J. Field Ornithol., 61(4):462–470

RECENT LITERATURE

Edited by Jerome A. Jackson

BANDING AND LONGEVITY

(see also 2, 9)

1. **Survival and mean life span of the Serin.** J. Senar and J. Copete. 1990. Bird Study 37:40–43.—Serins (*Serinus serinus*) were banded in Catelonia, Spain from 1977 to 1987 in order to determine their mean life spans and survival rates. The total number of birds banded was 1850, of which 90 were recaptured. Survival rates were estimated by methods of Brownie et al. (1985). Mean annual survival was estimated to be 60%, and the mean life span was 1.98 years. Number of young fledged per nest was only 1.49, partially due to the mortality caused by the pruning of trees. [Musea de Zoologia, Ap 593, 08003 Barcelona, Spain]—Robin J. Densmore.

MIGRATION, ORIENTATION, AND HOMING

(see also 31)

2. **Spring migrant Boreal Owls at Whitefish Point, Michigan.** Terry P. Wiens. 1989. Jack-Pine Warbler 67:89–93.—This paper summarizes 11 years of banding data at the Whitefish Point Bird Observatory near the eastern end of the Upper Peninsula of Michigan. The 316 Boreal Owls (*Aegolius funereus*) captured in mist nets between 1978 and 1988 included from 0 to 163 captured per year. Over 90% of the owls were captured during the years 1978, 1982–1984, and 1988, corresponding to some extent with peak years of winter invasions in the Great Lakes region. Most owls were captured between 23:00 and 03:00, and only a few roosting birds were observed during daylight hours. [Whitefish Point Bird Observatory, % Michigan Audubon Society, 6011 W. St. Joseph, Ste. 403, P.O. Box 80527, Lansing, MI 48908-0527]—Jerome A. Jackson.

POPULATION DYNAMICS

(see also 1, 2)

3. **Changes in a forest bird community during a period of fire and drought near Bega, New South Wales.** P. Smith. 1989. Austral. J. Ecol. 14:41–54.—This 3-year study fortuitously began 10 months before a wildfire swept through the area. Four seasonal bird surveys were conducted before the fire and two successive spring surveys and one winter survey were conducted after the fire. Survey efforts were augmented by colorbanding and mapping of marked birds. No overall dramatic differences were noted in bird species diversity among pre- and post-fire samples, but important micro-habitat changes were noted. More breeding species were found after the fire than before. Shrub layer insectivores were more affected (negatively) by the fire than was any other group. Brushy areas in gullies that survived the fire proved to be important refugia for shrub-layer birds. The argument is made that the "gully" forest ecosystems must be protected from intense logging practices that might render them more susceptible to wildfire and that these gully forests are important not only for the birds that normally inhabit them, but also for the birds that occupy adjacent forest ecosystems. I feel that this paper includes an important message for those concerned with the status of North American forest bird populations—we too have gullies and some forest managers seem much too eager to achieve uniform prescribed burns. Fire is an important part of many ecosystems, but there is much value in the mosaic resulting from less complete burns. [NSW National Parks and Wildlife Service, P.O. Box N189, Grosvenor St., Sydney, NSW 2000, Australia]—Jerome A. Jackson.

4. **Demographic analysis of a Rio Grande turkey population.** W. C. Glazener, D. Ransom, Jr., J. R. Cary, and O. J. Rongstad. 1990. Southwest. Nat. 35:23–27.—Demographic patterns for a population of Rio Grande Turkeys (*Meleagris gallopavo intermedia*) were analyzed using 11 years of mark-recapture data (1961–1972) on the Welder Wildlife Refuge, San Patricio Co., Texas. Sex ratios were skewed in favor of females in all

years and averaged 2.26 ± 0.58. Juvenile:adult and juvenile:adult female ratios exceeded 1:1 in only 2 and 3 years respectively, suggesting that recruitment levels were consistently low. Adult survival, which averaged 55%, did not differ significantly from that of juveniles during any year, nor did survival rate within each sex differ by age. Hen survival was significantly higher ($P < 0.001$) than that of males in 5 of 7 years. The winter population peaked at 981 birds in 1965–1966, but subsequently began to decline and was estimated at 224 birds by 1971–1972. Speculation over the cause of this decline has included predation, disease, and emigration. [2309 Tower Drive, Austin, TX 78703]—Danny J. Ingold.

