J. Field Ornithol., 61(2):254–269

RECENT LITERATURE

Edited by Jerome A. Jackson

NOTICE

In this collection of literature reviews we continue a new practice. At the end of most reviews we include the address of the senior author of the article being reviewed.

BANDING AND LONGEVITY

(see also 17, 22)

1. The relationship between body mass and annual survival in American Black Ducks. D. G. Krementz, J. E. Hines, P. O. Corr, and R. B. Owen, Jr. 1989. Ornis Scand. 20:81–85.—From January through March, 1979–1985, American Black Ducks (*Anas rubripes*) were marked (n = 1427) and recaptured (n = 177) along the Maine coast to examine the relationship between body mass and annual survival. Binary regression analyses showed that late-winter body mass was not related to survival for any age/sex class. These results are interpreted in light of other studies that have supported the hypothesis that body mass (i.e., condition) of a duck is positively related to survival at some stage of the annual cycle. The authors caution against accepting the general conclusion that body mass during winter is positively related to survival in ducks.—Jeff Marks.

2. Examination of band recoveries of Yellow-breasted Chats. P. A. Stewart. 1989. Chat 53:69.—This note summarizes data available in the U.S. Bird Banding Laboratory for *Icteria virens* banded in North America prior to July 1986. Only 68 banded chats had been subsequently encountered. Data show a strong philopatry for the species. Longest distance travelled by a banded bird was between New Jersey and Mexico, where a banded bird was recovered on 26 April, also documenting lateness of stay on the wintering ground. [203 Mooreland Dr., Oxford, NC 27565 USA]—Jerome A. Jackson.

3. Banding passerines on Chimon Island. C. J. Tricha. 1989. Connecticut Warbler 9:83–87.—This summary of 9 years of data provides evidence of the importance of islands of coastal Connecticut to migrant passerines. [65 Glover St., Fairfield, CT 06430 USA]—Jerome A. Jackson.

MIGRATION, ORIENTATION, AND HOMING

(see also 2, 3, 9, 34, 36)

4. Magnetic fields and orientation in homing pigeons: experiments of the late W. T. Keeton. B. R. Moore. 1988. Proc. Natl. Acad. Sci. 85:4907–4909.—This paper contains the results of pooling all of the pigeon (*Columba livia*) homing experiments of Keeton in which pigeons were fitted with magnets/brass bars and released under totally overcast skies. The pooled results of the 1969–1970 data support Keeton's 1971 conclusion that magnets placed on the backs of pigeons significantly reduced their orientation ability, while the pooled 1971–1979 data do not show any differences between birds wearing magnets and those wearing brass bars. Unfortunately, the paper has a couple of serious flaws. Moore lumped the results of 12 and 22 experiments respectively without showing that the results of the experiments are not statistically different. Based on the data presented in the paper, many different groups were pooled: young birds, first-year birds, and older birds; birds familiar to the release site and those not; magnets attached in different configurations and at different locations; as well as birds receiving specialized training. The second problem is the inclusion of releases in which the control birds were not significantly oriented, i.e., they showed random orientation. When the controls are random, the results of experimental manipulation are impossible to assess. Two-thirds of the releases reported in the 1971–1979 data set have controls which are random. One of the most obvious set of releases with random controls is Jersey Hill in which pigeons are known to show random orientation from almost every release. Examination of the differences between the earlier data set and the later one shows that the differences between the two is not the result of better orientation by the pigeons carrying magnets, but it is the result of poorer orientation by the control

birds! While the author's conclusion that his analyses of Keeton's data require that we carefully examine the influence of magnets on pigeon orientation is correct, the analyses presented in this paper do not disprove the use of magnetic information by homing pigeons as many people assume. There is a great deal of research by other workers which strongly support the use of geomagnetism by pigeons.—Robert C. Beason.

5. Pigeon homing: wind exposition determines the importance of olfactory input. R. Wiltschko, M. Schöps, and U. Kowalski. 1989. Naturwissenschaften 76:229–231.—The reaction of pigeons (*Columba livia*) to olfactory deprivation during homing was more influenced by whether they were exposed to winds (in a rooftop loft) or not (in a garden loft), than whether they had early training flights (German style of rearing) or not (Italian style of rearing). While these results seem to indicate that greater exposure to the wind results in the pigeons relying on olfactory information more strongly, the authors suggested that this interpretation might not be true! The anosmic birds reared without wind (and presumably olfactory) exposure oriented the same as the controls from the wind exposed loft (which supposedly are relying on olfactory cues): both groups showed the same release-site biases at different release sites. Why should control birds relying on olfactory information show the same response as anosmic birds not relying on olfactory information? The answer probably awaits our understanding the mechanisms of olfactory input to homing pigeons. [Fachbereich Biologie der Universität, Zoologie, D-6000 Frankfurt a.M., West Germany]—Robert C. Beason.

6. The dilemma for cross-desert migrants—stopover or skip a small oasis? D. Lavee and U. N. Safriel. 1989. J. Arid Environ. 17:69–81.—This study was conducted at an oasis 300 km south of the northern edge of the Sahara, and 2000 km north of the southern edge. More birds tended to stopover more on their southward journey, when they had most of the desert yet to cross, than on their northward journey, when they were nearer their breeding grounds. Autumnal stopovers tended to be longer than in the spring, with the length of the stopover inversely related to the bird's fat stores. Birds using the oasis for refueling in the autumn selected optimal weather conditions for the resumption of their migration. [Nature Reserves Authority, P.O. Box 667, Elat, Israel]—Robert C. Beason.

7. Photoperiod as a modifying and limiting factor in the expression of avian circannual rhythms. E. Gwinner. 1989. J. Biol. Rhythms 4:237–250.—In this paper the author reviews much of the earlier work on the influence of environmental factors on circannual rhythms. His conclusion is that the most important zeitgeber for avian circannual rhythms is the annual cycle of photoperiod which provides for the adjustment of seasonal activities to the geophysical rhythms. Garden Warblers (*Sylvia borin*) that winter farther south of the equator exhibit an accelerated spring migration and gonadal development, relative to those birds wintering closer to the equator. The result is that both groups of birds arrive on the breeding grounds about the same time and in the same physiological state. Environmental influences are further illustrated by the findings that the circannual rhythm of the Pied Flycatcher (*Ficedula hypoleuca*) can be stopped if the photoperiod is too long, preventing the termination of photorefractoriness. These results indicate that the response of circannual rhythms to environmental factors varies between species, even within a group of similar transequatorial migrants. [Max-Planck-Institut für Verhaltensphysiologie, Vogelwarte, D-8138 Andechs, West Germany]—Robert C. Beason.

8. Movement of land-based birds off the Carolina coast. D. S. Lee and K. O. Horner. 1989. Brimelyana No. 15:111–121.—This paper lists 96 species of "land-based birds" seen "primarily" from 10–55 miles (16–88.5 km) off the North Carolina coast between 30 and 35 N latitude. Observations were incidental to other efforts and the authors admit that most birds present were likely missed. The data set, nonetheless, provides evidence of extensive offshore movements, particularly during autumn migration. Among the species tallied are 20 species of wood warblers (Parulinae). Notably absent from the list are thrushes and vireos. In addition to bird species, the authors mention insects and bats seen. [North Carolina State Museum of Natural Sciences, P.O. Box 27647, Raleigh, NC 27611 USA]—Jerome A. Jackson.

