eagles are more tolerant of human activities than the other species, but further testing with a much larger sample size is needed. [Dept. of Wildlife Ecology, 226 Russell Labs, Univ. Wisconsin, Madison, WI 53706, USA.]—James P. Key.

**19. Bird abundance and species richness in grassed waterways in Iowa rowcrop fields.** G. G. Bryan and L. B. Best. 1991. Am. Midl. Nat. 126:90–102.—The authors documented bird species composition along linear grassed waterways in corn and soybean fields in central Iowa during the 1987 and 1988 breeding seasons. Forty-eight bird species were observed along waterways versus only 14 in the surrounding crop fields. The most abundant waterway species included Red-winged Blackbirds (*Agelaius phoeniceus*), Dickcissels (*Spiza americana*), Barn Swallows (*Hirundo rustica*), Grasshopper Sparrows (*Ammodramus savannarum*), Brown-headed Cowbirds (*Molothrus ater*), Song Sparrows (*Melospiza melodia*), and Western Meadowlarks (*Sturnella neglecta*). No difference was detected in the mean number of species recorded per waterway between years, or in total bird abundance between years ($P < 0.05$). Moreover, total bird abundance in waterways was three times that in field plots.

Temporal differences in bird species richness (from mid-May to late-July), closely correlated with vegetation height, were detected in both years. However, the species affected differed between years, probably as the result of a severe drought during 1988, which resulted in stunted vegetation growth along waterways. Nonetheless, 53% of all species (including all breeding species) were at peak abundance in the waterways during 4–22 July. Thus, the authors suggest that waterways not be mowed until the end of August or early September in order to minimize the negative impacts on avian production. [Iowa Cooperative Fish and Wildlife Research Unit, Dept. of Animal Ecology, Iowa State Univ., Ames, IA 50011, USA.]—Danny J. Ingold.

## ECOLOGY

**(see also 8, 10, 11)**

**20. Reversed sexual size dimorphism in Tengmalm's owl: is small male size adaptive?** H. Hakkarainen and E. Korpimäki. 1991. Oikos 61:337–346.—As the authors put it, "a plethora of hypotheses has been advanced to explain reversed sexual size dimorphism (RSD, male smaller than female) in animals." However, Hakkarainen and Korpimäki have made some interesting discoveries with Tengmalm's Owls (*Aegolius funereus*), a species which exhibits RSD. In this nine-year study including 379 breeding pairs, the authors tested several of the more popular theories on this phenomenon. They found (1) the degree of RSD within pairs was not of great importance to breeding success (# of eggs and fledglings produced), and (2) little evidence to support theories explaining selection for larger females. Among these are (1) "female starvation" (large females presumably have more energy reserves and can better complete nesting during adverse conditions), (2) "reproductive effort" (larger females can presumably lay more eggs and incubate more efficiently), (3) "female dominance" (a large female can presumably make her smaller mate perform his nesting duties more efficiently), and (4) "sexual selection" (females must compete for males).

This study did yield evidence supporting theories of selection toward a smaller male, though with a somewhat new angle. Major theories of small male size suggest that a smaller male is more agile and energy efficient, based on the assumption that it is better able to defend a territory and provide an excess of food (over and above its own requirements) for its mate and young.

This study showed that in years of vole population peaks large males had better reproductive success, but all males were able to provide suitable quantities of food for their respective nests. In years of vole population crashes, smaller (with respect to weight) and longer-tailed (thus lower flight surface loading) males were better providers and in many cases were the only males to mate. During these vole crashes the owls had to rely on small birds and shrews (*Sorex* spp.) for much of their prey. Avian prey presumably requires increased agility for capture, and shrews require more foraging trips to produce sufficient prey biomass as well as foraging in habitats that require increased maneuverability. Therefore, considerable selection for a more energy-efficient and agile male is applied during low-vole years.

These findings support the observations of several authors that RSD among raptors is correlated with prey type and stability. Raptors that prey largely on insects rarely experience prey crashes and show the least amount of RSD. Raptors that feed on mammals tend to be intermediate and bird-eaters experience regular fluctuations in prey availability and show the highest degree of RSD. These observations also correspond to agility required for preferred prey-type capture. [Lab. of Ecological Zoology, Dept. of Biology, Univ. of Turku, SF-20500 Turku 50, Finland.]—James P. Key.

## ZOOGEOGRAPHY AND DISTRIBUTION

**(see also 29, 31)**

**21. Geographic variation in sex ratios of wintering American Kestrels *Falco sparverius*.** T. W. Arnold. 1991. Ornis Scand. 22:20–26.—A nagging problem with the three general hypotheses (viz., body-size, social-dominance, and arrival-time hypotheses) put forth to explain differential migration is that they seldom are mutually exclusive. American Kestrels are good candidates for evaluating the hypotheses: females are larger than males, but males arrive first on the breeding grounds. If winter distributions are determined largely by physiological and/or dominance constraints, then females should winter farther north than males. If spring arrival times are the more important factor in winter distribution, then males should winter farther north than females. Arnold evaluates these predictions using kestrel data from 152 Christmas Bird Counts conducted in 1987.

Neither the body-size nor the social-dominance hypothesis was supported by the data. The percentage of males on the wintering grounds increased with latitude, but the relationship was weak. Moreover, sex differences in winter habitat use may have confounded the results. Although the arrival-time hypothesis was consistent with sex differences in the winter distribution of kestrels, Arnold cautions against attempts to explain differential migration based on single-factor hypotheses. Clearly, more data are needed on winter distributions and arrival times on the breeding grounds from species with reversed sexual dimorphism in size. [Dept. of Zoology, Univ. of Alberta, Edmonton, AB T6G 2E9, Canada.]—Jeff Marks.

## SYSTEMATICS AND PALEONTOLOGY

**(see 29)**

## EVOLUTION AND GENETICS

**(see also 13, 20)**

**22. Directional selection on morphology in the pheasant, *Phasianus colchicus*.** H. Wittzell. 1991. Oikos 61:394–400.—Directional selection associated with survival and reproduction was investigated over a three-year period for a population of feral Ring-necked Pheasants in the central Revinge range, Sweden. Upon capture (and recapture) each winter, the pheasants were subjected to a series of measurements to define body condition and phenotype. Tarsus length, wing length, and weight were recorded for all birds. In addition, several bill measurements were recorded for all females ($n$ = 30–54) and tail and spur length were recorded for all males ($n$ = 29–38). The birds were not released until the following April. Upon release the population was monitored via radio transmitters for survival and reproductive activities until recapture the following winter.

Sample sizes are questionable, but the author reports a significant negative correlation between weight and survival of females, and a positive correlation between spur length and survival of males for one year of the study. Female reproductive success (number of chicks hatched) was negatively correlated with bill length. Male reproductive success (females acquired and estimated chicks sired) was positively correlated with wing, tail, and spur lengths, with spur length being most significant. [Dept. of Ecology, Ecology Building, Lund Univ., S-223 62 Lund, Sweden.]—James P. Key.