5. Effects of flower removal on abundance and behaviour of honeyeaters in heathland near Sydney. G. H. Pyke. 1989. Austral. J. Ecol. 14:415–421.—Honeyeater populations were monitored on a 5.6 ha area near Sydney, Australia, for two years. During the second year, most flowers were removed. Overall honeyeater populations on the site did not differ significantly between years, although the population of Little Wattlebirds (*Anthochaera chrysoptera*) declined and those of smaller honeyeater species increased. Pyke thus agrees with other studies suggesting that Little Wattlebirds make use of rich nearby resources and that populations of other honeyeater species are limited by the aggression of the Little Wattlebirds. He concludes that the smaller species either flew offsite for nectar or made increased use of arthropods in their diets. [The Australian Museum, 6–8 College St., Sydney, NSW 2000, Australia]—Jerome A. Jackson.

6. Status of nesting seabirds at Saint Pierre and Miquelon. (Statut des oiseaux marins nicheurs de Saint-Pierre-et-Miquelon). A. Desbrosse and R. Etchberry. 1989. Alauda 57:295–307. (French, English summary.)—This paper summarizes annual censuses of seabirds in the archipelago of Saint Pierre and Miquelon in the Bay of St. Lawrence off the southern coast of Newfoundland between 1983 and 1987. Twelve species nest in the archipelago, and four others are possibilities. The most abundant are about 100,000 pairs of Leach's Storm-Petrel (*Oceanodroma leucorhoa*). Other species with breeding populations >100 pairs and approximate numbers of pairs nesting include: Herring Gull (*L. argentatus*), 900; Ring-billed Gull (*Larus delawarensis*), 800; Great Black-backed Gull (*L. marinus*), <100; Black-legged Kittiwake (*Rissa tridactyla*), 2000; Arctic Tern (*Sterna paradisaea*), 260-270; Black Guillemont (*Cepphus grylle*), 300; Atlantic Puffin (*Fratercula arctica*), 400. Comparative data are given for Newfoundland and some total species estimates are provided for the North Atlantic. [B.P. 4244, 97500 Saint-Pierre-et-Miquelon, Newfoundland, Canada]—Jerome A. Jackson.

NESTING AND REPRODUCTION

(see also 4, 9, 12, 13, 14, 15, 21, 23, 24, 30)

7. The Marsh Harrier *Circus a. aeruginosus* in Charente-Maritime (France). II. Chronology and parameters of nesting. (Le busard des roseaux *Circus a. aeruginosus* en Charente-Maritime (France). II. Chronologie et parametres de la reproduction). C. Bavoux, G. Burneleau, A. Leroux, and P. Nicolau-Guillaumet. 1989. Alauda 57:247–262. (French, English summary.)—Between 1980 and 1988, 963 Marsh Harrier nests were found, 413 with eggs. Clutch size ranged from 1–8 eggs and annual mean clutch sizes ranged from 3.8–4.6. Number of young fledged per laying female averaged 1.6. Most clutches were laid in May (171) or June (126), although during the study, clutches were laid in every month but January. On average, 40% of the nests in which eggs were laid failed, with failure rate varying among habitats. The largest number of nests (506) were in *Phragmites,* the next largest numbers in *Typha* (112 nests), and *Scirpus* (66 nests). Nest failure was highest in cultivated areas. Early nests were more often in flooded areas and enjoyed a higher success rate. [56, rue St-Jean, Cheray, 17190 St-Georges, France]—Jerome A. Jackson.

8. Nesting success of San Clemente Sage Sparrows. D. W. Willey. 1990. Southwest. Nat. 35:28–31.—From March through July 1986, 21 pairs of San Clemente Sage Sparrows (*Amphispiza belli clementea*) were monitored during the breeding season on San Clemente Island, about 110 km northwest of San Diego, California. At least one young fledged from all but one of 28 nests and no nests were destroyed by predators. Nestling success was greater than egg success (mean clutch size was 3.40 and an average of 2.05 nestlings fledged

from each nest). Territory sizes of San Clemente Sage Sparrows were generally larger than those reported from populations in the Great Basin region, and nest parameters varied little among pairs. Ten pairs produced second clutches and five of these produced a third clutch. Ultimately, this population of Sage Sparrows appears to be limited by the influence of climatic factors on habitat condition. [P.O. Box 136, Torrey, UT 84775]—Danny J. Ingold.

