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RECENT LITERATURE

Edited by Jerome A. Jackson

NEW JOURNALS

1. Hirundo. R. A. Earle (ed.). 1988. Vol. 1:1–13.—Published twice a year, **Hirundo** contains short articles, a listing of current interests and activities of researchers, requests for information, and a listing of recent literature on swallows. The articles include "Female choice and sexual tail ornaments in the swallow *Hirundo rustica*" by A. P. Moller in which he found that males with the longest tail feathers have a shorter premating period, are less likely to be abandoned by females, and have more extra pair copulations than males with shorter tail feathers. The article is fascinating, but no data are included and Moller fails to mention where a more complete article will be published. Gareth Jones has a short article "Using precision balances to study swallow energetics" in which he describes how a Mettler PK 2000 balance can be placed under a nest to monitor weight changes in parents and young to the nearest 0.01 g. Changes monitored include weight of the incubating female, weights of feeding adults, and weights of nestlings. Combined with measurement of energy expenditure using doubly labelled water, Jones' technique should improve our knowledge of the adaptive significance of weight changes. The article leaves much unexplained (e.g., identification of the sexes in the computerized record of weights), but includes references to articles recently published and in press. William A. Shields provides an overview of his research into the relationships among dispersal, demography, genetic structure, and the evolution of social behavior in "Short summary of current and future research on the Barn Swallow *Hirundo rustica* by the State University of New York laboratory of William A. Shields." The last article, by the editor, R. A. Earle, "Nest rotation by Whitethroated Swallows *Hirundo albigularis* during breeding season," concludes that Whitethroated Swallows use different nests each year despite few nest parasites. The implication being that avoidance of parasites may not be the only reason for building a new nest.

Hirundo is most successful where it combines a brief sketch of research with references to published work or articles in press thereby alerting researchers to information and ideas they might otherwise miss. Those interested in contributing to or receiving a copy of **Hirundo** should contact Dr. Roy A. Earle, Department of Ornithology, National Museum, P.O. Box 266, Bloemfontein 9300, South Africa.—Edward H. Burtt Jr.

2. Parus International. M. S. Ficken (ed.). 1987. Vol. 1:1–14, 15–32.—**Parus International,** published twice annually, contains abstracts of recent papers published or presented at meetings, current bibliographies of persons studying parids, information on theses concerning parids, and a section on research in progress. The first issue contained a section on etymology of parid names. The second issue contains a mailing list of all who responded to the initial newsletter with a brief summary of each person's current research interests. At a time when so many research papers are being published in such diverse journals, the newsletter ensures communication among students of parids and more complete knowledge from which to ask meaningful questions. The newsletter is distributed free of charge as a service of the Field Station and Department of Biological Sciences of the University of Wisconsin-Milwaukee. Material for the newsletter and requests to be placed on the mailing list should be sent to the founder and editor: Dr. Millicent S. Ficken, Department of Biological Sciences, University of Wisconsin-Milwaukee, Milwaukee, WI 53201, USA.—Edward H. Burtt Jr.

3. Purple Martin Update. J. R. Hill III (ed.). 1988. Vol. 1:1–37.—**Purple Martin Update** is the quarterly publication of the Purple Martin Conservation Association. The journal is attractively printed with color portraits of Purple Martins (*Progne subis*) on the front and back covers, black and white photographs and line drawings liberally distributed throughout the interior, and readable, error-free text in three columns. Articles include "How to attract Purple Martins" by J. R. Hill III; "Population trends of the Purple Martin in North America, 1966–1986" by J. R. Sauer, M. K. Klimkiewicz, and Sam Droege; "Population trends in the Purple Martin" by J. R. Hill III; "The breeding distribution

and relative abundance of the Purple Martin in North America" by J. R. Hill III; "The impact of Starlings on Purple Martin populations in unmanaged colonies"by C. R. Brown; and "When the martins returned to Frederick" by D. Wallace. The articles are brief, clear, and will interest a general audience. A number of continuing features are included, for example Bird Words, a list of terms and concepts (e.g., sexual dimorphism, fledge) briefly defined; Landlord Letters; and Doctor's House Calls. A special feature is an interview with George Finney, builder and owner of the largest martin house in North America, 620 compartments.

The journal tends to emphasize the decline of martins in parts of their range rather than looking at the mixed picture of decreases in some areas and increases in other areas and asking why the pattern is mixed. Nonetheless, **Purple Martin Update** is interesting reading for those who enjoy having a martin house in the backyard and want to know more about their tenants. If interested, contact the Purple Martin Conservation Association, Edinboro University of Pennsylvania, Edinboro, PA 16444, USA.—Edward H. Burtt Jr.

BANDING AND LONGEVITY

(see 7)

MIGRATION, ORIENTATION, AND HOMING

(see also 32, 46, 66)

4. Patterns of high bird migration over the North Sea area in October. (Patronen van hoge vogeltrek boven het Noordzeegebied in oktober.) L. S. Buurma. 1987. Limosa 60: 63–74. (Dutch, English summary.)—Surveillance radars covering the North Sea between southern Norway and northern Holland were used in this study. The main track of migrants across the North Sea fell into 2 patterns, a westerly and a southerly group. "Normal" SW-oriented flights were evident only above the Dutch mainland. The evidence suggested that some Scandinavian migrants arrived in the north of Holland either after a direct flight S-SSW from Norway, or by flying first WSW over the northern North Sea at night followed by a reorientation towards SE-SSE at dawn. The last mentioned pattern caused migrants to arrive in the Netherlands in the course of the day. Departures from the Netherlands to sea were usually WSW and WNW and were more or less perpendicular to the arrival direction. The author suggested that many Scandinavian, October migrants possessed an innate capacity to alternate between preferred compass directions. When landmarks were available they were able to fly intermediate directions which, in the case of adults, were goal-oriented.—Clayton M. White.