## PHYSIOLOGY AND DEVELOPMENT

**(see also 27)**

**23. Effects of environment and hunting on body condition of nonbreeding Gadwalls (*Anas strepera,* Anatidae) in southwestern Louisiana.** G. R. Gaston. 1991. Southwest. Nat. 36:318–322.—The chronology of body condition of Gadwalls taken by hunters on Sabine National Wildlife Refuge in coastal Louisiana (Cameron Parish) and the relationships between body condition and environmental variables and between body condition and hunting effects were observed during 1985–1988. Lipid samples taken from 2456 birds revealed that adult Gadwalls had significantly higher lipid reserves than juveniles every year ($P < 0.00001$). Lipid reserves increased in adult gadwalls, and to a lesser extent in juveniles, during hunting seasons every year with the greatest increases occurring between 4 and 15 December, when hunting was suspended. These data suggest that hunting, or some covariant of hunting, disrupted the establishment of lipid reserves of Gadwalls on the refuge, possibly by reducing feeding times and increasing energy requirements. On the other hand, lipid content of Gadwalls in most of the sex and age groups was inversely correlated with daily low temperatures, suggesting that some environmental factors other than hunting also influenced body condition. [Dept. of Biology, Univ. of Mississippi, University, MS 38677, USA.]—Danny J. Ingold.

**24. Maximum fat deposition rates in migrating birds.** Å. Lindström. 1991. Ornis Scand. 22:12–19.—When daily metabolizable energy intake (DME) is greater than daily energy expenditure (DEE), the surplus can be used for fat storage. We generally view DME to be limited by the amount of time available for foraging. However, if profitable food and foraging time are sufficiently abundant, DME may be limited by the capacity of an individual to metabolize food. The upper limit to DME ($DME_{max}$) generally ranges from 3–6 times BMR (Kirkwood 1983, Comp. Biochem. Physiol. 75A:1–3). Energy intake above this level is impossible no matter how much food is available. The existence of $DME_{max}$ implies that there is an upper limit to fat deposition rate (FDR), which is the daily gain in fat mass relative to lean body mass.

Using existing data for DME, DEE, BMR, energy value of fat, and transformation efficiency of ME to body tissue, Lindström predicts that $FDR_{max}$ decreases with increasing body mass in proportion to $M^{-0.27}$, where M = lean body mass in kg. He then calculates that $FDR_{max} = 2.22\ M^{-0.27}$ for passerines, $2.80\ M^{-0.27}$ for nonpasserines (excluding shorebirds), and $2.37\ M^{-0.27}$ for shorebirds. Field studies indicate that some migrants reach $DME_{max}$, although FDRs predicted from the equations are 2–4 times higher than those experienced in nature. This thought-provoking paper should be read by anyone interested in the energetics of migration. [Dept. of Ecology, Lund Univ., S-223 62 Lund, Sweden.]—Jeff Marks.

## MORPHOLOGY AND ANATOMY

**(see also 4, 22)**

**25. Species, class and individual characteristics in the African Wattled Starling.** W. A. Sontag, Jr. 1990. Bonn. Zool. Beitr. 41:163–169.—This zoo/aviary study is an investigation of the highly variable extent of feathering and wattles on the head, pattern and amount of white in the wing, and individual behavior of *Creatophora cinerea.* This is a widespread, highly social, colonially breeding starling in south and east Africa. Sontag looks at this variability in terms of stable species characteristics, periodically changing species characteristics (seasonal variation), sex and age characteristics, and individual variation. The study is purely descriptive, presenting an overview of variability in the species coupled with a review of knowledge of the species in the wild. It provides fodder for hypotheses that might be tested with a large sample of museum specimens and leaves me with the feeling that here is a great species for field studies of sociobiology. [Inst. fur Vergleichende Verhaltenforschung der Osterreichischen Akademie der Wissenschaften, Savoyenstrasse 1 a, A-1160 Wien, Austria.]—Jerome A. Jackson.

## PLUMAGES AND MOLTS

**(see also 25)**

**26. Intra-individual variation in primary molt of the Ruff (*Philomachus pugnax*).** [Mauser und intraindividuelle variation des handschwingenwechsels beim Kampflaufer (*Philomachus pugnax*)]. O. A. G. Munster. 1991. J. Ornithol. 132:1–28. (German, English summary and figure captions.)—The title of this paper is a gross understatement! This is a study of 6310 Ruffs captured and banded during spring and fall migration over a 16-year period. It includes not only data on primary molt pattern by age and sex, but also on leg color, bill color, and molt in other tracts.

Results support use of leg color as the best age criterion for the species, with the distribution of red at the base of the bill as a supporting factor—more red in older birds. Increasing extent of white feathers on the head, neck, and back during summer and fall indicate older individuals. Suspension of flight feather molt seems to be the rule, with females interrupting molt one primary sooner than males. Phenology of molt suspension seems independent of time of arrival at the "molting area" and consistent among years within individuals. [Biologische Station, Coermuhle 181, DW-4400 Munster, Germany.]—Jerome A. Jackson.

## WILDLIFE MANAGEMENT AND ENVIRONMENTAL QUALITY

**(see also 6, 18, 19, 23)**

**27. Effects of saline water on growth and survival of Mottled Duck ducklings in Louisiana.** A. M. Moorman, T. E. Moorman, G. E. Baldasarre, and D. M. Richard. 1991. J. Wildl. Manage. 55:471–476.—Loss and deterioration of habitat have caused a great decline in Louisiana Mottled Duck (*Anas fulviqula*) populations; many marshes in Louisiana have been significantly changed due to saltwater intrusion. Therefore, the effects of saline water on growth and survival rates of Mottled Duck ducklings were studied at the Rockefeller State Wildlife Refuge in southwestern Louisiana in 1989. Ducklings were assigned to one of eight of the following salinity treatments: 0.5-ppt (freshwater control), 1.5-ppt (slightly intermediate), 4.0-ppt (intermediate), 6.0-ppt (strongly intermediate), 9.0-ppt (slightly brackish), 12.0-ppt (brackish), 15.0-ppt (strongly brackish) and 18.0-ppt (slightly saline). Duckling mortality was 100% at 18-ppt, 90% at 15-ppt, and 10% at 12-ppt; there was no mortality in the remaining treatments. Ducklings in the 12-ppt treatment had a slower growth rate than ducklings in treatments of lower salinity. Ducklings in the 9-ppt treatment exhibited eye fatigue, loss of appetite, and nasal secretions. Fledging occurred at day 46 for ducklings in treatments 6-ppt and lower, day 53 for the 9-ppt ducklings and day 57 for the 12-ppt ducklings. The authors suggest that the threshold of tolerable salinity in Mottled Ducks is between 9 and 12-ppt, but closer to 9-ppt. Furthermore, they suggest that ducklings having access to marshes of less than 9-ppt salinity within 1–3 days of hatching will have greater survival rates than those exposed to higher salinity levels. Management implications are discussed. [Environmental and Forest Biology, State Univ. of New York, Syracuse, NY 13210, USA.]—Robin J. Densmore.

**28. Causes of mortality of Red-cockaded Woodpecker cavity trees.** R. N. Conner, D. C. Rudolph, D. L. Kulhavy, and A. E. Snow. 1991. J. Wildl. Manage. 55:531–537.—The mortality factors of Red-cockaded Woodpecker (*Picoides borealis*) cavity trees were examined in order to develop methods of management that could reduce the loss of these trees. Probable cause of mortality was determined for a total of 453 cavity trees from national forests in eastern Texas during 1978 to 1990. Bark beetles, specifically southern pine beetles (*Dendroctonus frontalis*), were the major cause of cavity tree death (53%). Habitat disturbances, such as hurricanes, facilitate bark beetle infestation. Another significant mortality factor in cavity trees is breakage due to high velocity winds; 29.6% were found to have snapped at nest cavity level. Other mortality factors include prescribed fires (7.1%), wind throw (trees blowing over from root decay, 4.0%), and lightning (4.0%). Bark beetles were the major mortality factor for loblolly (*Pinus taeda*) and shortleaf pines (*P. echinata*) while fire was the major cause of death in longleaf pines (*P. palustris*).

