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RECENT LITERATURE

Edited by Jerome A. Jackson

BANDING AND LONGEVITY

(see also 4)

1. **Temporal and geographic estimates of survival and recovery rates for the Mallard, 1950 through 1985.** D. S. Chu and J. B. Hestbeck. 1989. U.S. Dep. Inter. Fish Wildl. Serv., Fish Wildl. Tech. Rep. 20.—This is a compilation of tables of statistics relative to the population dynamics of banded Mallards (*Anas platyrhynchos*). Survival and recovery rates were estimated only for populations that had >100 birds banded for at least 3 consecutive years and had direct recoveries. Many geographic gaps remain in our knowledge of Mallard population dynamics, but these tables can be used to examine temporal and geographic variation in Mallard survival and recovery rates in North America.—Jerome A. Jackson.

MIGRATION, ORIENTATION, AND HOMING

(see also 1, 12, 13, 29, 33, 45, 57)

2. **Seasonal occurrence, body mass and fattening of migratory birds in northern Algeria during autumn migration.** [Herbstlicher Durchzug, Körpergewichte und Fettdeposition von Zugvögeln in einem Rastgebiet in Nordalgerien.] F. Bairlein. 1988. Vogelwarte 34:237–248 (German).—The author mist-netted migrants in 1985 and found that trans-Saharan migrants arrived earlier, had moderate fat deposits and medium to high body mass, and gained weight while stopping over in Algeria. He noted that those birds wintering north of the Sahara arrived later, were of normal body mass, and did not subsequently gain weight. His data support the belief that many trans-Saharan migrants cross the Mediterranean and Sahara in stages, rather than in one long flight.—Malcolm F. Hodges, Jr.

3. **Home range and dispersal of Great Gray Owls in northeastern Oregon.** E. L. Bull, M. G. Henjum, and R. S. Rohweder. 1988. Raptor Res. 22:101–106.—Great Gray Owls (*Strix nebulosa*) equipped with radio transmitters were monitored from 1982–1986. Considerable variability was observed in local movements, dispersal, and home range size among juveniles and adults, and between years for the same bird. Maximum distance adults of both sexes traveled from nest sites averaged 13.4 km, and home range size averaged 67.3 km^2. The majority of adults (ca. 85%) spent winters in areas where snow depths were <40 cm. Six of eight adults followed for two or more winters returned to the same area in more than one winter. All adults returned to the same area to nest between years. The maximum average distance traveled by juveniles from natal sites in their first year was 18.5 km, and home range size averaged 157 km^2.

Movements of Great Gray Owls reported here are considerably less than those of other studies and are possibly a function of topography, since owls had to travel only a short distance to change elevation, snow depth, and probability of food availability.—D. J. Ingold.

4. **Seasonal distribution and site fidelity in Great Lakes Caspian Terns.** L. L'Arrivee and H. Blokpoel. 1988. Colonial Waterbirds 11:202–214.—The authors analyzed 1126 recoveries of Caspian Terns (*Sterna caspia*) which represent about 5% of the birds banded from 1959–1982 in colonies on Lakes Ontario, Huron, and Michigan. These recovery data were analyzed to determine seasonal distribution of the birds, and assess fidelity to natal colonies. Recoveries of adult birds in the breeding season suggest that birds fledged on the Great Lakes return there annually. During the spring and fall migration, terns move primarily along the Atlantic coast. The terns winter primarily along the southern Atlantic coast, Caribbean islands, Venezuela, Colombia, and Central America. Juvenile birds use the same wintering grounds and migration routes as adults, suggesting that they may travel as family groups. Immature birds (6–18 months) spend their first and second winters on the adult range without returning to the breeding grounds. Sub-adult (18–30 months)

dispersal differs from other age classes, and these birds apparently have a greater tendency to wander.

There was no recorded interchange between adults of Great Lakes colonies and those in Washington and California. More than 70% of adult birds returned to their native lake. However, about 10% of adult recoveries for birds banded at Lake Michigan colonies were from Lake Huron, and 25% of recoveries of birds banded in Huron colonies were from Lake Michigan. Analysis of recoveries in and outside of 10-minute breeding blocks suggests that most Caspian Terns probably did not return to their natal colony.—William E. Davis, Jr.

POPULATION DYNAMICS

(see also 1, 3, 4, 14, 17, 20, 22, 29, 57)

5. Status and breeding ecology of the Black Tern (*Chlidonias niger*) in New York. J. R. Carroll. 1988. Kingbird 38:159–172.—Evidence from the Breeding Bird Survey and inclusion of the species on the *American Birds* Blue List since 1978 suggest widespread decline in populations of the Black Tern. From 1965 to 1987 the number of Black Terns reported during fall migration along the upper Niagara River plummeted from 5500 to 60. The number of colonies in New York decreased from 52 (pre-1980) to 31 (post-1980) and the number of pairs decreased at all colonies. Possible causes of the decline in New York include: loss of marsh habitat, changes in marsh management, and pesticide contamination. Increased competition for food on the wintering grounds in Panama could also influence numbers. The author calls for a thorough survey of the historic colonies of New York, investigation of the factors that affect productivity, acquisition of marsh habitat, and experimentation with marsh management. This excellent review should draw much needed attention to the status of the Black Tern in New York. Other states where the Black Tern occurs should follow suit with similar reviews.—R. Todd Engstrom.

6. Waders (Charadrii) and other shorebirds at Cape Recife, Algoa Bay, South Africa: seasonality, trends, conservation, and reliability of surveys. J. A. Spearpoint, B. Every, and L. G. Underhill. 1988. Ostrich 59:166–177.—On 126-foot surveys of a 4-km coastal strip from September 1978 to July 1988, two observers independently counted shorebirds. Several species of Palearctic shorebirds overwintered in good numbers, while others left entirely. Counts of the more conspicuous shorebirds were less variable than those for cryptic species. Because of 3-year cycles of abundance for certain Palearctic shorebirds, the authors recommend that surveys run for at least 2 years (including years of high and low numbers). Conservation of the Cape Recife area is discussed.—Malcolm F. Hodges, Jr.

7. A history of the status of the Tree Sparrow (*Passer montanus*) in the British Isles. J. D. Summers-Smith. 1989. Bird Study 36:23–31.—This study reviews published data to summarize the changes in numbers and distribution of Tree Sparrows. Tree Sparrows are mainly found on farmlands in the lower lying parts of the British Isles where the annual rainfall is less than 800 mm. Population sizes were greatest around the turn of the century, declined during the period 1930–1955, and increased dramatically from 1960–1978. The breeding population is estimated to have been about 130,000 pairs in 1950, 850,000 pairs in the mid 1960s, and 250,000 pairs in 1985. Increases in population numbers coincide with an extension of range north and west, possibly the result of the immigration of the expanding population from continental Europe.—Robin Densmore.

8. Is avian mortality preprogrammed? E. Curio. 1989. Trends in Ecol. Evolution 4:81–82.—Temperate passerines have far shorter life spans, on average, than do tropical passerines. The question posed by Curio is "Do temperate environments select for shorter life spans, perhaps because of the high cost of reproduction, than tropical environments?" Data are cited from a variety of studies suggesting that temperate passerines may age "more rapidly" than tropical species. For instance, signs of aging have been reported for Great Tit (*Parus major*) in that 4-year-old males have less of an ability to hold territories than younger birds, and females exhibit reduced mothering skills when they reach 4 years old. In contrast, two African passerines can breed effectively when 18–19 years old. Contrary to popular belief, avian mortality in the temperate zone may increase with age, rather than being a constant probability from one year to the next. Several British songbirds introduced to New Zealand (where the climate is moderate) seem to outlive their British counterparts, so environmental severity may have a strong influence on life span. Curio suggests the hypothesis that temperate species are selected for high clutch size and early senescence, due to climate severity.—John C. Kricher.