9. Apparent polygynous behavior of an Eastern Bluebird. H. Krueger. 1990. Sialia 12:43–45.—A banded male *Sialia sialis* assisted a different banded female in feeding young at each of two nest boxes that were 55 m apart. Observations were less than four weeks apart, with young from the first nest fledging 12 days before the male was seen at the second nest. No other males were observed near these nests. Alternative explanations are discussed and dismissed. [Rt. 2, Box OR28, Ore City, TX 75683]—Jerome A. Jackson.

10. Occurrence of extra-pair copulation in the Tree Swallow (*Tachycineta bicolor*). S. B. Morrill and R. J. Robertson. 1990. Behav. Ecol. Sociobiol. 26:291–296.—A new method for detecting sperm transfer using microspheres (small polystyrene or glass beads) inserted into a male bird's cloaca was used to document within- and extra-pair copulations (EPCs) in Tree Swallows near Kingston, Ontario during the 1988 breeding season. Microspheres were found in the lavages of 12 females; of these, 10 were determined to have come from non-mate males. These data suggest that 32% of all male Tree Swallows inserted with microspheres ($n = 25$) engaged in EPCs. Additionally, two EPCs were observed directly. EPCs occurred more frequently between neighboring birds (within a 40 m radius around a focal box) than non-neighboring birds, and apparently no cuckolded males abandoned their mates. These results suggest that EPCs occur quite frequently in this population of Tree Swallows and that males do pursue a mixed reproductive strategy. Only two within-pair copulations were detected by transfer of microspheres suggesting that this technique underestimates the occurrence of pair copulations. In fact, within-pair copulations were detected quite frequently during observation periods (an average of 12.5 per hour; $n = 17$ pairs). The authors propose that frequent pair copulations within Tree Swallows are to help ensure a male's paternity of its mate's offspring. [Dept. of Biology, Queen's Univ., Kingston, Ontario K7L 3N6, Canada]—Danny J. Ingold.

11. Breeding biology of Kestrels: a 16 year study in Westfalia. H. Hasenclever, A. Kostrzewa and R. Kostrzewa. 1989. J. Ornithol. 130:229–237.—The breeding success of Kestrels (*Falco tinnunculus*) varied significantly depending on the nest site. Kestrels that bred in nest boxes placed in trees or buildings, yielded equally successful broods. But Kestrel pairs that bred in tree nests laid smaller clutches and their offspring suffered higher fledgling mortality. The researchers suggest that tree-nesting Kestrels are more vulnerable to avian predators. The authors hypothesize that nest boxes are more suitable nesting sites for Kestrels than are stick nests. [Univ. of Cologne, Zool. Inst., Weyertal 119, D-5000 Koln 41, West Germany]—Nadine Lymn.

BEHAVIOR

(see also 10, 17, 18, 26, 27, 28, 31)

12. Offspring protection by Merlin (*Falco columbarius*) females; the importance of brood size and expected offspring survival for defense of young. C. G. Wiklund. 1990. Behav. Ecol. Sociobiol. 26:217–223.—The author used a stuffed Raven (*Corvus corax*) placed near the nests of Merlin pairs to examine female investment in nest defense from 1984 to 1988 in Padjelanta National Park, N. Sweden. The proportion of attacking females with large broods was significantly greater ($P < 0.05$) than among females with small broods, and the attack frequency was positively correlated with brood size, but not with original clutch size. When brood sizes were artifically manipulated, females defended enlarged broods more vigorously than reduced broods. Additionally, females invested more energy in defending first broods, which have a greater chance of survival, than replacement broods. There is no evidence that investment in nest defense is related to body size or condition. Attacking females fledged significantly more young than did non-attacking individuals ($P < 0.01$), and non-attackers experienced more chick losses due to nest predation. These data strongly suggest that nest defense by female Merlins enhances their reproductive

success. [Dept. of Zoology, Univ. Gothenburg, P.O. Box 250 59, S40031 Gothenburg, Sweden]—Danny J. Ingold.