The authors suggest short-term treatments for beetle infestations, as well as long-term measures which involve the use of bark beetle pheromones. Other methods discussed include restricting management activity to years of minimal beetle infestation, adequate protection of cavity trees during burns, treating root rot, and repairing cavities usurped and enlarged by other woodpecker species. [Southern Forest Experiment Station, U.S. Forest Service, Nacogdoches, TX 75962, USA.]—Robin J. Densmore.

## BOOKS AND MONOGRAPHS

**29. Distribution and taxonomy of birds of the world.** "1991" = 1990. C. G. Sibley and B. L. Monroe, Jr. Yale University Press, New Haven, Connecticut. xxiv + 1111 pp. $125, hardcover.—Negative things will be said about this book in reviews, this one included, but one point must be stressed—this is a *tour de force,* a major accomplishment on the part of Burt Monroe. By rights the authorship should read "Monroe and Sibley," as Dr. Sibley all but admits in his Preface. Nevertheless, to save space, the book will be referred to in the rest of this review as "S&M." Although the idea of an annotated distributional list of the species of recent birds had occurred to Sibley more than 20 years ago, and he had made some progress on such a list by the late 1970's, the pressure of other research and writing had caused him to all but abandon the project. Burt Monroe offered his help in 1983, and by the following year the work was off and running.

Sibley's principal contribution to the present book is, of course, the underlying classification, explained in a series of papers of various combinations of authorship (the bibliography in this book lists 28, not counting pre-DNA titles), and summarized in a companion volume by Sibley and his long-time associate Jon Ahlquist (1990). That book ("S&A") includes chapters on molecular genetics, phylogeny, classifications, and methodologies, plus a massive review of the history of the systematics of the major taxa of birds and an ultimate graphic presentation ("The Tapestry") of their new classification based on DNA hybridization. A discussion of S&A is beyond the scope of the present review; for a detailed and well balanced evaluation of that book, I recommend the review by Gill and Sheldon (1991). The classification used in S&M and presented in the S&A "tapestry" was published by Sibley, Ahlquist and Monroe (1988), but its authors are still changing their minds about certain details. The Introduction to S&M states that changes made between 1988 and completion of the manuscript for the book are indicated by asterisks in the Table of Contents; I counted 11 of these. Comparison of the diagrams in S&A with the text of S&M will show certain discrepancies. To mention only one, Figure 362 in S&A shows *Nyctea* as the closest relative of *Bubo,* whereas in S&M these two genera are separated by *Ketupa* and *Scotopelia.* The merits of the S&A classification (especially of higher categories) and of its origins are being strongly debated; I will not be dealing with those matters here. There are, however, some statements in S&M on relationships of species and genera, based on the DNA-DNA work, that I find clash so strongly with evidence from other disciplines that I wonder whether the distances shown between terminal branches in the S&A diagrams really fall outside of the range of possible error. Two of these are given below.

Plumages of adults and especially downy young shed doubt on the DNA-DNA data that indicate (p. 241) that *Tryngites* (Buff-breasted Sandpiper) is closer to *Calidris* than is *Micropalama* (Stilt Sandpiper). On p. 180 the statement is made that "DNA-DNA hybridization evidence indicates that this species [the Burrowing Owl, *Speotyto cunicularia*] is not closely related to *Athene.*" Nevertheless, the authors place *Athene* immediately after *Speotyto.* Comparison of Burrowing Owls with *Athene* sp. in all plumages clearly shows that "*Speotyto*" is nothing but a long-legged *Athene,* adapted to its somewhat more terrestrial habits than the other species.

The heart of S&M (pp. 1–784) is the annotated list of species of Recent birds of the world. This differs in important ways from previous world lists. It should not be confused with recent noncritical compilations such as those of Clements, Gruson, Walters, and Howard and Moore. In some ways it more closely resembles the first seven volumes (1931–1951) of the *Check-list of birds of the world* by the late J. L. Peters, one of the outstanding museum-based systematists of an older school. Many aspects of S&M, however, go far beyond what Peters included, and to some extent the reverse is true—Peters' full citations to original descriptions of genera and species are absent in S&M, and Peters also covered subspecies. Missing in the Peters volumes and the first five editions of the A.O.U. *Check-list of North*

*American birds* is any indication of alternative opinions on taxonomy and nomenclature of included groups. The sixth edition of the A.O.U. *Check-list* (American Ornithologists' Union 1983) added these, but inadvisedly (to save space) omitted literature references for these alternative treatments. This vital information *is* provided in many cases by S&M, but its omission can be frustrating. On p. 520 we are told that *Turdus plebejus* "is sometimes considered conspecific with *T. ignobilis* but probably not closely related to it." Neither part of this statement is documented, and *ignobilis* immediately follows *plebejus* even though they are "probably not closely related."

There is (as might be expected) a strong bias toward the S&A treatment, and alternatives are often unmentioned. This is perhaps carried to the extreme on p. 1. There is a positively huge recent literature on the relationships of the ratites, involving numerous and often incompatible classifications. The only statement about these birds in S&M is "Sibley and Ahlquist (1981a) discussed relationships among the ratites as indicated by DNA-DNA hybridization." They do not cite, for example, an important paper by Bledsoe (1988), in which it is shown that Sibley and Ahlquist later published a classification of ratites (in Diamond 1983) that differed in some respects from that in their 1981 paper (see also the critical remarks by Gill and Sheldon in their review of S&A, cited above).

Another feature of S&M absent in the Peters series (except for an incomplete and subsequently aborted attempt in vols. 9 and 15) is the provision not only of an English name for each species, but (as in the A.O.U. sixth edition) recommended names to be used if species are lumped or split. Many of the English names adopted by Monroe are unfamiliar, and Sibley states in his preface that "this may turn out to be one of the most controversial features" of the book. I doubt that, but in any case Monroe has carefully included the alternative, often better-known, English names. These are indexed, although incompetely and inconsistently. For example, the alternative name WHITE-TAILED FLYCATCHER is given for both *Microeca fascinans* and *Lanioturdus torquatus,* but only the former is indexed. A reviewer cannot possibly check the accuracy of an entire index, but that there are at least some problems in this one is indicated by the entries for the genus *Pseudochelidon*; the page references for the generic name and MARTIN, RIVER are correctly given as 572; that for RIVER-MARTIN erroneously as 512.

Small typographical errors such as 512 for 572, "**Nearactic**" for **Nearctic** (p. 81), "morpholgocial" for morphological (p. 131), "*A.rdeotis*" for *Ardeotis* (p. 216), "Carriker 1832" for Carriker 1932 (p. 350), "*currauca*" for *curruca,* etc., are hardly unexpected in a book of this size. Some typographical errors, however, can lead to confusion. On p. 223, for example, under *Gallirallus* "*conditicus*" (error for *conditicius*), there is a citation to "Wolters (1987)"; no such reference can be found in the bibliography, but a lucky reader will discover that the reference pertains to *Walters.* On p. 293, under the correctly spelled *Falco rufigularis,* reference is made to a paper by Eisenmann that "discussed use of *F. rufogularis* [*sic*] instead of *F. albigularis.*" These typos represent only a small part of the many symptoms of carelessness in the completion of this book. Knox (1991), in a detailed review of both S&A and S&M, has already called attention to this aspect of S&M, and adds that "One cannot help wondering if the editing of Sibley and Monroe suffered in the rush to get an advance copy ready in time" for the International Congress in New Zealand in 1990. Knox gives several instances of erroneous citation of references. Most readers will miss these unless they have special knowledge. For example, in the course of refereeing a manuscript on certain formicariids, I had occasion to look up the S&M treatment of *Dysithamnus plumbeus* (p. 383). They state "Hilty and Brown (1986:397) placed this superspecies and *occidentalis* in *Dysithamnus,* although Schulenberg (1983) treated them in *Thamnomanes.*" The true facts are that Hilty and Brown placed *plumbeus* in *Dysithamnus* and *occidentalis* in *Thamnomanes,* and one of the principal findings of Schulenberg's paper, exactly contrary to S&M, was that these two species did *not* belong in *Thamnomanes*; *plumbeus* is a *Dysithamnus* and *occidentalis* possibly a *Thamnophilus.* One must wonder how many other similarly botched statements occur in S&M.