9. Effects of weather on the breeding ecology of Vesper Sparrows in Iowa crop fields. J. E. Perritt and L. B. Best. 1989. Am. Midl. Nat. 121:355–360.—Vesper Sparrow (*Pooecetes gramineus*) breeding success and territory characteristics were compared during two breeding seasons in row-crop fields in central Iowa. During the wetter year, crops were planted later, cultivated less, and crop-canopy closure was delayed. Territories during the wetter year were smaller and consisted of greater numbers of nonproductive agricultural areas (other than fence rows) such as weed patches and grass waterways. During the wetter year, sparrow pairs produced an average of 0.95 successful nests in contrast to 0.59 during the drier year. This difference may be explained in part by an extended breeding season during the wetter year resulting from delayed crop-canopy closure and reduced crop cultivation. Even so, breeding success during the wet year was not sufficient to maintain stable population levels.—D. J. Ingold.

10. Louisiana Waterthrushes in Washington County: results of the 1988 Minnesota county biological survey work. B. C. Eliason and B. A. Fall. 1989. Loon 61:34–37.—Potentially suitable habitat was surveyed for breeding Louisiana Waterthrushes (*Seiurus motacilla*) which are believed to have declined in Minnesota. With the use of tape-recorded waterthrush songs, 11 territorial males were located at eight locations. On six of the 11 territories, birds were detected that were judged to be females. Habitat characteristics associated with most of these breeding pairs included the presence of a permanent stream with steep-sided valleys and numerous trees. These data double the number of possible breeding territories that have been recently reported statewide.—D. J. Ingold.

11. Double-crested Cormorant and Anhinga nesting in the Croatan National Forest. V. Doig, J. M. Hagan, and J. R. Walters. 1989. Chat 53:1–4.—Observations on nesting of Double-crested Cormorants (*Phalacrocorax auritus*) and Anhingas (*Anhinga anhinga*) on lakes in the Croatan National Forest of North Carolina are reported. From 1983 to 1988 breeding pairs increased, from 32 (1984) to 46 (1988) for cormorants and from 3 (1985) to 14 (1988) for Anhingas. Foraging areas and reasons for the increases are briefly discussed.—Malcolm F. Hodges, Jr.

12. Late spring arrival and dull nuptial plumage: aggression avoidance by yearling males? G. E. Hill. 1989. Anim. Behav. 37:665–673.—In many migratory passerines first-year males arrive after older males and have less brightly colored plumage. Two hypotheses have been proposed to explain this pattern: (1) first year males are at an energetic disadvantage during the winter and this causes the dull plumage or the late arrival or both; (2) first-year males are unable to compete on the breeding grounds with older males for good territories and/or females, and both the dull plumage and late arrival allow them to avoid fights that they couldn't win anyway. These hypotheses were evaluated by presenting mounted male Black-headed Grosbeaks (*Pheuticus melanocephalus*) in full adult plumage, bright first-year plumage, and dull first-year plumage to territorial males early and late in the period of territory establishment and mating. Overall aggression levels declined substantially between the early and late trials, and in each period aggressive levels were highest toward adult-plumaged mounts and lowest toward dull-plumaged, first-year mounts. Thus, the hypothesis that both dull plumage and late arrival decrease aggression from adult males was supported in this experiment. In a second experiment, arrival times of first-year males were recorded at two sites separated phenologically by about 10 days but by only 25 km. First-year males arrived at the early site 8 days before they arrived at the later site. The author argues that males were certainly capable energetically of covering the intervening 25 km in a short time, and he therefore rejects the hypothesis that late arrival of first-year males is caused by energetic constraints.—Jonathan Bart.

13. Hop, skip, or jump? Constraints on migration of arctic waders by feeding, fattening, and flight speed. [Hink, stap of sprong? Reisbeperkingen van arctische steltlopers door voedselzoeken, vetopbouw en vliegsnelheid.] T. Piersma. 1987. Limosa 60:185–194. (Dutch, English summary.)—This is a progress report on research concerning three alternative travel schemes used by waders traveling from the west coast of Africa in spring to Arctic breeding grounds. The hop technique involves a series of multiple short flights and stops and is characterized by the Ruddy Turnstone (*Arenaria interpres*). The skip consists of many fewer stopovers and much longer flights between stops than the hop and is characterized by the Dunlin (*Calidris alpina*) and Redshank (*Tringa totanus*). Lastly, the jump may involve as few as one stopover between the African departure and arrival in the Arctic. This applies to the Red Knot (*Calidris canutus*) and Bar-tailed Godwit (*Limosa lapponica*). The short hops are considered energetically cheaper than covering the same distance in one long flight because of the cost of transporting the extra feed (fat). Hopping also entails smaller risks of fattening and timing delays. Long flights are apparently not made by many waders because of limited availability of high quality feeding (stopover) habitat.—Clayton M. White.

NESTING AND REPRODUCTION

(see also 9, 21, 23, 24, 25, 26, 27, 31, 32, 33, 34, 37, 41, 51, 52, 57)

14. Breeding and moult of the Anteating Chat *Myrmecocichla formicivora*. R. A. Earle and J. J. Herholdt. 1988. Ostrich 59:155–161.—From April 1985 to February 1987, Earle and Herholdt studied Ant-eating Chats in an area with about 10 breeding pairs. This is a cooperative breeding species, with young of the year helping with later broods. Although they had definite home ranges, family groups did not defend them from other groups, and territories overlapped in some cases. A possible explanation given is that this species is more adaptable in choice of nesting sites than strongly territorial congeners, and thus has less need to defend territories, since nest sites are not a scarce commodity. The authors did not address the abundance of food, which may have played a great role in this species' lack of aggressive territoriality. After a post-breeding dispersal, the study area was reinhabited by mostly different individuals than those from the previous year; i.e., Ant-eating Chats in this study were not strongly philopatric. Information is also provided on population trends, nest-site selection, dates and periods of egg-laying, incubation, and nestling period. Growth of nestlings was analyzed and found to be similar to that of other tropical thrushes. Breeding success was high, with a fledgling-egg success rate of 41.8%. The sex ratio of fledglings was skewed (0.57 m:1 f), but was more even for adults (0.9 m:1 f), possibly due to higher death rate for females, which may have been even less philopatric than males. Molt pattern is also described.—Malcolm F. Hodges, Jr.

15. Unique shape of a Bachman's Sparrow nest. B. Meanley. 1989. Chat 53:12–13.—The author located a Bachman's Sparrow (*Aimophila aestivalis*) nest with four eggs in Croatan National Forest, North Carolina, in May 1987. This ground nest possessed a 7-cm long elevated shelf leading to the interior of the cup (which was 8.5 cm long). The nest was constructed mostly of panic grass (*Panicum* sp.).—D. J. Ingold.