13. Alliances in winter flocks of Willow Tits; effects of rank on survival and reproductive success in male-female associations. J. Ekman. 1990. Behav. Ecol. Sociobiol. 26:239–245.—The author assessed the value of ranking in winter flocks of Willow Tits (*Parus montanus*) as it relates to individual survival and enhanced fecundity from 1974 through 1984 near Gothenburg, Sweden. Flocks most commonly consisted of four members and were composed of subunits made up of male–female pairs. Males dominated females and adults dominated juveniles within sexes, although males consistently provided their mates with protection. Survival correlated to rank only within sexes. High-ranked females survived significantly better than low-ranked males even though these females were subordinate to these males in direct interactions. High-ranked females were rarely involved in interactions with subordinate males, since such males could not initiate interactions with females without trespassing in a portion of the tree claimed by dominant males. Consequently, high-ranked females were partially released from vigilance time allowing them more time to feed. Males should benefit from improving the survival chances of their mates since female Willow Tits are often in short supply during the breeding season, and lost mates are not easily replaced. Thus, dominance in winter flocks of Willow Tits not only enhances individual survival, but also appears to be positively correlated with fecundity. [Dept. of Zoology, Univ. Stockholm, S-106 91 Stockholm, Sweden]—Danny J. Ingold.

14. On the function of singing and wing-waving in the European Starling. M. Eens, R. Pinxten, and R. Verheyen. 1990. Bird Study 37:48–52.—The purpose of this study was to determine if singing by male European Starlings (*Sturnus vulgaris*) functions primarily in attracting females or in deterring other males. Experiments consisting of the introduction of male and female starlings into an all-male aviary were conducted in 1988 in Antwerp, Belgium. Male starlings showed a significant increase in the time spent at the nest box, total time spent singing, and the time spent sitting and singing in the nest box after the introduction of the female. After the introduction of the male, only the time spent at the nest box increased significantly. Thus these data suggest that starling song functions primarily in intersexual communication. Wing-waving occurred only after the introduction of the female. Additionally, wing-waving decreased significantly after a mate was acquired. Therefore the function of this behavior seems to be mate attraction. [Dept. of Biol., Univ. of Antwerp, UIA Universiteitsplein 1, B-2610 Wilrijk, Belgium]—Robin J. Densmore.

15. Aggression of Red-backed Shrikes toward a dummy male shrike. H. Jakober and W. Stauber. 1989. J. Ornithol. 130:247–251.—Breeding Red-backed Shrikes (*Lanius collurio*) showed varying degrees of aggression toward a stuffed male shrike placed 10–20 m from their nest. Female aggression toward the dummy was minimal. Males attacked the dummy shrike most frequently and violently during nest-building and egg-laying time. In the most violent attacks, the male would hover on the back of the dummy and bite into its neck. Male attacks became less vicious and frequent during incubation, and declined even more during the nestling stage. The researchers suggest that male shrikes are most aggressive during the time when their females are fertile. According to the authors, this hypothesis is normally difficult to test since unlike stuffed birds, live intruders usually flee immediately. [Friedrichstr. 8/I, D-7343, Kuchen, West Germany]—Nadine Lymn.

ECOLOGY

(see also 3, 8, 19, 24, 26)

16. Endemic hummingbirds and madrones of Baja: are they mutually dependent? L. Arriaga, R. Rodriguez-Estrella, and A. Ortega-Rubio. 1990. Southwest. Nat. 35: 76–79.—Ecological relationships between the madrone (*Arbutus peninsularis*) and the Xantus' Hummingbird (*Hylocharis xantusii*) were studied from late February to mid-March 1987 at the Sierra de La Laguna, Baja California Sur, Mexico. Structural characteristics of the madrone such as the position of inflorescences within the crown, crown cover, and the availability of flowers were related to the frequency of visits and foraging time of hummingbirds. Hummingbirds spent significantly more time ($P < 0.01$) foraging in the

upper crown stratum of trees with extensive crown cover probably because they harbored the highest density of external inflorescences relative to other crown strata. These data suggest that there is a relationship between the crown stratum in which hummingbirds spend most of their time foraging and success in flower fertilization in that stratum. During the late winter months, when madrone flowers are fertilized, their inflorescences are almost the only nectar supply for hummingbirds. Thus, it appears that these species are to some extent mutually dependent. [Division de Biologia Terrestre, Centro de Investigaciones Biologicas, Apartado Postal 128, La Paz 23000, Baja California Sur, Mexico]—Danny J. Ingold.