One of the erroneous citations mentioned by Knox was to one of his own papers, and a reviewer is certainly most likely to spot an error in a citation similarly close to home. Under *Pseudochelidon sirintarae* (p. 573; the genus already mentioned above in connection with an indexing error), S&M state "possibly breeds in China," followed by "Dickinson (1986) presented evidence of breeding in China." This is an important statement, as the breeding range is otherwise unknown. However, the "evidence" presented by Dickinson consisted of his interpretation of the identity of two grotesque birds on a modern Chinese scroll painting purchased in Hong Kong in 1972. Monroe somehow missed my note in the next volume (Parkes 1987), in which I demonstrated, *Dickinson concurring,* that the portrayed birds were in all probability Oriental Pratincoles (*Glareola maldivarum*). The breeding area of the White-eyed River-Martin remains unknown.

My specific comments on the species accounts can conveniently be divided into several categories. Some are objective—factual errors and omissions, and matters of scientific nomenclature. Many more are subjective in the sense that they are matters of judgment. These could be omitted from a review, which would then be chiefly a mere description of a book. However, if a chosen reviewer has enough familiarity with the subject of a book to have reasonably based opinions, I believe it is useful to have these presented, and I will thereby permit myself to do so.

First, some general comments. In most cases, there is no explanation of the source of species sequences (there are a few exceptions: I noticed, for example, *Francolinus,* grouse and turkeys, *Otus, Glaucidium,* and *Ptilinopus*). This is a serious omission from the Introduction; it would have been useful to know which authorities have been followed, especially in groups such as the parrots, in which several conflicting classifications have been published. For authors who have so radically revised higher categories, S&M are suprisingly reluctant, in some cases, to depart from previous sequences even when they have their own different opinions. The sequence of some African warblers on p. 598, for example, strongly suggests that it is taken almost intact from Traylor (1986). Under *Drymocichla incana,* S&M state "Affinities uncertain; probably closest to *Camaroptera.*" Yet they place five genera in between *Drymocichla* and *Camaroptera*!

Following "Peters" uncritically is also revealed by their acceptance of Paynter's preposterous statement (1970:40) that "*Calamospiza* and *Plectrophenax* appear to be quite closely related and both are not distant from *Emberiza.*" The Snow Bunting, *Plectrophenax,* is indeed an arctic-adapted *Emberiza,* but the Lark Bunting, *Calamospiza,* has nothing to do with those genera, but was properly placed in the sixth edition of the A.O.U. Check-list (1983) as an offshoot of a central North American radiation that also includes *Pooecetes, Chondestes,* and *Amphispiza.* Oddly, Monroe was the chairman of the committee (on which I also served) that compiled the A.O.U. list, and I have no indication or recollection that Monroe registered a dissent from this arrangement. The same is true of the S&M arrangement within the genus *Icterus,* taken directly from Blake (1968); for non-South American species, the A.O.U. sequence is far superior, for example, restoring the Hooded Oriole (*I. cucullatus*) to its proper place near the Orchard Oriole (*I. spurius*) instead of between the wholly different *I. pustulatus* and *I. icterus.*

Wording is sometimes used very subtly. The difference between "suggested that" and "presented evidence for" sometimes seems to be loaded. For example, under the Piopio, *Turnagra capensis,* we are told that "Olson et al. (1983) *suggested* [emphasis mine] a relationship with the 'bird-of-paradise/bowerbird assemblage,' which is not very useful because birds-of-paradise and bowerbirds are not closely related to each other." The authors refrained from stating that this claim is (of course) based on DNA-DNA hybridization, but is countered by *evidence* from a number of other disciplines. The paper cited *presented evidence* in great detail from four fields—osteology, external characters, pterylosis, and myology—all combining to show that *Turnagra* was [it is extinct] a primitive species most closely allied to the bowerbirds and the primitive birds-of-paradise of the subfamily Cnemophilinae. S&M have placed the Piopio at the end of the Tribe Pachycephalini, but supposed resemblances to members of this group were clearly shown to be spurious by Olson et al. (1983) as well as by earlier authors.

The category of superspecies is heavily used in this book, sometimes as apparently newly proposed groupings. Forms long regarded as conspecific are changed to allospecies, usually on the basis of recent publications or personal communications. On the other hand, some species are dubiously combined into superspecies while other, more plausible combinations are ignored. The Long-billed Curlew is combined with the Eurasian Curlew under the name *Numenius* [*arquata*] *americanus,* yet the much more logical shorebird superspecies combination of the Common and Spotted Sandpipers ("*Tringa*" [=*Actitis*] *hypoleucos* and *macularia*) is overlooked, even though these taxa have even been considered as conspecific (Mayr and Short 1970). The two species of the heron genus *Gorsachius* are far too different in morphological and plumage characters to be considered allospecies. Two Philippine species of paradise-flycatcher, *Terpsiphone,* are listed as allospecies, presumably because both are endemic and are allopatric. Even a perfunctory look at these birds is enough to counter such a treatment. *T. cinnamomea* is rufous in color, has short crown feathers, and a brightly colored fleshy eyelid, whereas *T. cyanescens* is blue, has a long fan-shaped crest, and lacks a fleshy eyelid.

Many taxonomic decisions in this book are based on personal communications, without further documentation. In all too many instances, these undocumented and often dubious decisions are in opposition to the published results of careful studies. A few cases in point follow.

An author cannot help being irritated when a detailed analysis, such as I did (Parkes 1980) on the relationships of the San Cristobal Honeyeater (*Meliarchus sclateri*) is rejected in favor of the vague statement (p. 435) that this species "appears to be a *Melidectes* (R. Schodde, pers. comm.)." Similarly, Ben King's "suggestion" on p. 478 that *Oriolus albiloris* "is more closely related to *O. isabellae*" than to *O. xanthonotus* is nonsense, as careful study of specimens of these Philippines orioles easily shows. *O. albiloris* is merely a very well-marked, nearly melanin-free race of *O. steerii,* which is an allospecies of *O. xanthonotus* as correctly given by S&M. The relationships of *O. isabellae* are obscure, but it differs in size, plumage pattern, proportions and soft-part colors from the *O. xanthonotus* superspecies. As in the orioles, Ben King has been misled by superficial field similarity into believing that *Urocynchramus pylzowi* "is a rosefinch related to *Uragus*" (p. 715). Zusi (1978) showed conclusively that it did not have the skull of a cardueline, and it has the highly distinctive bill shape of the Old World emberizine finches as well as emberizine plumage markings unknown in carduelines. Its resemblance to *Uragus* is essentially confined to pink color and long tail.

I realize that the amount of work necessary to produce this book was such that Monroe could not always make carefully considered decisions. Nevertheless, I have drawn up a partial list of what I consider to have been errors of judgement in accepting certain previously published material. Some of these are listed below.