16. Reproductive effects of nest-marking studies in an American White Pelican colony. D. E. Boellstorff, D. W. Anderson, H. M. Ohlendorf, and E. J. O'Neill. 1988. Colonial Waterbirds 11:215–219.—In a 1981 study to evaluate organochlorine residues in American White Pelican (*Pelecanus erythrorhynchos*) eggs, the authors removed a sample-egg from each of 26 nests at the pelican colony at Lower Klamath National Wildlife Refuge, near the California-Oregon border. They then followed the nesting success of disturbed and other nests in the Klamath colony, and at the nearby undisturbed Clear Lake colony in order to assess any disturbance-related differences in fledging success. Both colonies were monitored for fledging success the following year. Three visits were made to the Klamath colony after egg collection, but none was made to the Clear Lake colony in 1981, nor to either colony in 1982. Most censusing was done with fixed-wing aircraft. In 1981 the Clear Lake colony fledged 1.18 young/nest (y/n), while the disturbed Klamath Lake colony fledged only 0.51 y/n. The nests from which eggs had been collected fledged only one young for a

0.08 y/n average. In 1982 the Klamath colony fledged 1.03 y/n, and the Clear Lake colony 1.09 y/n. The authors attributed the lowered fledging success in 1981 to their disturbance because they observed (1) a differential effect from the most to the least disturbed parts of the colony, (2) abandonment during some of their visits, and (3) comparable fledging success in both colonies in 1982 when the nests were not disturbed.

The authors suggest the "sample-egg" technique could seriously impair productivity in American White Pelicans and should not be used in pelican reproductive studies.—William E. Davis, Jr.

17. Habitat selection and nesting biology of roof-nesting Glaucous-winged Gulls. K. Vermeer, D. Power, and G. E. J. Smith. 1988. Colonial Waterbirds 11:189–201.—Reports of successful rooftop nesting by Glaucous-winged Gulls (*Larus glaucescens*) in Vancouver, British Columbia, Canada, date back to 1962, but this phenomenon has become more common in recent years. A 1986 survey of buildings provided data including presence or absence of roof-nesting gulls, height and roof area of buildings, roof structures such as vents and chimneys, and the distance of each building from water. A nesting study, in which eggs were measured and marked and chicks followed through fledging, was done in a colony of 80 pairs and at dispersed nesting sites. In the study area 136 nests were located on 34 of 126 roofs. The average density of nests was one pair/ha of roof, with 3.2 pairs/ha for roofs with nesting gulls. About 200 pairs nested on roofs outside of the study area. Twenty-five of the roofs were flat, and the peaked roofs which supported nests had flat parts where gulls nested or structures which provided support for the nests. The gulls showed a preference for roofs nearer the water and near other roofs with nesting gulls. Of the dispersed nesters, 90% nested within 0.5 m of an edge or structure, in comparison to 44% for colony birds. Colony gulls began egg-laying a week earlier than dispersed nesters, but mean clutch size for all nest dates between the groups did not differ significantly. However, among the combined groups, early egg-layers had significantly larger clutches. The fledging success was significantly higher for dispersed birds. More chicks were pecked to death in the colony, and predation rates on eggs, presumably by gulls, was higher.

The authors suggest that roof-nesting gulls, like island-nesting gulls, may be spared mammal predation. The roofs, however, except for roof structures, provide little shelter from storms. Bimodal clutch initiation in the colony suggests that a group of older birds nest early while a younger, inexperienced group nests late. The dispersed birds showed no bimodality and are probably older birds. The authors end with a discussion of potential problems relating to roof-nesting and the probable need for control if the roof-nesting population continues to expand.—William E. Davis, Jr.

18. Factors promoting polygyny in European birds of prey—a hypothesis. E. Korpimäki. 1988. Oecologia 77:278–285.—Polygyny has been documented in wild populations of nine falconiform and seven strigiform species in Europe. Korpimäki suggests that an abundant food supply and nomadic breeding dispersal are the two most important factors promoting polygyny in raptors. His hypothesis predicts that (1) polygyny is more common in raptors that eat rodents vs. those that eat birds; (2) polygyny is more frequent in "good" vole years than in poor ones; (3) frequency of polygyny in vole-eating raptors should increase with latitude (peak vole densities increase with latitude in Europe); (4) supplementary feeding should increase both frequency of polygyny and harem size; and (5) polygyny is more common in nomadic raptors with annual pair bonds and weak territoriality than in resident, territorial species with perennial pair bonds.

Data gleaned from the literature and Korpimäki's own long-term data on Eurasian Kestrels (*Falco tinnunculus*) and Boreal Owls (*Aegolius funereus*) provide widespread support for all but prediction 4, which suffers for lack of support simply because few supplementary feeding experiments have been attempted with raptors. This paper also briefly considers why the polygyny threshold model and the "sexy son" hypothesis fail to explain polygyny in polyterritorial raptors.—Jeff Marks.

19. Nest cavity size and clutch size of Pied Flycatchers *Ficedula hypoleuca* breeding in natural tree-holes. R. V. Alatalo, A. Carlson, and A. Lundberg. 1988. Ornis Scand. 19:317–319.—Nest-box studies provide the basis for most of what is known about the biology of cavity-nesting passerines. Several studies of flycatchers (*Ficedula*) and tits (*Parus*) have documented reduced clutch sizes in small nest boxes and suggested that the relationship is adaptive. Furthermore, studies have shown that flycatchers lay smaller clutches in natural cavities than in nest boxes, presumably because the cavities are smaller than in the boxes. Yet, few studies have examined the characteristics of natural tree cavities. Toward correcting this deficiency, Alatalo et al. measured the size (nest-bottom area and cavity volume) of natural nest cavities used by Pied Flycatchers and assessed the relationship between cavity size and clutch size. They also compared clutch sizes in cavities with those in nest boxes.

From 1983 to 1985, clutch sizes and cavity dimensions were recorded at 74 nests in natural cavities and 194 in nest boxes in central Sweden. As one might expect, the size of natural cavities varied widely. Contrary to previous suggestions, (1) natural cavities used by Pied Flycatchers were not smaller than nest boxes, (2) there was no correlation between cavity size and clutch size, and (3) clutch size differences between cavities and boxes were small or absent. Thus, for Pied Flycatchers, variation in cavity area does not affect clutch size in natural cavities, and clutch-size data from nest boxes should reflect the natural situation.—Jeff Marks.

20. The cost of reproduction in birds: an examination of the evidence. N. Nur. 1988. Ardea 76:155–168.—The author examined the notion that the cost of reproducing large broods of young reduces adult survivorship. The author reviewed six studies that manipulated brood size; five provided evidence of reduced survival or future fecundity. They were studies on: Pied Flycatcher (*Ficedula hypoleuca*), Tree Swallow (*Tachycineta bicolor*), Blue Tit (*Parus caeruleus*), two on Great Tit (*Parus major*), and the Rook (*Corvus frugilegus*). After reviewing these studies the author presented a model which predicts that if females optimally adjust clutch size to conditions, then there will often arise a positive correlation between clutch size and observed survival. He then reviewed four non-manipulated studies that provided support for the existence of adaptive adjustments of clutch size and also a cost of reproduction. These studies concerned the Song Sparrow (*Melospiza melodia*), Black-billed Magpie (*Pica pica*), Great Tit, and Pied Flycatcher. Nur concluded from the empirical data that there was good support for the hypothesis of higher cost of reproduction associated with rearing larger broods.—Clayton M. White.