POPULATION DYNAMICS

(see also 1, 2, 17, 19, 20, 24, 27, 28, 31, 35, 37, 38, 40, 45, 47, 48)

9. Curlew Sandpipers in Britain and Ireland in autumn 1988. J. S. Kirby, K. K. Kirby, and S. J. Woolfall. 1989. Br. Birds 82:399–409.—At the western edge of their normal migration corridor, small numbers of Curlew Sandpipers (*Calidris ferruginea*) normally pass through Great Britain and Ireland each fall. On rare occasions, noticeable fall influxes occur on these islands. The 1988 influx involved only juvenile Curlew Sandpipers. Their numbers peaked along the British north and east coasts between 27 August–3 September. Peak numbers on the British west coast and in Ireland were later, with most between 7–16 September. Flocks of 50–150 sandpipers appeared at many locations; the largest concentrations totalled 250–283 at three sites in northern and eastern Britain. Curlew Sandpipers sharply declined during the last half of September and few remained after early October.

The magnitude of the 1988 influx was similar to movements in 1969 and 1985, constituting the largest movements ever recorded in Great Britain and Ireland. Each movement was associated with good reproductive success on Siberian nesting grounds. However, not every year with good breeding success produces influxes of these sandpipers along the western edge of their normal migration corridor. These influxes appear to be the result of weather systems producing northeasterly wind flows from Scandinavia across the British Isles coinciding with the passage of large numbers of Curlew Sandpipers across Europe. [BTO, Station Rd., Tring, Hertfordshire HP23 5NR, United Kingdom]—Bruce G. Peterjohn.

10. Sabine's Gulls and other seabirds after the October 1987 storm. R. A. Hume and D. A. Christie. 1989. Br. Birds 82:191–208.—An autumn storm of unusually severe intensity developed in the Bay of Biscay on 15 October 1987 and passed across southern England that evening. This article summarizes the meteorological events producing the storm and the ornithological fallout resulting from it. Unprecedented numbers of Sabine's Gulls (*Xema sabini*) and Red Phalaropes (*Phalaropus fulicaria*) were scattered across southern and eastern England, primarily in the counties along the center of the storm track. Other pelagic species such as jaegers (*Stercorarius* spp.) and Great Skua (*Catharacta skua*) were reported in relatively small numbers. Surprisingly few Leach's Storm-Petrels (*Oceanodroma leucorhoa*) and Black-legged Kittiwakes (*Rissa tridactyla*) were displaced by the storm.

These observations provided an indication of the relative abundance of some pelagic birds in the Bay of Biscay during mid-October, but also resulted in some unanswered questions. Why were Sabine's Gulls and Red Phalaropes displaced in large numbers while other common pelagic species, such as kittiwakes, were unaffected? Additionally, the distribution of displaced birds within the interior of England defied any logical explanation. [15 Cedar Gardens, Sandy, Bedfordshire SG19 1EY, United Kingdom]—Bruce G. Peterjohn.

11. Marsh Warblers in Britain. M. G. Kelsey, G. H. Green, M. C. Garnett and P. V. Hayman. 1989. Br. Birds 82:239–256.—While breeding Marsh Warblers (*Acrocephalus palustris*) are widely distributed within the western Palearctic, England has always hosted a small and locally distributed nesting population. This article summarizes historical trends in the abundance and distribution of this small breeding population.

Marsh Warblers remained reasonably stable in England through the 1940s, but declined precipitously between 1950 and 1960. After this decline, the only sizable population was found in Worcestershire, although scattered pairs and territorial males were sporadically discovered in southern counties. The Worcestershire population was fairly stable until the late 1970s, but has sharply declined since 1981 and is in danger of imminent extirpation. Scattered pairs and males are occasionally recorded in southern England.

Factors responsible for the initial population decline were not conclusively proven, although habitat destruction and climatic changes may have been involved. Extensive studies of the Worcestershire Marsh Warblers suggest that their recent decline was the result of uncompensated emigration and other demographic factors affecting this small isolated population. While the British population of Marsh Warblers was declining, this species' range in continental Europe expanded northward into Scandinavia. [Edward Grey Institute of

Field Ornithology, South Parks Rd., Oxford OX1 3PS, United Kingdom]—Bruce G. Peterjohn.

12. A Great Gray Owl influx, Winter 1988–89. K. R. Eckert. 1989. Loon 61:115–117.—From mid-October 1988 through mid-April 1989, 115 Great Gray Owl (*Strix nebulosa*) sightings were reported in the boreal forest zone of the northeastern quarter of Minnesota. In only one other season did an irruption of Great Gray Owls into the state result in over 100 sightings (122 in 1983–1984). During the 1988–1989 winter season, numerous Boreal Owls (*Aegolius funereus*) were found dead from starvation in this region, suggesting that food may have been in short supply for the owl populations as a whole. [8255 Congdon Blvd., Duluth, MN 55804 USA]—Danny J. Ingold.

13. The Ontario Great Gray Owl invasion of 1983–1984: numbers, dates, and distribution. R. D. James. 1989. Ontario Birds 7:5–15.—During the winter of 1983–1984, Great Gray Owls (*Strix nebulosa*) staged their largest recorded invasion of northeastern North America. Their distribution within the province of Ontario was mapped for each month of the winter, and their seasonal movements within the province were compared with published accounts from neighboring provinces and states that were also visited by large numbers of owls.

The first invading owls were noted in central Ontario during October. They accumulated north of Lake Nippissing through early December, but did not spread into southern Ontario until the end of the month. By early January, their southward movement had ceased and the largest numbers concentrated on a broad band centered along the southern edge of the Canadian Shield. The northward movement began during late January, with a 70% reduction in sightings in February. Few owls remained in southern Ontario after early March, and their northward passage through central Ontario was relatively inconspicuous.

The causes of this unprecedented invasion were not established, although exceptionally inclement weather did not appear to be an important factor. The source of the invading owls was the subject of speculation, with the pattern of observations suggesting a direct southward movement from the extensive forests of northern Ontario and Quebec. [Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario M5S 2C6, Canada]—Bruce G. Peterjohn.

14. The Ontario Great Gray Owl invasion of 1983–1984: habitat, behavior, food, health, age and sex. R. D. James. 1989. Ontario Birds 7:55–61.—Various aspects of the winter ecology of Great Gray Owls (*Strix nebulosa*) were recorded during the 1983–1984 invasion of Ontario. The invading owls mostly hunted in open fields with nearby woodlands available for roosting. The types of open fields used by foraging owls appeared to be used in proportion to their availability, with nearly equal numbers of owl observed in fallow/shrubby fields as in agricultural fields. The wariness of the individual owl and food availability also influenced their habitat preferences. Perched owls preferred deciduous trees over coniferous trees and perches less than 10 m high. Hunting methods were briefly described and small rodents appeared to be preferred prey, but this information was based on the observations of a very small number of owls.

Most owls observed or banded during this invasion appeared to be in good physical condition, suggesting that food shortages were not a problem in their wintering locations. Road kills and shooting were the primary causes of mortality of wintering owls. Specimen and sight records suggested a preponderance of females in the wintering population, but the number of confirmed records was very small. Most of the owls were adults, a fact suggesting to the author that food shortages in the northern forests was the most likely cause of this invasion. [Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario M5S 2C6, Canada]—Bruce G. Peterjohn.

15. Moray Basin wader populations. R. L. Swann and G. P. Mudge. 1989. Scottish Birds 15:97–105.—Mid-winter counts of waders at Moray Basin were conducted between 1970–1975 and 1984–1988. Peak mid-winter numbers of eight waders are given for the earlier time period, and of 13 waders during the later time period. Between 1984 and 1988 up to 39,626 waders were counted each year. When compared with the period 1970–1975, it appeared that numbers of Oystercatchers (*Haematopus ostralegus*) had increased during

the later time period, but numbers of Lapwing (*Vanellus vanellus*), Red Knot (*Calidris canutus*), and Dunlin (*Calidris alpina*) had decreased. [28 Druimlon, Drumnadrochit, Inverness-shire IV3 6TY, Scotland]—Lori A. Willimont.