S&M have accepted (p. 21) as a valid extinct species *Argusianus bipunctatus* (Wood) 1871, described from a fragment of primary feather of unknown origin, on which the spotted pattern of the inner webs of *A. argus* primaries is duplicated on the inner web. They cite a paper by Davison (1983) as having made a case for this feather having originated from Tioman Island, off eastern Malaya. This paper is perhaps the wildest flight of fancy ever to have appeared in a serious ornithological journal—the author also postulates that this mysterious species was flightless! The feather fragment was found in a bundle of feathers of *A. argus,* and I have seen no admission by any author that the color pattern and the slender shaft may represent nothing more than a developmental accident in an individual of *A. argus.* Anyone who has handled large numbers of birds has seen feathers that were abnormal both in shape and pigmentation. With no evidence other than this feather fragment, I see no justification for acceptance of *A. bipunctatus* as a species, much less Davison's conjectures about its supposed range and flightlessness.

The authors (p. 579) have given full credence to the species status of *Hirundo perdita* Fry and Smith (1985), described from a single rotted specimen of which only the wings and reassembled rectrices were saved. It was picked up dead at a lighthouse on the Red Sea, on a major flyway for Palearctic migrants; its supposed nearest relatives (allospecies!) are all from western and southern Africa. No consideration was given in the original description to the plausible hypothesis that the specimen might actually be a hybrid of Palearctic origin, certainly suggested by the time and place of its discovery. Both inter- and intrageneric hybrids are known in the Hirundinidae, and a mixture of parental characters could well mimic those of a distant species.

On p. 464 S&M revive the old "lumper's" viewpoint that *Cyanocorax yucatanicus* "May be conspecific with *C. sanblasianus.*" Various papers by Hardy and Raitt and by Hardy alone long ago showed that the Yucatan Jay is a distinct species (see Phillips 1986:53).

On p. 240 the controversial Cox's Sandpiper, *Calidris "paramelanotos,"* is listed as being "included" in *C. melanotos,* the Pectoral Sandpiper, even though the discussion paragraph indicates that its status is unknown.

Although I didn't want to get involved in this review in the question of English names, nevertheless I can see no point in abandoning the standard A.O.U. name Olive-sided Flycatcher in favor of Boreal Pewee (p. 352) just because this species is now in the pewee genus *Contopus* rather than the monotypic *Nuttalornis.*

Turning now to more objective comments on species accounts, I found a few matters of scientific nomenclature that call for attention. These are listed below by page number.

p. 32. For the next edition: the name *patachonicus* King, 1828 for the Flying Steamer Duck has been suppressed in favor of *patachonicus* King, 1831 (International Commission for Zoological Nomenclature 1991).

p. 40. Although many obscure generic synonyms have been included, no mention is made of *Lampronetta* Brandt, used for the Spectacled Eider as recently as the fifth edition of the *AOU Check-list* (American Ornithologists' Union 1957).

p. 371. Under *Zaratornis stresemanni,* Koepcke 1954 should not be in parentheses.

p. 381. Mees (1974) sought to replace *Thamnophilus amazonicus* Sclater 1858 with *T. ruficollis* Spix 1825; that name was subsequently suppressed by the International Commission for Zoological Nomenclature (1981).

p. 476. It is ironic that S&M state that "the original spelling by Linnaeus was not a *lapsus calami* and must stand . . ." The original spelling by Linnaeus was not "*leucorynchus*" as given by S&M, but "*leucoryn,*" which I have verified. The addition of "[*chus*]" at the end of the word, as by Mayr (1962:161), is an extrapolation based on deducing Linnaeus's intent.

p. 438. Although S&M cite McAllen and Bruce (1988) to the effect that the correct spelling is *Epthianura,* they use the incorrect *Ephthianura* for all three species.

Next I present a sampling of factual omissions and errors, also by page number; most ornithologists could no doubt, by careful reading, find many more in their own areas of expertise.

pp. 29–30. No mention is made of the fact that *Anser cygnoides* and *A. anser* are ancestors of domestic breeds, although this information is supplied for *Gallus gallus, Numida meleagris* (in an errata slip), *Cairina moschata,* and *Anas platyrhynchos.*

p. 182. *Sceloglaux albifacies* is attributed only to the South Island of New Zealand; it also occurred on North and Stewart Islands.

p. 197. The spread of *Streptopelia chinensis* throughout the Philippines has been by dynamic range expansion, not by island-by-island introductions.

p. 201. I know of no documentation for the oft-repeated allegation that *Geopelia striata* was introduced in the Philippines.

p. 231. Under *Fulica atra* there is a cross-reference to *Gallinula chloropus,* for no apparent reason.

p. 296. The widely used name "Holboell's Grebe" for the North American race of *Podiceps grisegena* is omitted, although "Grey-cheeked Grebe," which I have never encountered, is given as an alternate English name for Red-necked Grebe.

p. 318. The breeding of *Fregata magnificens* in the Revillagigedos Islands of Mexico (Jehl and Parkes 1982) was overlooked. This is important because it is the only locality other than the Galapagos Islands where this species is sympatric with *F. minor.*

p. 330. In spite of giving *Xenicus lyalli* the English name of Stephens [Island] Wren, the range is erroneously given as Stewart Island, which is at the opposite end of New Zealand.

p. 357. Under *Neoxolmis rufiventris* Lanyon is stated to have "treated this species in a monotypic genus" although earlier on the page they have chided Lanyon for including *Xolmis rubetra* in *Neoxolmis.* The line about the monotypic genus appears to have been an inadvertent repetition of the exact same sentence under *Heteroxolmis dominicana,* where it is accurate.

p. 370. *Tijuca condita* is said to be "probably related to *Lipaugus*," which is 10 genera away!

p. 394. The northeastern part of the winter range of *Upucerthia dumetaria* is understated; it reaches Entre Rios and Paraguay (Olrog 1979:167).

p. 446. Under *Eopsaltria australis*, the word "translation" should be "transliteration."

p. 617. *Orthotomus derbianus* is known from Palawan by a single specimen only, and almost certainly does not occur there normally.

p. 689. *Parmoptila rubrifrons jamesoni* has been known from Uganda, omitted in the S&M range, since 1960; this distribution has been mentioned in several papers such as that of Keith (1968) and in Goodwin's (1982) book on estrildine finches.

p. 702. Israel is omitted from the range of *Serinus syriacus*. It breeds on Mount Hermon in the north, and migrates through the central part of the country.

p. 727. The *Buarremon* group of *Atlapetes* species should begin with *A. brunneinucha*, not the *A. torquatus* superspecies.

I have yet to discuss pp. 785–1111 of S&M. Pp. 785–848 are devoted to a nominal list of species of birds of the world, to each of which is appended a code number based on the system used for A.O.U. numbers, extended to the rest of the world's avifauna. The sequence of these numbers, to be used where a numerical species code is desirable, does not agree with any other sequence, as it was created by assigning new numbers beginning with 1001 to follow the numbers already assigned by the A.O.U. up to 813. It remains to be seen whether this coding will prove valuable. Next come 25 pages of simple outline maps, followed by a 32-page gazetteer. The details in the maps vary. Most show no rivers or mountains, both important in bird distribution. The maps of Europe, India, and Southeast Asia, for example, show no rivers or mountains; that of Eurasia (labelled "Asia" but including all of Europe) shows rivers and a few mountains, in the [former] U.S.S.R. only. The China map labels only the Yangtze River and no mountains. In the North America map the boundaries of states and provinces are printed so faintly as to be nearly invisible. The explanation for the typographical conventions used in the gazetteer is on p. xxiv instead of at the beginning of the gazetteer, where it would be more useful. My feeling is that the pages devoted to the maps and gazetteer, although only forming 5% of the bulk of the book, are unnecessary. Any individual or library that spends $125 for this book is bound to have an atlas that will show and index far more localities than in S&M.