17. **Predation by Australian Magpies (*Gymnorhina tibicen*) on pasture invertebrates: are non-territorial birds less successful?** C. J. Veltman and R. E. Hickson. 1989. Austral. J. Ecol. 14:319–326.—Breeding Australian Magpies maintain territories and forage solitarily, but non-breeding individuals, particularly juveniles, often gather in flocks. Members of such flocks suffer higher mortality and have lower mean body weights than territorial birds. This study demonstrates that flock birds obtain prey at the same rate as territorial birds, although the authors were unable to determine if solitary birds exploit food resources more effectively or if flocking may assist individuals in finding patchily distributed food. They question the notion that flocking may confer a reproductive advantage on individuals, since flocking birds do not reproduce. Their final recommendation is that researchers focus on the selection pressures which have forced non-territorial birds to flock rather than on comparisons of territorial and non-territorial phases of the population. [Dept. of Botany and Zoology, Massey University, Palmerston North, New Zealand]—Jerome A. Jackson.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 1, 3, 4, 7, 11, 30)

18. **Efficiency of conditioned aversion in reducing depredation by crows.** C. R. Dimmick and L. K. Nicolaus. 1990. J. Appl. Ecol. 27:200–209.—This study describes results of a field study of the illness-producing cholinesterase inhibitor, Landrin, which was added to green-tinted chicken eggs and provided in an experimental design which included normal chicken eggs as controls. Each test site was visited by a breeding pair of American Crows (*Corvus brachyrhynchos*). During pre-tests crows consumed normal chicken eggs and green-dyed eggs which had not been laced with Landrin with equal frequency. When all green eggs were laced with Landrin, the crows learned to discriminate between the normal white and the green eggs, and predation on the white eggs continued. When only 50% of the green eggs were laced with Landrin, the crows predation on all eggs ceased. The authors argue that the delayed effect of the Landrin would not allow the crows to ascertain which egg it was that they ate that made them sick, thus they avoided all eggs. Foraging of fledglings seemed influenced by that of adults. During the second year of the study, the crows seemed to remember their aversion to eggs at the sites where there had been 50% treatment, and the authors conclude that as long as the same predators are in an area, the effects of the use of Landrin would be long-lasting—"far exceeding the length of time that the eggs of an endangered species and most fruit and grain crops are vulnerable to depredation." They suggest that such an approach to managing predators is more cost effective and less political than other means of control. [Dept. of Biological Sciences, Northern Illinois University, DeKalb, IL 60115]—Jerome A. Jackson.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see 3, 7)

PHYSIOLOGY

(see 19)

MORPHOLOGY AND ANATOMY

19. **Consequences of differences in body mass, wing length and leg morphology for nectar-feeding birds.** B. G. Collins and D. C. Paton. Austral. J. Ecol. 14:269–289.—

This review and synthesis compares characteristics of members of 10 families [many are subfamilies of other authors] of birds which feed on nectar: the honeycreepers (Drepanididae), New World orioles (Icteridae), lorikeets (Loriidae), honeyeaters (Meliphagidae), sunbirds (Nectariniidae), Old World orioles (Oriolidae), sugarbirds (Promeropidae), flower piercers (Parulidae, Thraupidae), hummingbirds (Trochilidae), and white-eyes (Zosteropidae). Of these, the authors describe the hummingbirds, honeyeaters, honeycreepers, and sunbirds as ecological analogs which differ in overall body size and dimensions of legs and wings either as a result of phylogenetic constraints or as a result of exposure to differing floral environments. In addition to detailing patterns of variation in the birds, including predicted rates of energy expenditure for flight, the authors discuss some of the floral variability to which the birds are exposed: positions of flowers on plants and patterns of nectar production. Some emphasis is placed on the honeyeaters. [School of Biology, Curtin University of Technology, Bentley, WA 6102, Australia]—Jerome A. Jackson.