16. Population ecology of the Skylark, *Alauda arvensis* in intensively used farm land. [Populationsökologie der Feldlerche *Alauda arvensis* in der intersiv genutzten Agrarlandschaft.] A. Schläpfer. 1988. Ornithol. Beob. 85:309–371. (German, English summary).—A population of 14-18 breeding Skylark pairs were studied in 10 structurally different habitats near Basel, Switzerland from 1983 to 1987 to determine population responses to spatial and temporal changes in crop species and plant size. The distribution of structurally different crops has a major influence on territory size (1.8–4.8 ha), with larger territories associated with larger fields and lower crop diversity. Small scale farming with high crop diversity provides the optimum habitat where lark territories are small and stable through time. At least two crops must be available within the territory for it to be used throughout the breeding season. When ground locomotion is restricted by the growth of vegetation, Skylarks shifted their territories, used only the poorer quality areas, or abandoned the territory completely. Winter cereal and rape were used early, but less so when the plants grew to 20–25 cm and abandoned when the seed heads developed. Spring cereals were preferred while the plants were short (10–25 cm) and most June nests were built in such fields. Other field types were secondarily important and used for feeding, especially freshly cut hay fields. Each crop type is optimally suited for nest building only during a limited time span. Consecutive clutches are usually laid sequentially in winter cereals, spring cereals, and corn, with hayfields and pastures being used only late in the season. Skylarks do not appear to have any specialized adaptations for breeding on farmland. The mean breeding success (37%) increases during the breeding season. Broods produced in cereal crops are responsible for about 70% of the breeding productivity. Haying is the only agricultural activity directly responsible for nest destruction.—Robert C. Beason.

17. The 1988 fall shorebird season at Jamaica Bay Wildlife Refuge. A. Morris. 1989. Kingbird 39:80–95.—Since 1981, migrant shorebirds have been censused weekly between late June and late November at Jamaica Bay National Wildlife Refuge, Queens, New York. This paper provides data for 1988 and compares these data with those of previous years. Excessive rain in mid-summer resulted in fewer migrants tallied, but numbers returned to normal following draining. Species accounts for the 31 species observed in 1988 describe patterns and unusual characteristics. For example, most Red Knots (*Calidris canutus*) "sported a green leg-flag indicating that they were banded in the United States." Raw data are provided in extensive tables. Table 4 provides ranges and mean arrival dates of adults and juveniles of several species for the six to nine years the species have been censused. Some management problems are discussed.

Such censuses should be conducted at more migratory stopovers. This is the sort of thing that local bird clubs should take on as a long-term project. The author is to be commended for his censusing efforts and, just as importantly, for organizing the data for publication. [80-11 160th Ave., Queens, NY 11414 USA]—Jerome A. Jackson.

18. North American Breeding Bird Survey annual summary 1988. S. Droege and J. R. Sauer. 1989. U.S. Fish Wildl. Serv., Biol. Rep. 89(13). 16 pp.—This most recent product of the North American Breeding Bird Survey (BBS) provides comparisons of census results for 222 North American species for 1987–1988 and 1966–1987. Summarized data are presented in tables and graphically illustrated in maps showing states, provinces, and physiographic regions. Although some strong geographic patterns are shown, the authors are very conservative in their discussion. There is some indication that grassland species suffered from the unusual heat and drought of the summer of 1988.

This continuing program provides a very important data base for monitoring North American bird populations, which in turn may be excellent barometers of the health of our environment. Dealing with such a massive data set, however, is the challenge. This annual summary is just that—a summary. While worthy of attention, it just skims the surface. I look forward to future and deeper analyses. [U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, MD 20708 USA]—Jerome A. Jackson.

NESTING AND REPRODUCTION

(see also 29, 32, 39, 43, 44, 45, 46, 47, 52, 55)

19. Does juvenile helping enhance breeder reproductive success? A removal experiment on moorhens. M. L. Leonard, A. G. Horn, and S. F. Eden. 1989. Behav. Ecol. Sociobiol. 25:357–361.—Helping-at-the-nest is well known in many avian species and often enhances the reproductive success of the breeders. Juvenile Common Moorhens (*Gallinula chloropus*) remain on natal territories and help their parents raise second and occasionally third broods. During two breeding seasons in Cambridgeshire, UK, the authors examined ways in which juvenile moorhens assisted their parents. In addition, by removing juvenile moorhens from their natal territories they tested the hypothesis that juvenile help will result in an increase in parental fitness. Juveniles helped their parents by feeding sibs, occasionally brooding them, and assisting in territorial and predator defense. Although chicks in the control group did receive significantly more feeds/min ($P < 0.05$) at 15 and 20 days than did those in the experimental group, removal experiments had no significant influence on the proportion of time parents spent foraging or on the total parental feeding rate. These data suggest that juvenile helping does not enhance parental survival or reproductive success. It is likely that the influences of helping previously reported in this population were confounded by parental and territorial quality. Since juvenile moorhens do not forego breeding to assist their parents, the costs of such helping may be relatively low. Consequently, the benefits may also be minimal and difficult to detect experimentally. [Dept. of Biology, Queen's Univ., Kingston, Ontario K7L 3N6, Canada]—Danny J. Ingold.

20. The role of hatching asynchrony in siblicidal brood reduction of two booby species. D. J. Anderson. 1989. Behav. Ecol. Sociobiol. 25:363–368.—Differences in hatching asynchrony (HA) in the Masked Booby (*Sula dactylatra*) and its sympatric congener the Blue-footed Booby (*S. nebouxii*) reflect differences in brood reduction systems in the two species. Masked Boobies are obligately siblicidal and have long HAs, whereas Blue-footed Boobies are facultatively siblicidal and have short HAs. The author examined the breeding biology of these booby species at Isla Española in the Galapagos Islands during three breeding seasons to test whether: (1) HA has a causal effect on the outcome of sibling aggression, and (2) species-specific differences in HA can explain differences between the species in the outcome of sibling aggression. Brood size reduction from two chicks to one occurred in 94 of 96 (98%) unmanipulated Masked Booby nests within 10 days of the second chick's hatching. In all instances, the second chick died. In contrast, among 42 2-egg clutches in which both eggs hatched in Blue-footed Boobies, one of the chicks died within 10 days of the second chick's hatching in only 7 of the nests (17%). Although the HA distribution of the species overlapped, most Blue-footed Boobies hatched over 3–4 days, while most Masked Boobies hatched over 5–6 days.

Data from manipulated Masked Booby nests (resulting in broods in which both chicks were the same age) indicate that there is a threshold HA of less than 3 days, below which early brood reduction is not inevitable. In Blue-footed Boobies, the older chick occasionally attacked the younger one, but a variety of parental controls (including nest architecture as well as HA) likely aided in preventing early mortality of younger chicks. Thus, differences in HA alone cannot account for differences in brood reduction in these two species. [Dept. of Avian Sciences, Univ. of California, Davis, CA 95616-0690 USA]—Danny J. Ingold.

21. Little Bitterns breeding in South Yorkshire. A. A. Allport and D. Carroll. 1989. Br. Birds 82:442–446.—England's first confirmed breeding record of Little Bitterns (*Ixobrychus minutus*) unexpectedly occurred in the northern county of South Yorkshire in 1984, a county where there were few previous records. Aspects of this pair's breeding behavior were described in detail, particularly the feeding behavior of the adults and their dependent young. Despite the successful fledging of three young, Little Bitterns returned to the same marsh in 1985 but did not nest. [Bramblings, Wighill Lane, Tadcaster, N. Yorkshire LS24 8HE, United Kingdom]—Bruce G. Peterjohn.