Next comes a 33-page bibliography, formatted traditionally and easy to use, although with a few flaws in addition to typographical errors. Peters is given as author for all volumes of the *Check-list of birds of the world*, including those published long after his death that included classifications of which he would not have approved. Only the first and not the revised editions of Ali and Ripley's *Handbook of the birds of India and Pakistan* are included. Accents are correctly given in most French and Spanish language titles, but are omitted, for example, in titles of papers by Berlioz and Desfayes. There are two principal methods of alphabetizing "Mac" and "Mc" names in bibliographies. The University of Chicago's authoritative *A Manual of Style* (1969 edition consulted) states that "Mc" names should be alphabetized as if they were "Mac." An alternative method (adopted in S&A) alphabetizes "Mc" names after all names beginning with "Ma . . ." In S&M, three "Mc" names are alphabetized under the Chicago system, whereas "McAllan," which a colleague of mine spent some time searching for, is sandwiched between "Mayr" and "Medway." You can't have it both ways.

The single index occupies pp. 940–1111. Because of its great length, it is cumbersome to use (and I have used it many times). Dual indices for scientific and English names, as in many books, would have been preferable in this one.

So what is the significance of all of this? I return to two points made at the beginning of this review. First should be a recognition of the tremendous amount of work that Burt Monroe put into this book; he may be the only living ornithologist with the knowledge and the patience to undertake such a task. But Knox's point also needs to be reiterated. He and I both found evidence of haste and sloppiness in the completion of the book, and he may well be right in attributing this to the desire of the authors (and/or publishers) to have available for the 1990 International Ornithological Congress in New Zealand. Any reviewer of a work like this is uncomfortably conscious of the fact that some of the errors and omissions were found by mere chance—I would not have discovered the miscitations in the account of *Dysithamnus plumbeus* had not my interest been aroused by reading a manuscript dealing in part with this species. Other reviewers could read more thoroughly than I did the pages devoted to groups of which I have relatively little knowledge, and would almost certainly be able to come up with criticisms like mine. The book cries out for the eventual publication of an Addenda and Corrigenda far more inclusive than the half-page Errata sheet that now accompanies the book. In some such situations the publication of a thoroughly revised edition, well vetted by selected experts, would solve the problem. Unfortunately, however, few owners of a book retailing at $125 can be expected to rush out and buy the next edition. Needless to say, many individuals and institutions, with no special knowledge of birds of the world, will be arranging their bird collections and formatting their manuscripts in accordance with S&M. To some extent this would be justified and not merely bandwagonism, as there is no doubt that parts of the traditional (usually called Wetmorean) classification of birds, originally followed by Peters in the early volumes of his *Check-list,* do not reflect true relationships. With the uncertainty still surrounding some of Sibley and Ahlquist's conclusions, and given the number of factual (and perhaps judgmental) errors in the Sibley and Monroe book, such institutions and individuals would be well advised to hold off for awhile in rearranging their collections and manuscripts.—Kenneth C. Parkes.

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**30. Ornithologie.** E. Bezzel and R. Prinzinger. 1990. Eugen Ulmer GmbH & Co., Stuttgart, Germany. 552 pp., hardcover (in German).—What is ornithology? The study of birds, of course, but that simple answer may not be so simple. How are birds studied and what about them is studied? One way to find out is to look at an ornithology textbook. Assuming that American texts in ornithology reflect what is taught, it is of interest that this revised text (first published in 1977) from Germany includes different emphases and much more detail.

The 27 chapters include 15 that deal with anatomy/physiology/embryology, three that deal with behavior, one each with population biology, migration, fossils and evolution, classification, zoogeography, parasites and diseases, conservation, ornithology as a biological science, and domestication of birds. American texts (e.g., Gill, 1990, Academic Press, New York; Welty and Baptista, 1988, Saunders College Publishing, New York; and Pettingill, 1985, Academic Press, New York) place much less emphasis on anatomy and physiology and proportionately more emphasis on ecology and behavior. As a specific example, Bezzel and Prinzinger (p. 20) include a figure with a lateral view of a bird skull with 23 structures labelled; in similar figures, Gill (p. 17) labels six structures, and Pettingill labels 11 (but he labels other structures on other views). The Welty and Baptista text lacks such a figure.

As might be expected, literature citations in *Ornithologie* are dominated by German literature. However, sources for the chapter on classification are dominated by American authors. What American literature was used? Among approximately 500 references cited, a "once through" revealed only nine references to papers in *The Auk,* seven references to papers in *The Condor,* and one reference to a paper in *The Journal of Field Ornithology.*

*Wilson Bulletin* and *American Birds* were not cited. *Current Ornithology* was cited at least 17 times, and the series *Avian Biology* was heavily used. What this suggests is that the authors relied on reviews. American authors cite much more of the primary literature: Gill, for example, includes approximately 1500 literature references. Another notable characteristic of the literature cited by Bezzel and Prinzinger is the lack of citations to references more than about 30 years old, again suggesting reliance on reviews. Gill, by contrast, cites literature spanning about 120 years.

Does any of this make a difference in the value of the German text? Perhaps not, but ornithology is a science in which observations made 120 years ago are sometimes quite valuable and no less important than ones made today. Students should be taught the value of "old" literature and the need to review it. If they don't learn that lesson, they are destined to repeat earlier discoveries—and mistakes.

Figures in *Ornithologie* are more reduced in size than are those in American texts, and all of the American texts have broader margins and more white space surrounding figures and tables. Important terminology is bold-faced when first used in *Ornithologie* and in Pettingill's text, but not in Gill's or Welty's and Baptista's. The first edition of the American text by Van Tyne and Berger (1959, John Wiley & Sons, Inc., New York) was particularly useful because of its glossary. Neither *Ornithologie* nor the more recent American texts cited have a glossary. *Ornithologie* has separate taxonomic and subject indices; the American texts do not.

Ecto- and endoparasites generally are not discussed or are only minimally covered in American texts, but are nicely reviewed and illustrated in *Ornithologie.* Where American texts often generalize or provide a few examples, *Ornithologie* includes lengthy tables. For example, Table 12.1 extends over four pages to list the nutritional characteristics of grains and meals used as bird food. Table 17.10 extends over three pages to list nest type, nesting substrate, sex that builds the nest, and nature of nesting material characteristic of each avian family. Chapter 26 in *Ornithologie* includes a brief history of ornithology as a science in various parts of the world—a subject lacking in American texts. Tables in this chapter list names and addresses of national and international ornithological organizations and journals published by them.

In sum, *Ornithologie* is an extremely detailed, well-illustrated, well-organized, and well-indexed text. It could be used as text for a whole curriculum in ornithology! It is certainly a handy desk reference to matters of bird biology. Access to the primary literature on which the text is based, however, is often through cited reviews.—Jerome A. Jackson.