20. Bills and tongues of nectar-feeding birds: a review of morphology, function and performance, with intercontinental comparisons. D. C. Paton and B. G. Collins. 1989. Austral. J. Ecol. 14:473–506.—This is a review and synthetic study of the functional morphology of hummingbirds (Trochilidae), sunbirds (Nectariniidae), honeycreepers (Drepanididae), and honeyeaters (Meliphagidae), with an emphasis on the latter group which the authors have studied extensively. Of particular interest is a 7-page appendix which lists weight (g), bill length (mm), bill length differences between the sexes, and data sources. Unfortunately ranges and sample sizes are not given, although the list of species is impressive. Although considerable differences occur in tongue shape, all apparently collect nectar by capillary action. The broad tongue of honeyeaters requires a brush-like tip for capillary action to occur. A curved bill is likely adaptive in allowing a perched bird to reach flowers. Consistent sexual dimorphism in some species suggests partitioning of floral resources within species. Male honeyeaters and sunbirds have longer bills than females; in many hummingbirds the reverse is true. The authors conclude that the influences of bill length and shape on speed and efficiency of nectar feeding are unknown and that more studies are needed which relate flower structure to bill and tongue structure. [Dept. of Zoology, University of Adelaide, Adelaide, SA 5001, Australia]—Jerome A. Jackson.

21. Growth of young Band-tailed Pigeons in captivity. J. A. White and C. E. Braun. 1990. Southwest. Nat. 35:82–84.—Wild, immature Band-tailed Pigeons (*Columba fasciata*) (n = 109) were captured in Colorado in July and August 1971 and 1972. Data from these birds as well as 17 nestling Band-tailed Pigeons (progeny of the wild-trapped group) fed by their parents were used to obtain body mass data from hatching until 240 days of age. Nestling pigeons gained mass rapidly from hatching to fledging, with an average weight of 150 g at 16 to 19 days post-hatching and 202 g at 24 to 27 days of age (fledging occurred at 24 to 31 days of age). They gained mass more slowly thereafter until losing their first primary at about 47 days of age. Birds continued to grow after they lost their third juvenal primary at about 79 days post-hatching and averaged 345 g at 95 days (this initial peak occurred immediately prior to the time of southward migration of wild band-tails in late September and early October). Body mass declined slightly in mid-October to 335 to 340 g at ages of 156 to 195 days, and increased again to peak at 350 g as immature pigeons completed their post-juvenal molt at around 240 days of age. [Soil Conserv. Service, P.O. Box 649, Walden, CO 80408]—Danny J. Ingold.

22. What is the function of the Mute Swan's *Cygnus olor* knob? [Wozu besitzen Höckerschwane *Cygnus olor* Höcker?] P. Lüps. 1990. Ornithol. Beob. 87:1–11.—The bony knob on the forehead of Mute Swans is often used to distinguish between the sexes, but the results of this study indicate that there is no significant difference between the sexes. The size of the knob is correlated with wing length in both sexes and with body weight in males. The authors theorize that the knob may serve to signal body condition. [Naturhistorisches Museum Bern, Bernastrasse 15, CH-3005 Bern, Switzerland]—Robert C. Beason.

PLUMAGES AND MOLTS

(see 29)

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 6)

23. Nesting Common Mergansers in Chihuahua, Mexico. B. T. Brown. 1990. Southwest. Nat. 35:88–89.—Two pairs of Common Mergansers (*Mergus merganser*), each with several downy young (about 5 days old), were observed during the first week of May 1988 on the Rio Conchos about 30 km below the Rio Nonoava confluence. Nineteen other mergansers (7 pairs, 4 single males, and 1 single female) were also sighted on this survey of a 100 km stretch of the Rio Conchos. Prior to these observations, there was only one nesting record of this species in Mexico (from 1909). These data suggest that Common Mergansers could nest along streams and rivers in the Sierra Madre Occidental of Chihuahua more frequently than previously thought. [P.O. Box 3741, Tucson, AZ 85722]—Danny J. Ingold.

24. Population size, density, and regularity in nest spacing of Buzzards (*Buteo buteo*) in two upland regions of North Wales. P. Dare and J. Barry. 1990. Bird Study 37:23–29.—Breeding Buzzards were censused in two regions of North Wales from 1977 to 1984. These two regions were adjacent but varied; Snowdonia consisted of mountainous terrain and wooded valleys while Migneint-Hiraethog consisted of moorlands and hill farms. Ninety-six territories were identified in Snowdonia and 62 in Migneint-Hiraethog. The mean nesting density was one pair per 9.7 km^2 of total terrain in Snowdonia and one pair per 7.1 km^2 in Migneint-Hiraethog. When excluding unsuitable nesting habitat from the calculations, nesting density was one pair per 6.4 km^2 in Snowdonia and one pair per 4.5 km^2 in Migneint-Hiraethog. In Snowdonia, density seemed to be positively correlated with woodland cover and the lowest density corresponded with high rainfall and 84% montane habitat. The densest population was associated with enclosed farmland, reduced rainfall, and sparse woodland cover in Migneint-Hiraethog. Nests were regularly dispersed, possibly caused by territorial behavior. Mean distances between nearest neighbors were significantly different between the regions, 1.95 km in Snowdonia and 1.53 km in Migneint-Hiraethog. [Glebe House, Toad Row, Henstead, Beccles, Suffolk NR34 7LG, UK]—Robin J. Densmore.