BEHAVIOR

(see also 8, 12, 14, 33, 44, 53, 55, 56, 57)

21. Polyterritoriality and deception in passerine birds. H. Temrin and A. Arak. 1989. Trends in Ecol. Evol. 4:106–109.—Polyterritoriality occurs when a male bird defends two spatially separated territories, attempting to attract females to both. This paper is a brief review of the hypothesis that males of such polyterritorial species as the Pied Flycatcher (*Ficedula hypoleuca*) are attempting to deceive females, "tricking" them into polygynous polyterritorial relationships, because each is unaware of the other. The authors argue that polyterritorial males act sufficiently distinctly from monogamous males that females could accurately assess such males, and thus are not fooled, but, rather, enter such relationships willingly. Data from a Norwegian study suggest that the highly constricted breeding season may select for females to choose an established male, even if such a male has another mate. Other examples from studies on Wood Warbler (*Phylloscopus sibilatrix*) and Great Reed Warbler (*Acrocephalus arudinaceous*) are cited as supporting the hypothesis.—John C. Kricher.

22. Territory acquisition and loss in male Song Sparrows. P. Arcese. 1989. Anim. Behav. 37:45–55.—Birds are generally assumed to obtain breeding territories by settling in vacant areas rather than by displacing existing territory holders. In this 5-year study, however, resident Song Sparrows were frequently displaced either by floaters or neighbors. The author observed 206 cases of floaters gaining territories and in 76% of them, a resident bird lost part or all of its territory. In the remaining cases the territory was temporarily vacant due to disappearance of the former owner. Arcese also observed 42 cases in which a territory holder appropriated >75% of a neighbor's territory. In contrast, there were only

44 cases of a resident gaining territory by taking over the former territory of a neighbor who disappeared. Thus, active take-over was a major mechanism for gaining, or expanding, territories by both floaters and territory holders. Detailed information is presented on frequency of territory turn-over by time of year and age of the individuals involved and on subsequent success of birds gaining and losing territories.—Jonathan Bart.

23. An extreme case of polygyny in the European Starling (*Sturnus vulgaris*). R. Pinxten, M. Eens, L. Van Elsacker, and R. Verheyen. 1989. Bird Study 36:45–48.—Extreme polygyny was documented in a male European Starling breeding in a nestbox colony in Zoersel, Belgium in 1986. This Starling was paired with five females and fledged a total of 18 young. He assisted in the care for young at only one of these nests. Monogamous males in the same year fledged an average of 5.29 young.—Robin Densmore.

24. Activity and habitat use by a breeding male Cooper's Hawk in suburban area. R. K. Murphy, M. W. Gratson, and R. N. Rosenfield. 1988. Raptor Res. 22:97–100.—During the breeding season of 1981, a radio-tagged male Cooper's Hawk (*Accipiter cooperii*) was monitored in a small town in central Wisconsin; about 150 h of habitat use and activity data were collected. The hawk's nearly elliptical home range was <8 km^2 surrounding its nest in an oak-pine woodlot. Oak-pine woods as well as shrub savanna were preferred habitats, and it avoided residential/business and open areas during hunting and perching bouts. The hawk disproportionately used areas within its home range for both hunting and roosting and did not roost in habitats in proportion to their availability (most roosts were in pine plantations—61%, and oak-pine woods—32%). Excluding a roost at the nest, roosts occurred an average of 765 m from the nest. High altitude flights (30–100 m) were used for prey deliveries and nest departures probably to avoid mobbing by passerines, which occurred virtually all the time at low altitude flights (<30 m). Prey delivery rate ranged from 0.38/h in the late nestling period to 0.06/h during post-fledgling. The male spent an average of 9.8 min at the nest during prey deliveries. Routine use of the same area as well as routine flight routes suggest the importance of site familiarity to Cooper's Hawks and may partially explain strong nest-site fidelity in males between years.—D. J. Ingold.

25. Adaptations of Meadow Pipits to parasitism by the Common Cuckoo. A. Moksnes and E. Roskaft. 1989. Behav. Ecol. Sociobiol. 24:25–30.—Sixty-two Meadow Pipit (*Anthus pratensis*) nests were observed during three breeding seasons in Central Norway to test the hypotheses that: (1) Meadow Pipits will normally accept mimetic Common Cuckoo (*Cuculus canorus*) eggs laid in their nest, and (2) this host species will show a high degree of aggression toward cuckoos. Nests were rarely abandoned (9% of the time) that were visited and in which eggs were rearranged, or in which one host egg was removed and replaced by an artificial cuckoo egg, or near which a dummy Willow Ptarmigan (*Lagopus lagopus*) was placed. Nests in which one artificial cuckoo egg was added and no eggs were removed, and nests in which the eggs were undisturbed but an artificial adult cuckoo was placed nearby were seldom abandoned (5% of the time). However, nests in which both an egg was added (without removing a host egg) and a dummy cuckoo was placed nearby were abandoned 50% of the time.

The propensity to abandon the nest was not correlated with either the Meadow Pipit's reaction (non-aggression, mobbing, or attack) or with the number of parent birds observed at the nest. However, pipits attacked cuckoos significantly more often at nests in which both pipit parents were present.

The results of this study may have been influenced by the fact that pipit nests were observed during the incubation period rather than during the egg-laying period (when cuckoos normally lay their eggs). However, the results do suggest that the Meadow Pipit is not efficient at recognizing cuckoo eggs; the most adaptive behavior it has evolved against cuckoo parasitism is the ability to recognize whether or not it has been parasitized, provided it has observed a cuckoo in the vicinity of its nest.—D. J. Ingold.

26. Great Tits choose between food and proximity to a mate: the effect of time of day. R. Mace. 1989. Behav. Ecol. Sociobiol. 24:285–290.—Experiments in an aviary were conducted on six male/female pairs of Great Tits (*Parus major*) in order to detect potential time of day differences in the attentiveness of both sexes to their mates. When food and caged females were both kept in the inner half of a partitioned aviary, males spent a mean of 76% of their time in that half. When females were moved to the outer half, all six males spent much less time (mean 32%) in the inner half, and the time the males spent away from their mates increased from a mean of 1 min in the first twentieth to over 15 min in the last twentieth of the day.

When food and caged males were kept in the same half of the aviary, females spent much of their time (ca. 70%) in that half. When males were moved to the outer half, females divided their time about equally between halves. As with males, females spent less time with their mates as the day progressed.

These data suggest that males partition their time so as to stay near the females early in the day—a time when females may be most fertile and willing to copulate with outside males (mate guarding hypothesis). Possible functional explanations regarding the behavior of experimental females (which was similar to that of males) are discussed.—D. J. Ingold.

27. Importance of monogamous male birds in determining reproductive success—evidence for House Wrens and a review of male-removal studies. J. Bart and A. Tornes. 1989. Behav. Ecol. Sociobiol. 24:109–116.—The reproductive success of House Wrens (*Troglodytes aedon*) was examined in two groups in central Ohio: those in which both males and females of mated pairs were present throughout the nesting effort (control group), and those in which males of mated pairs were removed shortly after the young hatched (treatment group). The average number of eggs hatched per nest was not significantly different between the groups, and the number of successful nests in the treatment group was significantly lower during only one of four study periods. Cold temperatures and excessive precipitation during this period, which likely retarded the growth of invertebrates, may explain this difference. No size differences in nestlings were detected between the groups. This study provides evidence that the male in monogamous, altricial birds may be helpful in raising young during some reproductive periods, but not in others. The results of 15 other male removal studies are summarized with the general conclusion that when males appear to be helping, their absence usually results in decreased nestling survival, whereas when males offer little apparent help, their absence does not affect nestling survival.—D. J. Ingold.

28. Interspecific territoriality in *Acrocephalus*: a critical review. B. G. Murray, Jr. 1988. Ornis Scand. 19:309–313.—Most workers who have studied interspecific territoriality in birds consider it to be an adaptation that reduces competition between ecologically similar species. Murray, however, has argued for years that many cases of interspecific territoriality have a non-adaptive origin resulting from two species having features that normally elicit intraspecific aggression. In other words, interspecific territoriality is really misdirected intraspecific aggression because the aggressor thinks it is ousting a conspecific. Murray's theory has been criticized many times, although he contends that no empirical data contradict its predictions.