**31. Wisconsin Birdlife.** S. D. Robbins, Jr. 1991. The University of Wisconsin Press, Madison. 702 pp., 1 color plate, many maps and charts, some black and white photographs. $75, hard cover.—When I came to Wisconsin in 1956 the extant state bird book was the pamphlet by Kumlien and Hollister, *Birds of Wisconsin,* 1903, as updated and briefly revised by A. W. Schorger in 1951. I was told that a new state bird book was in preparation. O. J. Gromme's *Birds of Wisconsin* appeared in 1963, but it consisted solely of a collection of paintings of the species of Wisconsin birds accompanied by small and often misleading range maps. The text would be published separately, we were told, and the task would be taken over by Sam Robbins, the recognized leader of Wisconsin birders, who would work on it in the time he could spare from a busy professional life as a clergyman. It has taken another 28 years, but at last the book has been published and I am happy to say that Wisconsin birders and ornithologists now have an excellent, well-prepared and up-to-date (in most respects) account of the distribution and abundance of birds in the state.

*Wisconsin Birdlife* consists of two major parts. Part I in turn has two lengthy sections. The first includes an historical review of the study of birds in Wisconsin, from the shotgun collectors of the early 1800s to the formation of the Wisconsin DNR Bureau of Endangered Resources in the 1980s. In the same section there follow discussions of avifaunal changes, population changes, and bird conservation. This section is informative but quite generalized and diffuse. Many population and distribution trends are mentioned here rather than in the later species accounts. As the book has no subject index it is hard to locate or relocate specific topics in this section.

The second section of Part I is a very long one written by James Hall Zimmerman entitled "The Landscape and the Birds." It attempts to describe bird habitats and relate them to geography, climate, topography, major vegetation types and plant communities, bedrock geology, soils, pre-glacial and post-glacial land form geology, and impacts of human land use. This Michener-like approach is somewhat overwhelming and may include more detail than most users of the book will want to read. Nevertheless it is well done and collects in one place a vast amount of pertinent information.

Part II is the main body of the book. There is a brief section defining terms and explaining sources of information, then a list of Wisconsin species in chart form, showing seasonal occurrence and overall status (regular, rare, casual, accidental, former, hypothetical). This is followed by the species accounts. Each account gives first a synopsis of status, habitat, migration dates, breeding data specifically from Wisconsin (range of egg dates and usual clutch size), distribution in winter, and a reference to a plate number in Gromme's 1963 book. The following narrative lists specific records by date, county, and observer, that define the species distribution, migration periods, and breeding or wintering status. Except in the case of very rare species, the source of a particular record is not given.

For most species a map of Wisconsin is included showing the summer and winter ranges, if these do not include the whole state. Many maps also show the localities of important records, county-by-county dates of appearance of invading or expanding species, and the like. For many species a map is included that shows the average numbers on Breeding Bird Survey routes, arranged in eight avifaunal zones based on physiography and vegetation. Black and white photographs are included for documentation of some rare species for which there are no museum specimens from the state. Aside from occasional vignettes expressing some of the pleasures of bird-watching, especially the discovery of rare birds, there is little in the species accounts on natural history or behavior. There are accounts for all of the 394 confirmed species in Wisconsin and briefer accounts of 13 unconfirmed species.

At the end of the species accounts there is another long section by Zimmerman describing in detail the habitat types in Wisconsin and tables of bird species associated with them. I am puzzled by the placement of this section. Why is it not in Part I along with, or consolidated with, Zimmerman's other section? There is considerable repetition in these two sections.

The main strengths of this book are its meticulous and up-to-date (to 1989) compilation of records of rare and unusual birds; the accurate depiction of normal migration and seasonal changes, as distinct from aberrant dates of occurrence; and the accurate definition of breeding and wintering ranges.

I have three general criticisms of the book. First, I believe that Robbins is generally less successful in his treatment of abundance than he is in documenting distributional records. Some discussion of changes or trends in abundance is given in Part I, but abundance is given relatively short shrift in the species accounts. In some cases this may be due to failure to update or revise some of the accounts that were written early in the game. For example, the great increase in wintering Mourning Doves that began 30 years ago is mentioned, but the equally conspicuous development of a resident Canada Goose population in southeastern Wisconsin, which began about 12–15 years ago, is not. The account for the Double-crested Cormorant describes the decline in numbers in the 1950s and 1960s, then mentions a "modest comeback," which seems to date the preparation of this species account to the 1970s, as there has been a much more than "modest" increase in the 1980s.

A second criticism relates to the BBS maps. While the use of the BBS to document abundance is innovative and laudable, the author gives little discussion and no guidelines regarding their interpretation. He does not mention how many survey routes were included in each of his eight avifaunal zones. Are we looking at averages of two routes or of twenty? There are no caveats about comparing numbers across species. There is no discussion of the problems, particularly important in Wisconsin, concerning regional abundance vs. abundance within suitable habitat.

Finally, the sources for the specific sight records given in the book are usually not indicated. In the introduction to Part II, Robbins says that some of these come from the data files of the Milwaukee Public Museum or other institutions, some are personal communications to the author, and many are from seasonal lists or other sections of *The Passenger Pigeon,* the journal of the Wisconsin Society for Ornithology. Unfortunately, for a given record the reader is not told which, and is unable to track it to its origin without a great deal of difficulty. In B. G. Peterjohn's Birds of Ohio (1989, University of Indiana Press) this problem is solved by using a superscript for each record, denoting a particular literature or other source. While this might be an editor's nightmare, I think some such system should have been used in *Wisconsin Birdlife.*

Despite these few shortcomings this is overall an excellent book, accurately detailing the distribution and status of the birds of Wisconsin. There is no doubt that it will be the Wisconsin birder's bible for a long time.—Charles M. Weise.

**32. Bird trapping and bird banding: a handbook for trapping methods all over the world.** H. Bub. 1978. (Translated by F. Hamerstrom and K. Wuertz-Schaefer. 1991. Cornell University Press, Ithaca, New York. 330 pp. $69.50, hardcover.)—Often times books translated to a different language are awkwardly worded, which can be annoying to the reader. I must say, however, that Hamerstrom and Wuertz-Schaefer have made this translation read smoothly. Moreover, the inclusion of the many line drawings and photographs make for an informative presentation of the material.

The methods discussed in the book are quite varied and, as the title states, are taken from all over the world. The discussions range from general treatments of particular methods (e.g., funnel traps, mist nets, cannon nets) to very specific traps aimed at capturing a particular species. The contents are loosely arranged into sections rather than into discreet chapters. The different sections of the book represent three topical categories: (1) types of traps, (2) special situations or habitats, and (3) species-specific trapping methods.

The various means of capturing birds described in the book include funnel, pit, and cage traps, as well as mist, drop, clap, bow, hand or dip, and cannon nets. Sections concerning trapping birds during the evening or at night and around watering holes also are included. Specific methods for capturing grouse and raptors are outlined in detail as well. Included at the end of the book are listings of books and manuals for bird banding, periodicals related to bird banding, and an extensive bibliography representing literature from around the world. One minor problem involves the bibliography; each reference does not start on a new line, but instead follows immediately after the preceding entry. I found this layout somewhat annoying because one cannot quickly scan the bibliography to locate a particular reference.

One very important point relates to some of the techniques outlined in the text. As indicated in the forewords written by George Jonkel (then Chief of the Bird Banding Laboratory, U.S. Fish and Wildlife Service) and Chris Mead (General Secretary of EURING and Head of the British Ringing Scheme), the techniques described need to be adapted to comply with national laws and international treaties.

I recommend highly that anyone interested in capturing and/or banding birds consult this text before embarking on any banding excursion. The amateur bird bander would find the book interesting and would likely consult the book when trying to develop new techniques for trapping different kinds of birds. The professional scientist with little or no bird trapping experience would find the book an excellent starting point for developing a research project where there is a need to capture wild birds.—Mark S. Woodrey.