25. An introduction to the Black-capped Petrel. K. C. Parkes. 1990. Pennsylvania Birds 4:2–3.—Parkes provides a brief history of the Black-capped Petrel (*Pterodroma hasitata*) along with measurements and plumage description of a specimen found in Allegheny County, Pennsylvania, following Hurricane Hugo in 1989. The specimen is now in the Carnegie Museum of Natural History. [Carnegie Museum of Natural History, 4400 Forbes Ave., Pittsburgh, PA 15213]—Jerome A. Jackson.

FOOD AND FEEDING

(see also 5, 16, 17, 18, 19, 20)

26. The seasonal abundance and foraging behaviour of honeyeaters and their potential role in the pollination of *Banksia menziesii*. M. W. Ramsey. 1989. Austral. J. Ecol. 14:33–40.—Honeyeaters (Meliphagidae) are at times the most abundant songbirds in some Australian habitats. Ramsey found seven species associated with flowering *Banksia menziesii* during the winter (March–September), including five relatively common species. These predominantly nectarivorous species all took advantage of the same nectar resources and did so in much the same manner. Some probed more into unopened flowers, others used flowers at all stages. Relative abundances of the Red Wattlebird (*Anthochaera carunculata*) and Brown Honeyeater (*Lichmera indistincta*) were positively correlated with the mean number of flowers per tree. A similar relationship would have been evident for Little Wattlebirds (*Anthochaera chrysoptera*) if the two months of peak abundance for Red Wattlebirds were excluded from the analysis, and there was a great deal of agonistic interaction between these wattlebird species. Larger species of honeyeater foraged for longer periods at single and neighboring trees than did smaller species. Ramsey noted that smaller honeyeaters moved greater distances between foraging sites as a result of the aggression of larger honeyeaters. He suggests that the smaller species may thus be responsible for more cross

pollinations. More work is needed elucidate the significance of interrelationships of the honeyeater species and plant reproductive success. [Biological Sciences, Murdoch University, Murdoch, WA 6150, Australia]—Jerome A. Jackson.

27. Strategies of mussel dropping by Carrion Crows. J. Whiteley, P. Slater, and J. Pritchard. 1990. Bird Study 37:12–17.—Strategies of mussel dropping by Carrion Crows (*Corvus corone*) were observed on the Eden Estuary in Fife, Scotland in February and March of 1988. Factors examined included search time, mussel size, substrate (mussel bed, sand, and airfield runway), number of drops, and height of drops. Crows spent approximately 10 min selecting, dropping, and eating each mussel. Mean number of drops required to break each mussel was greatest with small mussels and least with large mussels. Number of drops necessary to break mussels was greatest on the sand substrate and least on the airfield runway. The mean drop height was 4.3 m on the mussel bed and 5.1 m on the sand; drop height on the runway was estimated to be 2–3 m. Crows rarely gave up dropping mussels, even after numerous attempts, because the probability of a mussel breaking does not change with successive drops, and search time for another mussel would be costly. Overall, crows chose the largest mussels and dropped them on hard surfaces, but mussel beds were also advantageous due to the possibility of breaking open other shells in the process. [Dept. of Bio. and Preclinical Med., Bute Bldgs. Univ. of St. Andrews, Fife, KY16 9TS, UK]—Robin J. Densmore.