Several species pairs of *Acrocephalus* warblers are interspecifically territorial in Europe. Considering differences in timing of spring arrival and territory establishment and in aggressive behavior once both species have arrived, Murray concludes that interspecific aggression in the early arriving species is misdirected intraspecific territoriality.

Much of the paper is devoted to a critical evaluation of Catchpole and Leisler's work on *Acrocephalus* warblers. These authors respond with a thoughtful rebuttal (Ornis Scand. 19:314-316, 1988) that includes a discussion of the ability of birds to discriminate among species.—Jeff Marks.

29. Does dominance determine how far Dark-eyed Juncos, *Junco hyemalis*, migrate into their winter range? C. M. Rogers, T. L. Theimer, V. Nolan, Jr., and E. D. Ketterson. 1989. Anim. Behav. 37:498-506.—These authors evaluated the ability of the dominance hypothesis to explain differential migration among age-sex classes of birds. In many migratory species, certain age and sex classes, usually the females and young, winter farther south than the remaining classes. The dominance hypothesis explains this pattern by assuming that individuals wintering farther south are subordinate to those wintering in the north and would suffer reduced survival if they had to compete with dominants in more northern areas. Juncos provide a good test species for the dominance hypothesis because, in contrast to most species, young birds winter farther north than older birds. The dominance hypothesis thus predicts that young birds should be dominant, during the winter, to older birds. The prediction seems unlikely because young birds are usually subordinate to older ones, and in juncos specifically this has been found to hold on the breeding ground. The authors tested the dominance hypothesis by capturing young birds from the northern portion of the wintering grounds and older ones from a more southerly location and testing them in dyadic encounters. Older birds were clearly dominant. The authors also tested birds of the same age and sex class and found no difference in dominance between birds from northern and southern areas. The authors argue that their results invalidate the "straightforward prediction(s)" of the dominance hypothesis about which birds should win encounters, but they do not rule out a role of age-sex-specific dominance relationships in determining wintering sites. Instead, they argue that the process is complex, and probably involves several factors, and that when these are better understood dominance relationships may still turn out to be one of the important factors determining where individuals spend the winter.—Jonathan Bart.

30. Time and place learning by Garden Warblers, *Sylvia borin*. H. Bieback, M. Gordijn, and J. R. Krebs. 1989. Anim. Behav. 37:353–360.—The authors point out that there is little evidence on whether birds can learn to visit different places at different times of day to forage or for other activities. They tested whether Garden Warblers could learn to visit each of four different rooms in an aviary during four different periods of the day. In each period, food was available in just one of the rooms. Each of five birds developed substantial ability to visit the right room at the right time, and these behaviors persisted even when all rooms contained food all day. The authors considered three possible decision rules which the birds might have used to decide when to leave a room: immediate reinforcement (leave when food is no longer present), leave after ingesting a given amount of food, and leave after a given amount of time has passed. The results show that the 3rd rule is being used, and the authors argue that the first two rules were not being used. To me, the results seemed to indicate that both the 1st and 3rd rules were being used by the birds. The authors point out that the timing (3rd) rule could involve either a circadian timer (visit room 3 from 0900 to 1100, etc.) or an hourglass timer (remain in each room for 2 h), and that these possibilities could be investigated by phase shifting the birds. They also comment briefly that the decision rule for "where to go next" could be either a sequence rule (visit room 3 first, then room 2, etc.) or a time-place map (go to room 3 between 0900 and 1100, etc.), and they note that these hypotheses could be investigated by preventing trained birds from visiting the room they would ordinarily go to first.—Jonathan Bart.

ECOLOGY

(see also 3, 9, 10, 17, 24, 46, 54, 57)

31. Habitat use and nest-site selection by Red-shouldered Hawks in Arkansas. C. R. Preston, C. S. Harger, and H. E. Harger. 1989. Southwest. Nat. 34:72–78.—Potential breeding habitats of Red-shouldered Hawks (*Buteo lineatus*) were surveyed in all of the state's major physiographic regions in order to determine their distribution and to identify nest-site characteristics. With the use of taped Red-shouldered Hawk vocalizations, individuals were detected along 10 of 14 survey routes and at 64 of 280 stops. Hawks were encountered most frequently in oak-gum-cypress habitat followed by elm-ash-cottonwood and oak-hickory habitat. All hawks were seen within 1 km of water, and none was found in oak-pine or agricultural habitats.

Nineteen nests found were distributed about equally in the three previously mentioned habitats. No structural differences among nest sites in the three habitats were detected, suggesting that site location and habitat structure are more important than tree-species composition for breeding Red-shouldered Hawks. Nests were more common in oak-gum-cypress forest than in other habitats and were frequently found in areas with a relatively tall canopy and well-developed understory. Breeding Red-shouldered Hawks appear to be adapted to forested wetland systems and their distribution is likely influenced by the availability of such sites.—D. J. Ingold.

32. Nesting and foraging habitat of Great Gray Owls. E. L. Bull, M. G. Henjum, and R. S. Rohweder. 1988. Raptor Res. 22:107–115.—Data are presented for 46 Great Gray Owl (*Strix nebulosa*) nests located in northeastern Oregon from 1982 to 1986. Most nests were on stick platforms (mostly old hawk nests), with 24% on artificial platforms and 22% on top of large, broken-topped dead trees. Most nests were in old-growth stands or stands with some large dead trees left standing, and 72% were in areas that were unlogged. Male owls feeding families foraged most in open mature stands and in stands that had been logged. Details on species composition of forests used for nesting and foraging are given, as is information on nest-site fidelity, dispersion of nests, and behavior of juveniles.

It is unfortunate that the authors used the misleading and weighted term "over-mature" to designate forests with largest trees of ≥50 cm dbh. Often used by foresters to describe old-growth forests, "over-mature" falsely suggests senility, making them seem less than vital parts of an ecosystem. It imparts only economic value to a forest and has no place in scholarly work.—Malcolm F. Hodges, Jr.

33. Ecology and behavior of southern South American Cinereous Harriers, *Circus cinereus*. J. E. Jiménez and F. M. Jaksić. 1988. Rev. Chil. Hist. Nat. 61:199–208.—Field observations made in Torres del Paine National Park, southernmost Chile, are reported on the ecology and behavior of breeding Cinereous Harriers (*Circus cinereus*). Previously published material on this species is also reviewed, so that this paper includes discussion of this harrier's taxonomy, morphology, distribution, habitat, migration, abundance, status, reproduction, behavior, and diet. Reproductive aspects of the population studied are documented with emphasis on behavior; 1620 min of observations on prey transport and transfer are analyzed quantitatively. A quantitative assessment of the Cinereous Harrier's diet is based on 1259 prey items identified among 413 regurgitated pellets collected in the study site: 33.6% of the prey (by number) was insects, 27.2% birds, 19.1% each, mammals and reptiles, and 1.0% arachnids. The biomass contribution to the diet, however, follows a decreasing order from birds, through mammals, reptiles, insects, and to arachnids. Four tables document: morphometric features, reproductive features such as dimensions of nests and eggs, observations of prey transfers from males to breeding females and prey items in pellets, which are identified to the species level in the case of mammals and birds and to the family or ordinal level in the case of insects and arachnids. The literature cited provides a useful entry to the few papers that have ever dealt with these birds.—Fabian M. Jaksić.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 1, 5, 16, 17, 19, 47)