**33. Bird Migration.** T. Alerstam. 1990. Cambridge University Press, New York. 420 pp. $105, hardcover.—This book is a translation by David A. Christie of Alerstam's *Fågelflytthing,* originally published 1982 in Swedish. It is well written and a pleasure to read, a tribute to both the author and the translator. The author's delight of birds and fascination with bird migration are clearly evident. The book contains an incredible amount of information on avian ecology and migration. Although the author included results of a few of the studies published since the original edition, the book has not received a serious update or revision. This is unfortunate because a number of new and exciting findings have been reported in the interim. The intended audience appears to be primarily the general public, but the book has much to offer ornithologists as well. The book is divided into five chapters (a small number by American standards). The first two chapters are introductory and cover historical ideas about migration and a general overview of the earth's ecology. Alerstam skillfully applies this general information to birds and to its influence on migration.

The third chapter comprises half of the volume and deals with the ecology of individual species and its effect on their migration. There is a great deal of information here on the habitat and food requirements of many species and feeding guilds in both their breeding and nonbreeding ranges. Much of this information is in tabular or graph form and easy to extract. As might be expected, there is a strong bias towards European breeding species, but examples of North American and Holarctic breeders also are included. This series of species accounts results in some topics, e.g., molt, being treated in a number of places, including a more general discussion on the topic. A more synthesized discussion of such topics would have made them easier to follow. Some of the statements and assumptions are rather simplistic, and not in accordance with general facts. The model of leap-frog migration, for example, is based on the Redshank (*Tringa totanus*) and makes intuitive sense, but is different from what is known about the differential timing between northern and southern populations of other species. This discrepancy illustrates some of the problems associated with making generalizations about migration, even within birds.

The chapter contains many short natural history accounts of migrants that are grouped together by food and foraging style. Much of the ecology is used to develop Alerstam's discussion on the evolution of bird migration; he considers migration to be an ecological factor in avian life histories. These accounts include considerable interesting information with regard to migration. For example, immediately after fledging, young Manx Shearwaters (*Puffinus puffinus*) set off on a 10,000-km migratory trip that they complete in two weeks. As a result of their migrations taking them into different habitats, some species switch food and feeding strategies. Dietary changes from insectivory to granivory result in a weight doubling in the stomach and intestine of the Beaded Tit (*Panurus biarmicus*). Apparently this change is due to a massive increase in the alimentary muscles needed to digest seeds, compared to insects.

Eruptive movements or invasion migrations result when small rodent populations decline from high early summer levels to 1/100 of that level the following winter. As a result, Taiga birds of prey fly south seeking food. Unlike many speculators on the evolution of migration, Alerstam proposes that the ancestral home of some migrants is the tropics. The Marsh Harrier (*Circus aeruginosus*) may have expanded its range from the African savannahs northward to Europe in response to new habitat appearing. The migrants came into contact and competition with the African Marsh Harrier (*C. ranivorus*) during the nonbreeding season. Perhaps as a result of this interaction, the African Marsh Harrier currently is less abundant than the migratory species. For species that are partial migrants, many factors can influence a bird's decision to migrate in a particular year: competition, social rank, winter severity, and food supply. Not surprisingly, nomadic species show less site-fidelity to "winter" sites than do migrants, probably because their food resources (such as fruits) are more patchy, causing the birds to move from patch to patch.

Many European-African migrants appear to use marginal habitat during the "winter," presumably because of competition with year round residents. As a consequence, many migrant individuals spend almost every waking minute searching for food and feeding. Many migratory species on the wintering grounds subsist in marginal habitat that is unsuitable for breeding.

The discussion of migration in the fourth chapter begins with a presentation of the various techniques used to study migration. Each technique is explained sufficiently to understand it. A great deal of time is spent on the use of radar and the studies employing it, reflecting the author's primary research technique. The migratory trip itself is broken down into its various components. A discussion on the energetics of flight explains how flocked and soaring flight can reduce the cost of the migratory trip. A number of large migratory species use soaring or gliding/flapping flight to travel over land. As might be expected, the altitude of migration varies from near the ground by some small passerines to over 10,000 m by some large species. These high flying migrants have been identified by aircraft pilots or by the remains of a bird that collided with an aircraft. Most passerine migration is below 600 m and almost all is below 2000 m, with birds tending to fly at altitudes that provide the most profitable winds. Fat is used by migrants to fuel their migration because fat releases more energy per gram than carbohydrates or proteins, and does not require extra water for storage as does carbohydrates.

Avian migrants can be grouped into four categories: nocturnal (e.g., passerines), diurnal soaring (raptors), diurnal and nocturnal (waterfowl), and diurnal only (swallows). These patterns are the results of differences in feeding behavior and method of migration. Diurnal soarers, for example, can travel up to 10,000 km using only their fat stores. Nocturnal migrants generally spend the daylight hours foraging individually, but diurnal migrants tend to forage as flocks on ephemeral foods. The passage of migrants is strongly influenced by weather conditions, with more migrants moving with tail winds, in areas that lack precipitation, and with other conditions that favor their forward migration. When birds are faced with unfavorable weather conditions, they generally land and wait for more favorable conditions. The greatest hazards to migrants result from a malfunctioning of their navigation system or strong winds that result in their ending up over oceans, large deserts, or other inhospitable environments. Even if these misdirected migrants can reach land, they rarely survive because they usually are at too high a latitude to pass the winter. Other hazards of migration include predation at stopover sites and even during the migratory flight. The breeding season of Eleonora's Falcon (*Falco eleornorae*) is synchronized with the southward passage of migratory songbirds over the eastern Atlantic that provide its primary diet during the breeding season.

The final chapter of the book, on navigation and orientation abilities, suffers the most from the lack of revision. Since the publication of the original edition in 1982, this field has had several exciting findings with regard to the sensory abilities of birds and their mechanisms of orientation and navigation. Avian orientation is proving to be a complex phenomenon in which the birds appear to assess many cues to determine their migratory direction. The three avian compass mechanisms (sun, star, magnetic) and the histories of their study are well presented, along with some prophesy that has since come true! The descriptions of multiple compasses raise questions of functional redundancy, hierarchal relationships, and coordination between systems. Different species appear to weight the various compasses differently, but none is completely ignored. A second aspect of avian navigation is the ability to select the proper direction toward a goal. Some evidence indicates that southward movements by young birds, and the initial stages of migration of all birds, may rely on orientation migration, i.e., migrating in a fixed direction. As a bird nears its goal, it switches to navigational migration and flies more directly toward that goal. For some species this involves an innate switch in the migratory path to avoid ecological barriers. Navigational migration requires something analogous to a map. Within the vicinity of the goal, visual landmarks appear to be important. Outside this familiar area, migrants probably are relying on a different type of "map." Although olfactory and magnetic cues have been proposed as the source of this map, the support is weak. As the author concludes, there still are unsolved mysteries in avian migration and navigation.

The book contains a few errors, e.g., table and figure numbers do not match the text references. The Latin names of many, but not all, species have been omitted. It would have been helpful if at least an appendix provided a cross reference for Latin and common names. There are a limited number of literature citations within the text. Although the references are grouped at the back of the book by subchapters, it is not as useful as placing the citations in the text. In some cases papers referred to in the text are not listed in the bibliography.

Overall, the book has two short-comings: (1) It is not as up-to-date as its publication date would imply, and (2) its bibliography is somewhat limited. Offsetting these shortcomings, this is the most enjoyable and readable book on the topic that I have seen. I strongly urge anyone interested in migration to read it.—Robert C. Beason.