22. Trigyny in Tengmalm's Owl *Aegolius funereus* induced by supplementary feeding? B.-G. Carlsson and B. Hörnfeldt. 1989. Ornis Scand. 20:155–156.—Owls are

generally thought to be monogamous. The glaring exception to this notion is the Tengmalm's (Boreal) Owl, which frequently is polygynous during cyclic peaks in microtine rodent numbers. All previous records of polygyny in owls have involved one male and two females (i.e., "bigyny"). In this paper, the authors document the first known case of "trigyny" in an owl.

A banded male Tengmalm's Owl was repeatedly captured while provisioning three females at different nest boxes (0.85–2.5 km apart) in northern Sweden. The nests produced 2, 3, and 5 young from clutches of 7, 8, and 6 eggs, respectively. The authors had provided each box with 500 g of mice one month before laying and 100 g/day during the laying and incubation periods. These supplementary feedings likely enhanced the male's ability to obtain three different mates. The authors suggest that trigyny is possible without artificial provisioning during years when small rodents are extremely abundant. Such a case recently was documented for Northern Saw-whet Owls (*Aegolius acadicus*) in Idaho (Auk 106:732–734, 1989).—Jeff Marks.

23. A new avian mating system: ambisexual polygamy in the Penduline Tit *Remiz pendulinus*. O. Persson and P. Öhrström. 1989. Ornis Scand. 20:105–111.—Penduline Tits are unusual among passerines in that care of eggs and young is never bi-parental. Of 140 clutches monitored in southern Sweden from 1980–1988, 18% were attended by the male, 48% by the female, and 34% were deserted by both parents before incubation began. Thirty-one percent of the females (n = 68) and 55% of the males (n = 60) nested with a new mate after deserting a clutch. Thus, females were polyandrous and males were polygynous within the same season, a mating system previously unknown in birds. Most (65%) females incubated their first clutch and tended to desert small clutches (mean = 3.7 eggs) and incubate large ones (mean = 5.1 eggs). Males tended to desert early clutches (May) and incubate late ones (June) regardless of clutch size.

The authors believe that the nest is an important factor in uni-parental care in this species. Penduline Tits build a domed nest suspended from the tips of branches over water. Such nests are safe from predators and are well-insulated, enabling parents to leave nests unattended for long periods. Because most females incubate their first clutch, the operational sex ratio becomes male-biased later in the breeding season. Thus, as the breeding season progresses, selection might favor males that care for nests and females that exploit the skewed sex ratio by seeking new mates.—Jeff Marks.

24. Breeding biology and site fidelity in the Tree Pipit *Anthus trivialis* in a patchily distributed habitat in the Swiss Lowlands. [Brutbiologie und Ortstreue einer Baumpieperpopulation *Anthus trivialis* in einem inselartig verteilten Habitat des schweizerischen Mittellandes.] R. Meury. 1989. Ornithol. Beob. 86:219–233 (German, English summary).—A breeding population of about 40 pairs was studied in the lower Reuss Valley where the birds primarily nested in the remnant marshlands. There were only 17 second-nest attempts compared to 110 first-nest. Five of the second nest attempts included the only bigamous matings of the study. The return rate of the adults from the previous year was 51% for males and 32% for females. Returning pairs were more successful breeders than new birds entering the study area. Of the birds hatched on the study area, 15% of the males returned and 10% of the females. The overall reproductive output of the population is sufficient to compensate for the adult mortality, keeping the population size stable. [Hauptstrasse 54, 4105 Biel-Benken, Switzerland]—Robert C. Beason.

25. Factors influencing the breeding density and nest-site selection of the Egyptian Vulture (*Neophron percnopterus*). O. Ceballos and J. A. Donazar. 1989. J. Ornithol. 130:353–359. (English, German summary).—Distribution and density of vultures nesting in northern Spain depended on cliff availability and intraspecific interferences, rather than on characteristics of the environment as a whole. Although not statistically significant, vultures often chose cliffs located near the bottom of valleys, probably to minimize energy spent provisioning the nest; they are tolerant of humans and often feed in carrion dumps near villages. [Museo de S. Telmo, S. Sebastian, Spain]—Andrea Dinep.

26. Nesting mortality of the Golden Sparrow (*Passer luteus*). [Mortalität im Nest des Goldsperlings (*Passer luteus*).] R. Klein. 1989. J. Ornithol. 130:361–365. (German,

English summary.)—Nests were monitored at four sites in the Republic of Niger. Total mortality was 30–60%. Egg losses (primarily cold or sterile) were 13–21%; nestling mortality (primarily due to starvation) was 16–40%. Inequality in size allowed the dominant chick to compete with siblings and survive even in poor seasons. This species is considered a pest; many experimental nests in trees thinned for visibility were disturbed by humans. [Univ. des Saarlandes, ZfU, D-6600 Saarbrueken, West Germany]—Andrea Dinep.

BEHAVIOR

(see also 4, 5, 19, 20, 21, 22, 23, 24, 32, 43, 44, 45, 49)

27. Offspring reproductive value and nest defense in the Magpie (*Pica pica*). T. Redondo and J. Carranza. 1989. Behav. Ecol. Sociobiol. 25:369–378.—Nesting mortality in birds may be explained by the "predation risk hypothesis," in which older nestlings suffer from increased predation since they are more conspicuous and profitable to predators. The "reproductive value hypothesis," which is not mutually exclusive of the predation risk hypothesis, predicts that parental defense levels increase in response to any developmental change that causes an increase in nestlings' probability of survival. The authors studied a population of Magpies (*Pica pica*) in Spain for three breeding seasons to determine the extent to which they suffer from nest predation, and to test which one of the above hypotheses best supports potential nestling losses. Magpie nestlings under 12 days of age suffered a higher mortality than older nestlings. In addition, parental defense increased significantly ($P < 0.05$) in both frequency and two intensity measurements when nestlings were older than 18 days. The number of predatory visits to the nest and time in the breeding season were only weakly correlated with measurements of parental defense.

Nestlings younger than 13 days typically responded to "predators" (the authors) by begging for food, while nestlings between 13 and 18 days old crouched silently at the bottom of the nest. Nestlings older than 18 days substituted a passive defensive response by active escaping and alarm calling. Parental defense occurred in significantly more trials in which nestlings escaped (83%) compared to trials in which nestlings crouched (50%; $P < 0.05$). The authors conclude that nest defense is a form of parental investment that maximizes reproductive success of parents (supporting the predation risk hypothesis); consequently it is sensitive to variations in reproductive value of the offspring. [Catedra de Biologia y Ethologia, Facultad de Veterinaria, Unex, 10071 Caceres, Spain]—Danny J. Ingold.

28. Age-specific social dominance affects habitat use by breeding American Redstarts (*Setophaga ruticilla*): a removal experiment. T. W. Sherry and R. T. Holmes. 1989. Behav. Ecol. Sociobiol. 25:327–333.—Habitat segregation in birds is often attributed to the behavioral dominance of certain individuals that control access to the best habitat. To test this hypothesis, the authors conducted a series of male-removal experiments during three breeding seasons in the Hubbard Brook Experimental Forest in New Hampshire. All 15 experimentally removed males were replaced by 15 "new" individuals, of which 10 were yearlings and 5 were older males (significantly more yearlings colonized vacated areas (67%) than were present in the redstart population at large). Sixty percent of both of these groups consisted of birds new to the study site. Competitive interactions between yearling and older males, however, support the hypothesis that older males were behaviorally dominant. Additionally, these data demonstrate the presence of numerous floaters in this population of American Redstarts, as well as age-specific competition among males for preferred habitat. Habitat selection by redstarts in this population is thus, density dependent, although the strength of this force on its dynamics is not yet known. [Dept. of Biology, Tulane Univ., New Orleans, LA 70118 USA]—Danny J. Ingold.