34. Clutch size and nesting sites of the Mandarin Duck (*Aix galericulata*). A. Davies and G. Baggot. 1989. Bird Study 36:32–36.—Variability in clutch size between artificial and natural sites was studied during 1972–1985 in Surrey. Nest boxes were erected in 1978 and used beginning in 1980. During 1980–1985, roughly equal numbers of tree cavities and nest boxes were available in the study area. Mean clutch size from both natural and artificial nest sites was 16.9 eggs. The median clutch sizes for incubated eggs from natural and artificial sites were 20.8 and 15.0 eggs. During the period when both nest site types were available, clutches from natural sites were significantly larger than clutches from artificial sites. Increased availability of artificial sites did not reduce the frequency of dump-nesting in natural cavities. The total number of eggs incubated in natural sites did not change after the introduction of nest boxes into the study area. However, the average yearly number of eggs incubated in both types of nest sites increased almost four-fold after the introduction of nest boxes. Thus the provision of nest boxes resulted in the laying and incubation of additional eggs, rather than a redistribution of the same total number within the study area.—Robin Densmore.

35. A transmitter package for Eastern Bluebirds. D. H. Allen and J. R. Sweeney. 1989. Sialia 11:43–47.—Two captive Eastern Bluebirds (*Sialia sialis*) and 28 free-ranging bluebirds were equipped with transmitters weighing 7 to 9% of their body weight. The transmitters were attached on the back with harnesses made from 7.7-kg test monofilament fishing line. Twenty-four birds observed for at least 13 h each readily adapted (less than 2 h) to the transmitter package. Five birds exhibited an initial flight impairment and/or 1-d adjustment period, and one bird died 3 d after release (although this individual did not exhibit abnormal behavior upon release). Although for some bluebirds, transmitter weights may have approached their maximum loads, these data suggest that bluebirds and other similar-sized birds can be successfully fitted with transmitters of this design. However, for such a device to be successful, proper attachment is critical.—D. J. Ingold.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see also 3, 5, 6, 16, 17, 31, 32, 47, 57)

36. **Saving endangered species by translocation, are we tinkering with evolution?** S. Conant. 1988. BioScience 38:254–257.—Conant points out two groups of unpredictable effects that may occur when attempts are made to save an endangered species by translocation: (1) The new ecosystem may be harmed. For example, numerous organisms that have been introduced for pest control are causing undesirable effects. (2) Rapid evolutionary changes may occur in the translocated species. She cites Laysan Finches (*Telespyza cantans*), and a rock wallaby (*Petrogale* sp.) on Oahu, as examples of differentiation from the parent population occurring in translocated species.

She asks the question: when we translocate an endangered species, are we really saving the species or something that may become so distinct from the parent population that it must be called a new race or species? Conant cautions that care must be taken before a translocation program is begun. Thorough documentation of the source population should be among the first steps.—Lori A. Willimont.

37. **Chlorinated hydrocarbon residues in African Marsh Harrier eggs and concurrent reproductive trends.** A. C. de Kock. 1988. Ostrich 59:180–181.—Six eggs of the African Marsh Harrier (*Circus ranivorus*) were collected well after other eggs in the same nests had hatched and were examined for pesticide residues. DDT or its metabolites were present in all eggs, PCBs in four, and dieldrin in four. Two eggs had DDE levels and one egg had a level of dieldrin higher than those believed to adversely affect other raptors' eggs. The marsh harrier population in the area where the eggs were collected appears to be stable and reproductively healthy.—Malcolm F. Hodges, Jr.

38. **The sensitivity of Golden Plovers (*Pluvialis apricaria*) to human intruders.** D. Yalden and P. Yalden. 1989. Bird Study 36:49–55.—Alarm calls were used to measure distances at which Greater Golden-Plovers react to human intruders at two study sites in Peak District National Park. The Snake Summit study area experiences greater recreational pressure than does the Saddleworth Moors study area. Greater Golden-Plovers reacted to human intruders at a mean distance of 191 m at Snake Summit and 227 m at Saddleworth Moors; these means are significantly different. It is not likely that Greater Golden-Plovers will establish breeding territories near well-traveled footpaths, and the more paths opened for public use, the less area available for Greater Golden-Plover breeding grounds.—Robin Densmore.

PARASITES AND DISEASES

39. **Key to Acanthocephala reported in waterfowl.** M. E. McDonald. 1988. U.S. Dep. Inter., Fish and Wildl. Serv. Resour. Publ. 173.—This is the third in a series of keys to the helminths found in waterfowl throughout the world. The first was a key to nematodes from waterfowl (McDonald, 1974, Bur. Sport Fish. Wildl., Resour. Publ. 122), the second a key to trematodes (McDonald, 1981, Fish Wildl. Serv., Resour. Publ. 142). "Waterfowl" in these keys is used in the broad sense, to include primarily Anatidae, but also some Rallidae (e.g., *Fulica*), Gaviidae, and even Passeriformes such as the dippers (*Cinclus*).

This key to acanthocephalans includes a dichotomous key to families and genera, followed by keys to species within each genus. Eleven of the species reported are considered accidental in waterfowl, normally occurring in birds of other orders. Two normally mature only in marine mammals, and one in freshwater rodents. Another species is known only from domestic waterfowl. Intermediate hosts of these parasites have been identified as Crustacea of only a few orders, although several use fish and some use snakes or frogs as transport hosts. It was once thought that only one species of acanthocephalan could occur in an individual host, but that thought is laid to rest with the discovery of up to three species in one individual. A few species are known to cause mortality in waterfowl, although eiders are the only waterfowl in which repeated lethal outbreaks are known.—Jerome A. Jackson.

PHYSIOLOGY

(see also 2)

40. Maintenance energy requirements and energy assimilation efficiency of the Australasian Harrier. A. M. Tollan. 1988. Ardea 76:181–186.—Eighteen food trials were performed on six Australasian Harriers (*Circus approximaus*). Dry food intake was highest on a diet of fish (14.1 g/d), intermediate on 1-d-old domestic chicks (13.6 g/d), and lowest on laboratory mice (10.9 g/d). Energy requirement for maintenance was least on the mouse diet (185.9 kJ/d), intermediate on day-old chick (207.4 kJ/d), and highest on fish (241.6 kJ/d). Differences were related to relative proportions of fat, protein, and ash in the diets.—Clayton M. White.

41. Daily and seasonal variation in body mass of the Kestrel in relation to food availability and reproduction. C. Dijkstra, S. Daan, T. Meijer, A. J. Cave, and R. P. B. Foppen. 1988. Ardea 76:127–140.—The authors measured body mass variation of both male and female Eurasian Kestrel (*Falco tinnunculus*) in relation to the falcon's age, food availability, and reproduction. There was a daily increase in body mass so data were corrected by transforming them to morning weights. The authors found: (1) adults were heavier than juveniles, especially in low vole years; (2) both sexes had higher body mass in winter than summer; (3) breeding females reached maximum body mass during reproduction; non-breeding females did not show the same increase; (4) from egg hatching onwards, females dropped body mass sharply to a minimum during molt; (5) males gradually lost mass through the breeding season; and (6) late-laying females produced smaller clutches and had less body mass during the entire reproductive phase. Overall, body mass and laying data were nicely correlated with nutritional conditions.—Clayton M. White.