28. Acquisition of foraging skills by Heron Island Silvereyes *Zosterops lateralis chlorocephala*. A. Jansen. 1990. Ibis 132:95–101.—Numerous studies on a diversity of bird species have demonstrated that juveniles are less proficient foragers than adults. As a result of these studies it is widely believed that inept foraging skills cause many birds to forego breeding in the first several years of life until they obtain full adult-levels of foraging proficiency. In this work Jansen contributes to the field with an interesting finding—reproduction is not delayed until adult levels of foraging proficiency have been attained. Not surprisingly, she demonstrates that first-year Silvereyes (*Zosterops lateralis*) were less efficient foragers than older birds, with second-year birds being intermediate. Both first- and second-year birds had lower success rates than older birds overall for most foraging methods and substrates. The important message here is that many (41%) of the inept second-year Silvereyes attempted to breed, but unfortunately she does not tell us how their nesting success rate compares with that of older birds. [Dept. of Zoology, James Cook Univ. of North Queensland, Townsville 4811, Australia]—J. M. Wunderle, Jr.

29. Foraging differences between white and dark morphs of the Pacific Reef Heron *Egretta sacra*. S. Rohwer. 1990. Ibis 132:21–26.—White-dark color polymorphism occurs in seven or eight of the 37 species of herons (Ardeinae). Previous workers have suggested that heron color polymorphism is probably related to: (1) predation or harassment by kleptoparasites; (2) hunting methods; or (3) social factors. How these hypotheses applied to the polymorphic reef herons of the Pacific was previously unknown. Sievert Rohwer, who has made substantial contributions to our knowledge of avian plumage coloration, studied foraging behavior in white and dark Pacific Reef Herons (*Egretta sacra*) on several Pacific Islands. He found that the white-colored birds foraged by a flight, land, and freeze style in breaking surf on reefs of the windward side of islands. In contrast, the dark-colored birds fed by actively walking or running on reef flats on the leeward side of islands. In addition, on another island the dark-colored herons foraged almost exclusively in shaded streams and no white-colored herons were encountered. In this work Rohwer has nicely demonstrated that differences in hunting technique and habitat are associated with color type, thereby supporting the hypothesis that reef heron polymorphism serves the herons in their role as predators. [Dept. of Zoology & Burke Museum, DB-10, University of Washington, Seattle, WA 98195]—J. M. Wunderle, Jr.

30. Feeding ecology of the Skylark *Alauda arvensis* in an intensively cultivated agricultural system in the Swiss Midlands. [Nahrungsökologie der Feldlerche *Alauda arvensis* in einer intensiv genutzten Agrarlandschaft des schweizerischen Mittellandes.] M. Jenny. 1990. Ornithol. Beob. 87:31–53.—Given a choice, Skylarks prefer to forage in meadows that have been heavily covered with manure, as long as the vegetation is shorter

than 20 cm. Other preferred foraging locations include corn fields planted in stubble and near natural vegetation along the field edges or drainage ditches. Large monoculture crops provided the poorest foraging, and birds nesting in those areas frequently have to leave their territories to forage elsewhere. Nestlings were most commonly fed Diptera (56%) and Tipulidae larvae and pupae (20%). Most of the food was between 6 mm and 15 mm. Coleoptera were rarely taken or fed to the young. [Madetswilerstrasse 3, 8332 Russikon, Switzerland]—Robert C. Beason.

SONGS AND VOCALIZATIONS

(see 14)

BOOKS AND MONOGRAPHS

31. Flight strategies of migrating hawks. P. Kerlinger. 1989. Univ. Chicago Press, Chicago. $15.95 pb.—The title of this book is somewhat misleading. The material it contains is much more extensive. While the book is aimed primarily at those individuals interested in hawk migration, it contains material that would be useful to anyone interested in ornithology. The introductory chapters thoroughly review various aspects of migration, usually illustrated with raptor species. The author divides the book into two sections: an introduction to hawk migration, and aspects of migrating raptor flight behavior. Because the topics of hawk counts and management are covered so well in other places, they are excluded from this book. Hawk counts produce a bias towards low, easily seen birds and so are excluded. Otherwise, the book provides a thorough review of the literature on hawk migration. Although the author indicates that much of the material is technical, his presentation makes it comprehensible for individuals having enough of an interest to be familiar with general ornithological concepts and terminology. The material that is covered is somewhat biased towards the author's research interests, which provide the basis for the book. For example, too much emphasis is given to detailed discussions on the technique of using various types of radars to monitor migrating hawks.

Because many of the basics of migration and raptor non-breeding biology are clearly presented and documented in this book, it will make a valuable reference for all ornithologists. It is a "must have" book for anyone interested in raptor migration or migration in general, and will be well worth the investment to other ornithologists as well.—Robert C. Beason.