29. Territorial intrusions in the House Wren *Troglodytes aedon*: evidence for the sperm competition hypothesis. L. S. Johnson and L. H. Kermott. 1989. Ornis Scand. 20:89–92.—Male passerines frequently intrude into neighboring territories of conspecifics. Møller (Oikos 48:47–54, 1987) proposed that territorial intrusions might serve to (1) establish and maintain territory boundaries, (2) locate vacant suitable habitat, or (3) obtain extra-pair copulations (the "sperm competition" hypothesis). The authors tested these hypotheses by comparing intrusion rates when resident females were presumed fertile (starting

5 days before laying and ending with the penultimate egg) with intrusion rates during presumed infertile periods at seven House Wren territories in Wyoming.

Rates of intrusion were significantly higher during the fertile period than during infertile periods. Moreover, if the resident male was absent, intruding males tended to approach the resident female and adopt a posture associated with copulation. Indeed, two females solicited copulations from intruders. The authors conclude that most territorial intrusions made by male House Wrens are attempts to obtain extra-pair copulations.—Jeff Marks.

30. Wintering Turkey Vultures in Letchworth State Park. D. K. Bassett. 1989. Kingbird 39:74–79.—For at least two recent years up to 20 Turkey Vultures (*Cathartes aura*) have wintered along the gorge of the Genessee River in Letchworth State Park and have been seen in Livingston and Allegany counties, New York. Both adult and immature birds have wintered in the area. Primary food of the wintering vultures has been road-killed deer, although several smaller mammal species have also been included in their diet. Roost sites included 30-m spruce trees and sheltered rock ledges. Vultures were observed dunking themselves in the Genessee River—up to their necks—in mid-winter.

This paper includes a great deal of valuable, albeit minimally quantified data on Turkey Vultures. The author also describes summer roosts, home ranges, nest sites, roosting behavior, and more. This nice piece of work deserves attention by all interested in New World vultures. [Nature Interpretive Program, 1 Letchworth State Park, Castile, NY 14427 USA]—Jerome A. Jackson.

31. Hunting behaviour and attack success of a female Sparrowhawk between October 1987 and April 1988. 1989. J. D. Wilson and A. G. Weir. Scottish Birds 15:126–130.—This paper chronicles the hunting of an apparent first-year Sparrowhawk (*Accipiter nisus*) at three feeding stations. Only 75 of 123 visits by the Sparrowhawk to a feeding station were considered attacks, and most of these involved "short-stay-perch-hunting/contour-hugging flight." Target species included two Great Tits (*Parus major*) and 55 Blue Tits (*P. caeruleus*) at one site. This is an important study in that it documents the role of bird feeders in concentrating prey for this *Accipiter* species. I can't help but wonder how the tremendous increases in birdfeeding activity in the United States have influenced the population dynamics of North American *Accipiter* species. [Dept. of Zoology, Univ. of Edinburgh, West Mains Rd., Edinburgh EH9 3JT, Scotland]—Jerome A. Jackson.

ECOLOGY

(see 6, 10, 16, 18, 25, 28, 30, 38, 39, 50)

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 16, 26)

32. Responses to human intruders by birds nesting in colonies: experimental results and management guidelines. R. M. Erwin. 1989. Colonial Waterbirds 12:104–108.—Because many colonially nesting birds risk high mortality due to recreational or other human-related disturbance during the breeding season, guidelines for limiting human access to colonies are important. Erwin visited 11 wading-bird (8 species of herons and ibises) and 35 seabird (6 tern species) colonies in Virginia and North Carolina once or twice in a single breeding season. He determined colony size and stage of nesting, and measured distances from the colony that human presence caused: (1) a "dread" (terns fly up, circle and land), (2) the first individual of a species to flush, and (3) more than 50% of the birds to flush. He also recorded how long it took for 50% of the flushed birds to land. Common Terns (*Sterna hirundo*) and Black Skimmers (*Rynchops niger*) responded to human disturbance at greater distances (200–400 m) than did Royal Terns (*S. maxima*) or Least Terns (*S. antillarum*). Herons began to flush at an average distance of about 50 m, and Black-crowned Night-Herons always flushed before other heron species. Colony size and whether nesting stage was early (eggs) or late (young) did not appear to be important variables in determining flushing distances. Flushing distances (excluding "dreads") averaged less than 100 m for all species. Erwin warned that all colonies studied were already in at least the egg-laying

stage, and that many species show less tolerance for human disturbance during the earlier stages of site selection and courtship. Also, flush distances may be less when birds have become habituated to human disturbance.

The author concludes with recommendations to managers, including sign-posting 100 m from Least Tern, Royal Tern, and wading-bird colonies, 200 m for Common Terns and Black Skimmers, and an additional 100 m for all colonies very early in the breeding season before egg-laying has begun. Posting should begin 3 weeks or more before egg-laying begins, and signs should be placed every 50 m around the colony.

This paper is a must for anyone involved in colonial waterbird conservation or management. [Branch of Migratory Bird Research, Patuxent Wildlife Research Center, U.S. Fish and Wildlife Service, Laurel, MD 20708 USA]—William E. Davis, Jr.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see also 12, 13, 14, 16, 18, 32, 37, 55)

33. Heavy metals in Goshawk (*Accipiter gentilis*) feathers from differently polluted areas. [Schwermetalle in Federn von Habichten (*Accipiter gentilis*) aus unterschiedlich belasteten Gebieten.] E. Hahn, K. Hahn, and M. Stoeppler. 1989. J. Ornithol. 130:303–309. (German, English summary.)—Levels of heavy metals (cadmium, copper, lead) in molted primaries of breeding female Goshawks were significantly correlated with deposition rates of the metals in polluted and control areas. Central primaries contained the highest levels of metals. Deposition rates of heavy metals in the environment may be calculated from levels in feathers. [Biomonitoring, Welldorf, Auf der Heide 16, D-5170 Jülich, West Germany]—Andrea Dinep.

PHYSIOLOGY

(see 5, 7, 53, 54)

MORPHOLOGY AND ANATOMY

(see 1, 42)

PLUMAGES AND MOLTS

(see also 33, 41, 42)

34. Some comments on Yellow-rumped Warbler molt. R. P. Yunick. 1989. Kingbird 39:100–101.—Yunick presents data on molt of primaries, secondaries, and rectrices of 14 New York and two New Jersey *Dendroica coronata* captured between 11 July and 20 October. Molt in some individuals begins about 5 July, and in others may not begin until about 15 July. Birds captured through August were believed to be local breeders. [1527 Myron St., Schenectady, NY 12309 USA]—Jerome A. Jackson.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 3, 10, 11, 12, 13, 14, 15, 17, 18, 21, 24, 25, 30)

35. Reappraisal of the status of gulls in the Carolinas. M. H. Tove. 1989. Chat 53:53–65.—Tove reviews the status of 16 species of gulls from the Carolinas. Ten occur regularly in North Carolina, six in South Carolina. Reports of several species have increased in recent years and regression analysis suggests that the Lesser Black-backed Gull (*Larus fuscus*) may become fairly common within the next 20 years. Some previous records of gull species are questioned, including a sight record of the Ivory Gull (*Pagophila eburnea*) which was accepted by the AOU Checklist Committee and cited in the AOU Checklist (American Ornithologists' Union. 1983:226). [303 Dunhagen Place, Cary, NC 27511 USA]—Jerome A. Jackson.