MORPHOLOGY AND ANATOMY

(see also 2, 49, 50)

42. Sexual dimorphism in the Azure-winged Magpie, *Cyanopica cyanea*. [Sobre el dimorfismo sexual en el Rabilargo, *Cyanopica cyanea*.] F. Alvarez and E. Aguilera. 1988. Ardeola 35:269–275. (Spanish, English summary and table captions.)—The relationship between sexual dimorphism and diet in *Cyanopica cyanea* was studied. Eight measurements (weight, tarsus length, length of claw of middle toe, tail length, wing length, bill length, bill depth, bill breadth) were recorded for 96 specimens of adults collected in various areas of Spain. Significant differences were detected in all measurements except bill breadth. Stomach contents from 71 specimens of adults were analyzed. No significant differences in diet of the sexes were found.

The authors suggest that sexual dimorphism in this species is related to behavioral differences during reproduction. I suggest another possibility is differences in foraging technique. More behavioral data should be collected and analyzed to further our understanding of these differences.—Lori A. Willimont.

43. A comparison of structures related to foraging in two closely related gulls: *Larus leucophthalmus* and *L. hemprichii*. R. W. Storer and S. M. Goodman. 1988. Ostrich 59:145–149.—The authors collected 32 White-eyed (*L. leucophthalmus*) and 12 Sooty gulls, related species sympatric in the Middle East, and examined the skeletons for morphological differences that could be related to differences in foraging behavior. The White-eyed Gull had longer neck, bill, wing tip, and *Crista fibularis* relative to the Sooty Gull, which showed wider gape, longer tarsometatarsus, and shorter middle toe than the former species. White-eyed Gulls feed in pelagic waters over shoals of small fish, while Sooty Gulls scavenge and steal their food. The possible relationship between interspecific morphological differences and foraging behavior is discussed. Males of both species also had longer bills and wider gapes than their respective females; this difference probably relates primarily to breeding behavior, but secondarily increases the niche breadth of the males.—Malcolm F. Hodges, Jr.

44. Seasonal changes in shield size in the Coot. J. Visser. 1988. Ardea 76:56–63.—This study examined data taken from 5588 captures of the Eurasian Coot (*Fulica atra*) over a 20-year period. Size of the white frontal shield was correlated with sexual maturity, sex, age, status, and condition of the individual bird. The differences can be summarized as: (1) larger shield in males than females from March through July; (2) in adults, the shield is larger in females in November and December; (3) although still developing, the shield in the juveniles may exceed that in the adult in March and April. This may be related to territory settlement by juveniles during this period. Shield size was positively related to body mass or gonad size. The shield may thus act as a signal of rank order and sexual maturity to other Coots.—Clayton M. White.

PLUMAGES AND MOLTS

(see also 12, 14, 49)

45. The seasonally divided flight feather moult in the Barred Warbler *Sylvia nisoria*—a new moult pattern for European passerines.—D. Hasselquist, A. Hedenström, Å. Lindström, and S. Bensch. 1988. Ornis Scand. 19:280–286.—The typical Palaearctic *Sylvia* warbler undergoes a complete molt in summer. Hasselquist et al. captured Barred Warblers from June–August in southeastern Sweden and discovered a molt pattern previously unknown among European passerines.

The warblers normally had three to five fresh secondaries per wing and four to nine fresh rectrices upon arrival on the breeding grounds, indicating that these feathers had been replaced on the wintering grounds. Several birds also had 1–3 fresh tertials in spring. All primaries and tertials were replaced over a 40-d period immediately following breeding. Usually, no more than one secondary was molted during this period, and winter-molted secondaries were never replaced in summer. The warblers also replaced three to four rectrices during summer. Thus, the typical pattern for Barred Warblers is to molt primaries, tertials, and central rectrices in summer and most (or all) secondaries and a variable number of tertials and rectrices in winter.

The selective advantage of this unusual molt pattern is thought to be an early departure from the breeding grounds. Primary molt is so fast that "near-flightlessness probably occurs." The birds migrate immediately after the primaries are regrown.—Jeff Marks.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 2, 4, 5, 6, 7, 10, 11, 36, 57)

46. A survey of breeding Wood Warblers (*Phylloscopus sibilatrix*) in Britain, 1984–1985. C. Bibby. 1989. Bird Study 36:56–72.—A survey was conducted in wooded areas of Britain in the summers of 1984 and 1985 to determine the abundance and distribution of Wood Warblers. Warblers were counted by tetrad within 10-km squares. The male population was estimated to be 17,200. Wood Warblers preferred higher altitude woods largely consisting of oaks, with a high canopy cover and sparce understory. Other factors influencing Wood Warbler abundance and distribution probably include soil, climate, competition, and predator numbers.—Robin Densmore.

47. The winter status and distribution of Gadwall in Britain and Ireland. A. Fox and D. Salmon. 1989. Bird Study 36:37–44.—Data on abundance and distribution of *Anas strepera*) were collected between 1960/61 and 1985/86 in Britain and Ireland. Winter populations showed an increase of 12–17% during December to February, which is more than three times the increase in the size of the breeding population. The total estimated population in Britain and Ireland by 1985/86 had increased to 6000 birds. It is suggested that foreign birds are supplementing the winter populations. The creation of more artificial habitats in lowland areas, such as reservoirs and gravel pits, is suggested to have contributed to Gadwall expansion.—Robin Densmore.

48. Ornithology—systematic list. N. Riddiford. 1988. Fair Isle Bird Observatory Report for 1988, No. 41:15-44.—This annual report details 204 species recorded, including three new for the island (Roseate Tern, *Sterna dougallii*; Blackburnian Warbler, *Dendroica fusca;* Blyth's Pipit, *Anthus godlewskii*). Sighting of the Blyth's Pipit was the first British record of this century.—Lori A. Willimont.

SYSTEMATICS AND PALEONTOLOGY

49. The taxonomy of redpolls. A. G. Knox. 1988. Ardea 76:1-26.—In this study the author examined 540 museum specimens of the taxa *Carduelis flammea* (with four races) and *C. hornemanni* (with two races). He concluded that each recognized race showed much more phenotypic variation than has been assumed. The notion of hybridization between the taxa *C. flammea* and *C. hornemanni* is an artifact of an over-narrow definition of the range of variation of the two taxa. He suggested, based on a review of differences in plumage, measurements, ecology, and behavior, that differences of the nature observed would unlikely be found within a freely interbreeding (hybridizing) population. He concluded that the taxa *C. flammea* and *C. hornemanni* behave as separate species.—Clayton M. White.

EVOLUTION AND GENETICS

(see 8, 12, 18, 20, 25)

FOOD AND FEEDING

(see also 18, 24, 33, 40, 41, 42, 43, 57)

50. Notes on the measurements and diet of Ludwig's Bustard *Neotis ludwigii*. R. A. Earle, S. Louw, and J. J. Herholdt. 1988. Ostrich 59:178-179.—Stomach contents of seven Ludwig's Bustards included mostly insects, predominantly orthopterans both by number (30.1%) and weight (88.8%). Male bustards were significantly larger than females, and weighed nearly twice as much.—Malcolm F. Hodges, Jr.

51. Prey of Northern Rockhopper Penguins at Gough Island, South Atlantic Ocean. N. T. Klages, M. de L. Brooke, and B. P. Watkins. 1988. Ostrich 59:162-165.—The diet of Rockhopper Penguins (*Eudyptes chrysocome*), which were feeding young nestlings at Gough Island, was examined from 1984-1986. Over 90% of the diet by weight was composed of euphausiid crustaceans. The rest of the diet was made of fish, squid, and chaetognaths, in that order of predominance. The authors acknowledge the need for studies over the entire nestling period, so that a more complete picture of this abundant penguin's diet may be obtained.—Malcolm F. Hodges, Jr.