36. Checklist of the birds of Switzerland. R. Winkler. 1989. Ornithol. Beob. 86: 243–257.—This list includes the common names in German, French, Italian, and English

(as well as the Latin names), and the breeding and migratory status of the birds of Switzerland. It should prove helpful to travelers to Switzerland. [Naturhistorisches Museum, Augustinergasse 2, CH-4001 Basel, Switzerland]—Robert C. Beason.

37. The significance of the Alps for the Swiss avifauna. [Die Bedeutung der Alpen für die Schweizen Avifauna.] T. Salathè and R. Winkler. 1989. Ornithol. Beob. 86:155–161.—The role of the Alps as a barrier to avian species undergoing range expansion seems to be only temporary. Their greatest importance is as a refuge for species suffering habitat destruction in lower regions. Twenty-two species are confined to the coniferous forests and steppes of the Alps, although some of these species have recently colonized similar habitats in the Jurals.—Robert C. Beason.

38. Wintering wildfowl and waders at Aberdeen, 1975-1986. M. V. Bell. 1989. Scottish Birds 15:106–113.—A survey of wintering waterfowl and waders was conducted from Aberdeen to Greg Ness, a 3 km stretch of rocky shoreline. Seven common species were found: Green-winged Teal (*Anas crecca*); Eider (*Somateria mollissima*); Common Goldeneye (*Bucephala clangula*); Oystercatcher (*Haematopus ostralegus*); Purple Sandpiper (*Calidris maritima*); Redshank (*Tringa totanus*); and Ruddy Turnstone (*Arenaria interpres*). Thirty-six other species were recorded during the survey. [48 Newton Crescent, Dunblane, Perthshire FK15 ODZ, Scotland]—Lori A. Willimont.

39. The distribution and status of the Chough in Scotland in 1986. P. Monaghan, E. Bignal, S. Bignal, N. Easterbee, and C. R. McKay. 1989. Scottish Birds 15:114–118.—A survey of Choughs (*Pyrrhocorax pyrrhocorax*) in Scotland was conducted during the 1986 breeding season. One-hundred-fifty breeding pairs were at nest sites with 71 confirmed breeders; several non-breeding flocks were also recorded. The total population was estimated at 325–340 birds. Breeding was restricted to three areas, with 90% of the total number of birds restricted to one area. [Applied Ornithol. Unit, Zoology Dept., Univ. of Glasgow G12 8QQ, Scotland]—Lori A. Willimont.

40. American Swallow-tailed Kites in Mansfield, Connecticut. G. A. Clark, Jr. and L. Bevier. 1989. Connecticut Warbler 9:80–82.—*Elanoides forficatus* once bred as far north as Minnesota, but fell on hard times as eastern forests were cleared. Range in the U.S. had been much contracted until recently. Now these kites are reinvading more northern areas. Two were seen 11–24 June; 1989 is the third consecutive year they have been found in Connecticut. [Biology, Box U-43, Univ. of Connecticut, Storrs, CT 06268 USA]—Jerome A. Jackson.

SYSTEMATICS AND PALEONTOLOGY

41. Field identification of the smaller skuas. K. M. Olsen. 1989. Br. Birds 82: 143–176.—The primary emphasis of this article is the field identification of Parasitic (*Stercorarius parasiticus*), Pomarine (*S. pomarinus*) and Long-tailed (*S. longicaudus*) jaegers. Since the information is largely based on jaeger observations in Europe, most of the article is devoted to discussions of the juvenal and adult alternate plumages of each species. These plumages are described in considerable detail, with an emphasis on the range of variability in each characteristic. Excellent color plates by Lars Jonsson and numerous photographs illustrate these plumages. Some information is provided on the adult basic plumage of Pomarine Jaegers, but this plumage in the other species, and the second-and third-year plumages of all species, receive relatively scant attention.

More than a simple identification article, it provides new and useful information on the range of variability in the juvenal and adult alternate plumages of this difficult group. It corrects some misinformation in the existing literature and identifies aspects that require additional study. Undoubtedly the most fruitful area for future research are the second- and third-year plumages of these species, which remain rather poorly described in the literature. [Møllegade 21, st. th., DK 2200 Copenhagen N, Denmark]—Bruce G. Peterjohn.

42. Notes on the taxonomy and geographic variation of *Phaethornis bourcieri* (Aves: Trochilidae) with the description of a new subspecies. C. Hinkelmann. 1989.

Bonn. Zool. Beitr. 40:99–107. (English, German summary.)—Study of skins from throughout the species' distribution revealed no continuous, geographically-based variation in color or measurements; thus no basis for the present subspecies *bourcieri* and *whitelyi*. The slight decrease in size from E to W is probably clinal. Males of several isolated populations from the E bank of the lower Rio Tapajos, Brazil, were substantially larger than average and merited a new subspecies, *P. b. major*. [Forschungsinstitut u. Museum Koenig, Adenauerallee 150-164, D-5300 Bonn 1, West Germany]—Andrea Dinep.

EVOLUTION AND GENETICS

(see also 23, 27, 29)

43. Coloniality in herons: Lack's predation hypothesis reconsidered. L. S. Forbes. 1989. Colonial Waterbirds 12:24–29.—Forbes examines the possibility that coloniality in herons is an anti-predator adaptation and the counter-arguments suggesting that coloniality is largely a feeding-related adaptation. An argument against the predator hypothesis is the absence of a mobbing response in herons, but Forbes argues that herons ought not to mob because they are awkward flyers, would be poor mobbers, and would be at high risk. Colonial herons may benefit from group vigilance, with, for example, nestlings adopting cryptic postures when alerted to the presence of a predator. Lower per capita predation would be expected for colonial herons in a single raptor territory than for dispersed herons in many raptor territories. The author suggests that predation by large raptors may have been more common in the past, before humans reduced many raptor populations. Additional benefits from colonial breeding might include information about good nest sites and stable colony location from the presence of old nests, or information about feeding areas or conditions.

Forbes suggests that if avian predation played a major role in the evolution of coloniality in herons, large herons, which would be less susceptible to predation, should be less colonial than small herons. He does find a correlation between heron size and degree of coloniality, with solitary nesting occurring more frequently among large herons. He argues that social facilitation of food-finding alone cannot satisfactorily account for coloniality in herons, although he suggests that in some situations it may be important, by, for example, compensating for increased competition for food due to high densities of herons in colonial conditions. He concludes with a discussion of future research directions, and argues that it would be wrong at the present time to dismiss the importance of predation in the evolution of coloniality in herons. [Behavioural Ecology Research Group, Dept. Biological Sciences, Simon Fraser Univ., Burnaby, British Columbia V5A 1S6, Canada]—William E. Davis, Jr.

44. Cuckoos and parasitic ants: interspecific brood parasitism as an evolutionary arms race. N. B. Davies, A. F. G. Bourke, and M. de L. Brooke. 1989. Trends in Ecol. Evol. 4:274–278.—Both certain cuckoos (*Cuculus* and *Chrysococcyx*) and certain ant species practice brood parasitism, accompanied by the parasite killing the host's young (or, in ants, the host's queen) and "fooling" the host into attending its young. This review compares the adaptations of cuckoos for deceiving hosts with those of ants. Several compelling similarities exist, and the authors speculate about why hosts seem so defenseless as well as why brood and social parasitism are not more widespread. [Dept. of Zoology, Univ. of Cambridge, Downing St., Cambridge CB2 3EJ, United Kingdom]—John C. Kricher.

45. Nest predation and the species diversity of birds. R. E. Ricklefs. 1989. Trends in Ecol. Evol. 4:184–186.—In this "commentary," Robert Ricklefs reviews and comments on recent work by Thomas E. Martin on the role of nest predation in structuring avian communities. Martin's experiments suggest that nest predation is an extremely important selection pressure and that bird species diversity may be as related to partitioning "nest niches," among species as foraging niches. Ricklefs offers some critique of Martin's work but generally applauds its relevance and timeliness. [Dept. of Biology, Univ. of Pennsylvania, Philadelphia, PA 19104 USA]—John C. Kricher.

46. DNA fingerprinting and other methods for the study of mating success. T. Burke. 1989. Trends in Ecol. Evol. 4:139–144.—A relatively new technological tool, DNA

fingerprinting has shown great promise for use in analysis of paternity among birds (as well as other animals). This review outlines this methodology and briefly discusses analysis of paternity using restriction fragment length polymorphisms, sex-linked sequences, and mitochondrial DNA. Studies of the Dunnock (*Prunella modularis*) are cited as examples. Already DNA fingerprinting has added new insights into the sex lives of "monogamous" species, demonstrating considerable "infidelity" among several species. Measures of reproductive success could be substantially in error because of undetected conspecific matings that could only be revealed by molecular analysis such as DNA fingerprinting. [Dept. of Zoology, Univ. of Leicester, Leicester LE1 7RH, United Kingdom]—John C. Kricher.

47. Cost of reproduction and covariation of life history traits in birds. M. Linden and A. P. Moller. 1989. Trends in Ecol. Evol. 4:367–371.—Given the role of natural selection in the evolution of birds, what, exactly, is selection selecting for—a long life or a prolific life? The answer, at least based on the small data set thus far available for birds, seems to be either longevity or fecundity, but not both. This paper reviews work suggesting that reproductive costs are traded against long lifespan. Birds that put large amounts of calories into annual reproduction, expressed, for instance, as second broods or larger clutch sizes, simply do not seem to live as long as birds that invest less in annual reproductive effort. Such a notion makes a certain amount of sense, and might even seem intuitive, but the data are still somewhat equivocal and much more data need to be collected before firm conclusions about the evolution of avian life histories are clear. The authors suggest some future research directions. [Dept. of Zoology, Box 561, Uppsala Univ., S-751 22 Uppsala, Sweden]—John C. Kricher.

FOOD AND FEEDING

(see also 22, 25, 30, 31, 35)

48. Selective predation by Eagle Owls *Bubo bubo* on rabbits *Oryctolagus cuniculus*: age and sex preferences. J. A. Donázar and O. Ceballos. 1989. Ornis Scand. 20: 117–122.—The European rabbit is abundant in Mediterranean ecosystems and is consumed by a wide variety of predators. Prominent among these is the Eagle Owl, one of the world's largest owls and the most specialized rabbit predator among European raptors. No study has assessed the age and sex composition of rabbits killed by raptors. Toward filling this gap, the authors studied rabbit population dynamics and Eagle Owl food habits in northern Spain from 1981–1985.

Rabbits were live-trapped year-round with the aid of muzzled ferrets (see Cowan, J. Zool. 204:570–574, 1984). Owl food habits were identified from pellets. Bones found in pellets were used to distinguish three age/size classes (by size of long bones) and the sex (by form of the pelvic girdle) of rabbits.

Relative to availability estimates, owls selectively caught young rabbits (<500 g) and avoided adults (>1 kg) throughout the year. Subadults (501-1000 g) generally were caught in proportion to availability. Owls caught more males than females, despite the sex ratio of live-trapped rabbits being statistically equal.

Unfortunately, the explanations for why Eagle Owls selectively preyed upon certain age/sex classes of rabbits were convoluted and weak. Nonetheless, this paper stands out among the hordes of raptor food habits studies because it goes far beyond the mere listing of prey items.—Jeff Marks.

49. Association of birds with monkeys in Costa Rica. S. Boinski and P. E. Scott. 1988. Biotropica 20:136–143.—Double-toothed Kites (*Harpagus bidentatus*), Gray-headed Tanagers (*Eucometis pencillata*), and Tawny-winged Woodcreepers (*Dendrocincla anabatina*) feed on arthropods and small vertebrates flushed by monkeys, especially squirrel monkeys (*Saimiri oerstedi*). These species are normally considered to be ant-following species, but apparently will also follow monkey troops, especially when the monkeys are foraging and traveling.—Robert C. Beason.

50. Winter food of the Snowfinch *Montifringilla nivalis*. [Zur Winternahrung des Schneefinken *Montifringilla nivalis*.] C. M. Wehrle. 1989. Ornithol. Beob. 86:53–68. (German, English summary).—The Snowfinch (Ploceidae) is a high altitude species of the Swiss

Alps. Winter flocks feed in snowfree patches of ground which contain the seeds from 21–32 species of plants. Food choice experiments using 4 hand-reared birds revealed a preference for *Trollius europaeus, Cirsium spinoissimum, Potentilla aurea,* and *Alchemilla alpina.* Although these species had small seeds, they had high caloric and protein content which resulted in the birds maximizing their rates of energy gain. Commercial bird food at feeders was used only in extremely cold weather and when the ground was snow-covered. The study lacks good direct data of food choice by Snowfinches. Stomach contents were analyzed from 14 birds, but only 5 had any identifiable materials.—Robert C. Beason.

51. Discriminant analysis of Lepidopteran prey characteristics and their effects on the outcome of bird-feeding trials. D. B. MacLean, T. D. Sargent, and B. K. MacLean. 1989. Biol. J. Linnean Soc. 36:295–311.—Free-flying insectivorous birds were allowed to choose between 213 species of adult butterflies and moths in 348 feeding trials. The dead insects were presented in groups of six at each trial. Although a complete list of avian predators is not given, the four most abundant species were Blue Jays (*Cyanocitta cristata*), Black-capped Chickadees (*Parus atricapillus*), White-breasted Nuthatches (*Sitta carolinensis*), and Tufted Titmice (*Parus bicolor*). The prey characteristics that were preferred by the birds were (1) large size, (2) bark-like appearance, (3) warning coloration, (4) woody generalist, (5) dead-leaf appearance, (6) woody specialist, and (7) medium size. The features least attractive to the birds were (1) small size, (2) mimetic appearance, (3) butterfly-like, (4) herbaceous specialist, (5) black-and-white coloration, (6) extra large size, (7) overall generalist. The authors do not present any information about between species difference or even how many visits each avian species made to the feeding station. The paper contains some useful information about prey selection by insectivorus birds, but the authors concentrated more on the statistical analyses than on the biological significance of their findings. [Dept. Biol. Sci., Youngstown State Univ., Youngstown, OH 44555 USA]—Robert C. Beason.

52. Time constraints and vigilance: breeding season diet of the Dotterel (*Charadius morinellus*). I. Byrkjedal. 1989. J. Ornithol. 130:293–302. (English, German summary.)—Female Dotterels are polyandrous; males provide all parental care. Analysis of fecal material, stomach contents, and feeding behavior indicated that 38–89% of the diet consisted of adult insects (Coleoptera and Tipulide). Dipteran larvae made up 0–45%. During incubation and chick rearing, males consumed more adult insects, which are readily detectable but less profitable, than did females. This is interpreted to be a result of constraints imposed by parental responsibilities. [Museum of Zoology, Univ. of Bergen, N-5007 Bergen, Norway]—Andrea Dinep.

53. Assimilation efficiency in birds: a function of taxon or food type? G. Castro, N. Stoyan, and J. P. Myers. 1989. Comp. Biochem. Physiol. 92A:271–278.—The assimilation efficiency of birds is dependent primarily on the type of food ingested. The average assimilation efficiencies are: plant material, 40%; fruit, 41%; seeds, 78%; invertebrates, 74%; fish, 77%; and meat, 78%. This mini review also contains an extensive annotated table showing the type of food eaten and the assimilation efficiency for many avian orders and species. It should provide a valuable reference to workers investigating feeding efficiencies. [Acad. Natural Sci., 19th & Parkway, Philadelphia, PA 19103 USA]—Robert C. Beason.