52. The diet of adult and nestling Blackshouldered Kites, and breeding success. R. H. Slotow, J. M. Mendelsohn, and M. R. Perrin. 1988. Ostrich 59:150-154.—The authors examined pellets of Black-shouldered Kites (*Elanus caeruleus*) collected at roosts (adults) and nests (nestlings) in Transvaal, South Africa. Their diet was 98% rodents, made up of three common species, the most frequently eaten of which was *Otomys angoniensis* (51%). Proportions of prey in the diet of kites reflected those of trapped mammals throughout the year, suggesting no preference for any particular prey species. Proportions of age classes of rodents in the diet were also similar to proportions of rodents collected in the field. Diet of kites varied greatly from nest to nest, and quality of the diet was apparently not related to nestling survival. As the breeding cycle progressed, chances of success were found to increase.—Malcolm F. Hodges, Jr.

53. Physical and behavioral correlates of prey vulnerability to Barn Owl (*Tyto alba*) predation. T. L. Derting and J. A. Cranford. 1989. Am. Midl. Nat. 121:11-20.—Relationships between physical and behavioral attributes of three rodent species—*Microtus pennsylvanicus, Peromyscus leucopus,* and *P. maniculatus*—and their vulnerability to Common

Barn-Owl predation were examined in controlled laboratory experiments. *Microtus* were captured more frequently than either species of *Peromyscus,* and among *Microtus* species, adults were captured more frequently than juveniles. Prey sex had no detectable relationship with capture rates among adults for any of the rodents. However, there were detectable relationships between capture rates and sex among juveniles of all three species.

Body mass of *Microtus* was significantly greater than that of either *Peromyscus* species, and large prey (based on mass) were captured at higher rates than smaller prey. However, in addition to caloric yield, Common Barn-Owls also selected prey based on their expectations of a successful capture, which when taken into consideration was substantially greater for *Microtus.* Predator behavior observed in this study suggests that by preferentially preying on *Microtus,* Common Barn-Owls could minimize their foraging time and costs.—D. J. Ingold.

54. Winter foraging behaviour of Blackcap and Sardinian Warbler in a Mediterranean scrubland. M. C. Guterrez. 1988. Ardea 76:107–110.—These two similar sylviid warblers, the Blackcap (*Sylvia atricapilla*) and Sardinian Warbler (*Sylvia melanocephala*), overlap extensively in their foraging techniques. To examine this overlap the author considered four foraging techniques and six structural layers in habitat. While both used gleaning (arboreal or ground) techniques, they showed strong habitat segregation. Blackcaps foraged mostly within the tree canopies while Sardinian Warblers used the scrub layer. Both appeared to selectively use different plant species. The results suggested that the two ecologically similar or related species reduced competition by means of habitat segregation more than by dissimilar use of foraging techniques.—Clayton M. White.

SONGS AND VOCALIZATIONS

(see also 57)

55. Song, sex, and sensitive phases in the behavioural development of birds. N. S. Clayton. 1989. Trends in Ecol. Evol. 4:82–84.—In all oscines thus far studied, learning is important for proper development of both song and sexual preference. Song learning seems parallel to sexual imprinting in many ways. Sensitive phases in both behaviors are not solely age dependent, and social experiences can play a crucial role in governing what, when, and from whom a young male learns. Examples from ongoing studies on Zebra Finch (*Taeniopygia guttata*) are cited.—John C. Kricher.

56. Repertoire size, territory acquisition and reproductive success in the Song Sparrow. S. M. Hiebert, P. K. Stoddard, and P. Arcese. 1989. Anim. Behav. 37:266–273.—Birds with large song repertoires gained territories faster, held them longer, and had greater annual reproductive success than similar-aged males with smaller repertoires. Repertoire size did not change with age. The authors suspect that "conspecifics preferentially take over territories defended by birds with small repertoires," an hypothesis that would be interesting but difficult to investigate rigorously.—Jonathan Bart.

PHOTOGRAPHY AND RECORDINGS

(see 57)

BOOKS AND MONOGRAPHS

57. The Common Loon: spirit of northern lakes. J. W. McIntyre. 1988. University of Minnesota Press, Minneapolis. 228 pp., 40 black-and-white figures and 10 color plates; vinyl disc soundsheet. Hardcover, $29.95.—This book contains a well-documented life history of the Common Loon (*Gavia immer*), as well as some information on other loon species. The information contained within the book should be of interest to not only loon lovers, but also to a variety of researchers and conservationists. The chapters include information on migration, courtship and pairing, diseases and parasites, behavior and ecology, evolution and taxonomy, and interactions with humans. There is an interesting discussion of the history of loon systematics and a comparison of common names, including some from several Inuit dialects. Researchers in many areas of ornithology will find useful information in the book. For example, workers looking at avian evolutionary strategies would be interested in the fact that at hatching the second chick weighs about 3 g more than the first chick (differential investment by the female evens the survival chances of the chicks?), but the first-hatching chick is still 6 g heavier by the time the second chick is out of the egg. The loon is involved in several parasite-host cycles. The blackfly *Simulum euryadminiculum* is host specific on loons, apparently attracted by olfactory cues from the uropygial gland. The blackfly may also serve as a vector for a leukocytozoan parasite. The complex life cycle of *Apophallus brevis* (a trematode causing trout black spot disease) involves loons and snails as a series of intermediate hosts.

Unlike most piscivorous birds, loons lack a specialized digestive system for eating fish. Instead of regurgitating indigestible parts such as bones and spines, loons pass all the food through the digestive system where it is ground within a powerful, keratin-lined gizzard. Loons appear to be somewhat selective in their food, taking yellow perch more commonly than trout. This difference may be attributed to the different behavioral responses of the fish when pursued by a loon. Yellow perch stay nearer the surface and swim zigzag, making them easier to capture than the trout which swim straight away into deeper water where the loon cannot see them.

The influences of humans on loons are both direct and indirect. Lake acidification is an indirect problem that has been detrimental to loons. The greatest effect is on chick survival. Although there are small invertebrates and plant material to provide food for the younger chicks, the lack of fish results in older chicks starving before they can achieve the ability to fly to a new pond. In less severely affected lakes, the young loons, which normally eat crayfish and small fish, switch to a diet of aquatic insects and newts, causing changes in the community food webs. Human activity also directly impacts loon population size. Although there is little difference in the number of young produced per nest on lakes with light vs. heavy boating and canoeing activity, the unused lakes had more nesting pairs. Hatching success was also influenced by the proximity of occupied cottages. When cottage use was postponed until after the eggs hatched, nest success was higher. Other factors which influence loon population size are also discussed, especially hunting pressures and conservation measures. The information on conservation includes details of actions taken in Minnesota, New Hampshire, and several other states to protect and reintroduce loons to their former habitats.

Overall, the book is well written, although the author tries to tred the line between technical and popular writing and occasionally lapses into a thesis-like approach when comparing her data to those of other researchers. The result is some unnecessary redundancy. The book is well illustrated, mostly with line drawings, but also a number of color plates. The color plates are more useful and informative, but not as "artsy," as those in the April 1989 National Geographic article, also by McIntyre. The book is a well-documented study which provides much information about loon biology, but at the same time, it poses many unanswered questions for future research. It should provide interesting reading and a valuable reference to professional and nonprofessional ornithologists alike.—Robert C. Beason.