54. Gut retention times of experimental pseudoseeds by Emus. M. F. Willson. 1989. Biotropica 21:210–213.—Captive Emus (*Dromaius novaehollandiae*) were fed buttons and beads having specific gravities similar to real seeds to determine how long they are retained by the birds' digestive systems. About half of the pseudoseeds were passed after 2 days, but several were held for over 1 week and some for up to several weeks. Shape did not appear to influence retention times. [Dept. Ecol., Ethol., & Evol., Shelford Vivarium, 606 Healey St., Univ. of Illinois, Champaign, IL 61820 USA]—Robert C. Beason.

55. The food of some young seabirds on Fair Isle in 1986–1988. J. D. Wilson and A. G.Weir. 1989. Scottish Birds 15:119–125.—During the 1980s some of Shetland's seabird species have declined and breeding success has been low. Changes in food supplies have been suggested as contributing to the problem. In this study food samples were obtained from several gulls, terns, alcids, and shags (*Phalacrocorax aristotelis*). Food samples ranged

from regurgitations of chicks, to fish dropped by birds caught in mist nets, to fish dropped in colonies, to fish identified during observations from a blind—thus the extent to which these reflect actual diets of the birds is subject to varying interpretations. Problems with the data set are addressed. Sandeels (*Ammodytes* spp.) were present in the diet of all species. Variability in proportions of sandeels fed to chicks of different species and in sizes of sandeels in samples of different years led the authors to suggest a need for study of sandeel population dynamics as a foundation for understanding the problems in bird populations. [Institute of Terrestrial Ecology, Banchory, Kincardineshire AB3 4BY, Scotland]—Jerome A. Jackson.

SONGS AND VOCALIZATIONS

56. Addition of song-related neurons in Swamp Sparrows coincides with memorization, not production, of learned songs. K. W. Nordeen, P. Marler, and E. J. Nordeen. 1989. J. Neurobiol. 20:651–661.—Twenty-four Swamp Sparrows (*Melospiza georgiana*) were collected when 2 to 20 days old, hand-reared in isolation and trained with tutorial tapes until 65 days of age. Birds were sacrificed and the brains examined using thionin during the peak period of song acquisition. During the period of song acquisition (20–60 days of age), there was a large increase in the number of neurons to both the nucleus HVc and Area X, both major song control areas of the brain. The addition of neurons to HVc did not affect the density of neurons within it but did significantly increase HVc's volume. In Area X, both the neuron density and the volume of Area X increased significantly. The song nuclei lMAN and RA did not show significant changes in neuron numbers during this period, but did show decreases in neuron density, with RA also showing an increase in volume. From the time when the birds began producing subsong (70 days of age) until they "crystallized" their final pattern of song (340 days), the number of neurons within HVc, Area X, lMAN, and RA did not show any significant changes; nor were there any significant changes in volume or neuronal densities. In the Swamp Sparrow, increases in some song nuclei (HVc and Area X) occur when the bird is memorizing a song model (song acquisition), but not when the bird begins practicing song production (sensorimotor learning). [Univ. of Rochester, Rochester, NY 14627 USA]—Robert C. Beason.

57. Microgeographic variation in songs of the Yellowhammer, *Emberiza citrinella*, at the dialect border in northern Germany. [Geographishe Variabilität des Gesanges der Goldammer, *Emberiza citrinella,* im norddeutchen Dialekt-Grenzgebiet.] M. Glaubrecht. 1989. J. Ornithol. 130:277–292. (German, English summary.)—Four new song endings were discovered. Song variants are more homogeneously distributed in north Germany than Denmark. Glaubrecht suggests two main dialect categories—"zity" and "tysieh"—for known song-end variations, based on non-overlapping geographic distributions. Sub-dialects may, in part, be due to misimprinting and small, isolated populations. [Tunnkoppelstieg 17, D-2000 Hamburg 67, West Germany]—Andrea Dinep.

58. Communication and the cadence of birdsong. L. D. Beletsky. 1989. Am. Midl. Nat. 122:298–306.—Several hypotheses have been proposed to explain why birds pause regularly while singing. Most of these hypotheses consider intersong intervals (ISIs) to be "empty spaces" without signal value per se. The author extracted from the recent literature typical song durations and song rates for a variety of temperate zone birds. From these he calculated approximate ISIs. In addition, he measured ISIs for several individuals from each of four species from tape recordings. The data reveal that the songs of many species vary from ca. 1–4 s, while ISIs are longer, with most ranging from 7–13 s. Regular ISIs may benefit an advertising male by signaling his "singleness," which helps to insure that his vocalizations are associated with him. Regular ISIs could also facilitate localization of singing males by females, the males being intially chosen acoustically from a variety of songs. Finally, regularly dispersed ISIs may benefit males by reducing intrusions by conspecifics on their territories. Thus, ISIs may be more than just "empty spaces" in song repertoires, and may have significant roles in avian communication. [Dept. of Zoology, NJ-15, Univ. of Washington, Seattle, WA 98195 USA]—Danny J. Ingold.

BOOKS AND MONOGRAPHS

59. History of the Nuttall Ornithological Club 1873–1986. W. E. Davis, Jr. 1987. Mem. Nuttall Ornithol. Club No. 11. 179 pp., hardcover. $20.00. [Available from: The Nuttall Ornithological Club, c/o Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138]—The Nuttall Ornithological Club (NOC) of Cambridge, Massachusetts, was founded in November 1873 and thus became the earliest of North American organizations devoted to ornithology. In addition to its longevity, the NOC is important in ornithological history for its role as a "springboard" for the launching of the American Ornithologists' Union and for the *Bulletin of the Nuttall Ornithological Club* which was transferred from the Club by its editor, J. A. Allen, to the nascent AOU and metamorphosed into *The Auk*. The Club has been nurtured by the membership of many of the most prominent North American ornithologists of the past century and such other notables as Theodore Roosevelt. At the same time it provided camaraderie, contacts, and encouragement that have been significant in advancing the careers of many ornithologists.

Although Batchelder (Memoirs of the Nuttall Ornithol. Club, No. 8, 1937) chronicled the history of the Club from 1873 to 1919, Davis returns to its founding and expands on Batchelder's work. An introductory chapter highlights the accomplishments of members, growth in membership and financial assets, nature of meetings and programs, and the basic changes that have occurred in the Club over the years. Chapters 3 and 4 focus on the long tenures of two NOC presidents, Glover M. Allen (1919–1942) and James L. Peters (1942–1952).

A useful resource provided as Chapter 7 of the history are 43 pages including brief biographical information for 178 members and former members. These do not include members who died or resigned before 1973, when the Club last published outline biographies of its members. Appendices provide tabulation of NOC officers and members, NOC publications, and the NOC Bylaws.

Numerous black-and-white photographs contribute greatly to the interest and value of the history. There is no index, and one including both people and birds mentioned would have been useful.

In many ways the Nuttall Ornithological Club is like local bird clubs—or for that matter, any other kind of small club. It has been dominated by individuals who were idolized by some and hated by others. It has been divided by personal feuds and personality clashes. It excluded women until 1974 (except for two female corresponding members very early in its history)! The foundation for the greatness of the NOC in my opinion lies in the greatness, loyalty, and generosity of its members; the persistence in the pursuit of a narrow common interest—the study of birds; affiliation with academic ornithology; and the strength of its publications. This publication will be an important resource for those interested in the history of American ornithology.—Jerome A. Jackson.