POPULATION DYNAMICS

(see 3, 6, 31, 38, 49)

NESTING AND REPRODUCTION

(see also 1, 3, 18, 20, 25, 26, 29, 34, 40, 44, 49, 67)

5. Notes on the nesting of the Puerto Rican Nightjar. (Apuntes sobre el anidamiento del Guabairo.) R. E. Noble, F. J. Vilella, and P. J. Zwank. 1986. Caribb. J. Sci. 22:223. (Spanish.)—Notes on the nesting behavior of the Puerto Rican Nightjar (*Caprimulgus noctitherus*) are given from Guánica forest in southwest Puerto Rico. Dates of nest observation are given as well as detailed observations of adults and young at a particular nest. Adults perform distraction displays when their nest is approached, and young often move from the nest-site to nearby areas, apparently as an anti-predator strategy.—Tristan J. Davis.

6. The breeding ecology of woodpeckers in a temperate primaeval forest—preliminary data. W. T. Wesolowski and L. Tomialojc. 1986. Acta Ornithol. (Warsaw) 22:1–21.—Six woodpecker species were observed during the breeding seasons of 1975–1984 at Bialowieza National Park in eastern Poland. Stands of coniferous forests were inhabited regularly by only the Great Spotted Woodpecker (*Picoides major*), the Three-toed Wood-

pecker (*P. tridactylus*), and the Black Woodpecker (*Dryocopus martius*), and even these species did not prefer this forest type for nesting. Deciduous forests (often swampy in nature) were inhabited by these three species, and three additional species: the Middle Spotted Woodpecker (*P. medius*), the Lesser Spotted Woodpecker (*P. minor*) and the White-backed Woodpecker (*P. leucotos*). Population analyses were done on only the two most numerous species. Numbers of Middle Spotted Woodpeckers remained stable throughout the study, while Great Spotted Woodpeckers increased significantly during the latter 5 yr, a possible consequence of irruptive movements by this species.

In all habitats, Three-toed Woodpeckers excavated most of their cavities in dead or dying spruce trees. In swampy deciduous habitats birds of the other five species preferred to nest in alders which constituted 100% of the nest trees used by White-backed Woodpeckers. In oak-hornbeam forests, tree species used for nesting varied among the woodpecker species. Great Spotted Woodpeckers preferred aspens, whereas Middle Spotted, Lesser Spotted, and White-backed woodpeckers most often selected hornbeams. The proportion of nest cavities excavated in dead or dying trees varied among species. Only 26% of the cavities excavated by Great Spotteds were in such trees, in contrast to Middle Spotteds (53%) or the other species (71–79%).

Nest initiation times also varied among the species. White-backed Woodpeckers began egg laying during the first 10 days of April. Great Spotted, Middle Spotted, and Lesser Spotted woodpeckers began egg laying during the last week of April through the first week of May, and Three-toed Woodpeckers started laying during the first 10 days of May.

In general, niche differences among the six woodpecker species were subtle, suggesting that selection pressures other than competition may be more influential in shaping their modes of existence. Two such pressures may include seasonal or spatial distribution of food resources and safety from predators.—D. J. Ingold.

7. Effects of age on breeding performance of Tengmalm's Owls *Aegolius funereus* in western Finland. E. Korpimäki. 1988. Ornis Scand. 19:21–26.—From 1981–1986, 192 female and 169 male Tengmalm's (Boreal) Owls were trapped at 216 nests. Owls were placed into one of three age classes (1 yr, 2 yr, >2 yr) based on wing molt. Yearling females constituted 10–56% of the breeding females each year and bred more often during vole peak years than during non-peak years. Yearling males constituted 0–23% of the breeding males each year and did not breed during the 2 yr that the vole population crashed. Despite considerable variation within age classes, breeding performance "generally improved" with age. Yearling-yearling pairs laid later in the season, laid smaller clutches, had lower hatching success, and fledged fewer young than did older pairs. In addition, pairs of 2-yr-olds were less successful than were pairs of >2-yr-olds. The effect of age on breeding performance seemed to be more important for males than for females. This was expected, because male Tengmalm's Owls provided all the food from before egg-laying until the young were 3 wk old. Evidence that provisioning skill increased with age was provided by counts of stored prey in nests: yearling males had a mean of 1.7 stored prey items, whereas 2-yr-olds and >2-yr-olds had means of 2.7 and 4.0 stored prey items, respectively.

Because Tengmalm's Owls live under fluctuating food conditions and seldom survive longer than 8 yr, they should start breeding as early in life as possible. Korpimäki concludes that ". . . lack of experience and a shortage of mates and food . . . seemed to cause delayed breeding and poor breeding performance of yearlings."—Jeff Marks.

8. Urban nesting of Tristram's Grackles *Onychognathus tristramii* in Israel. H. Hofshi, M. Gersani, and G. Katzir. 1987. Ostrich 58:156–159.—Observations of six nests of Tristram's Grackle during 1983–1984 are detailed. Locally, the species traditionally nests in cliffs near the Dead Sea, only recently moving to urban environments. Nests were built in crevices of abandoned buildings 6–20 m above the ground. Nests were deep cups built of *Tamarix* branches, in which 3–4 eggs were laid. Females incubated while males guarded the nest, although both sexes fed young. The nestling period lasted about 30 d, and parents fed fledglings for about a week, after which they formed fledgling flocks.—Malcolm F. Hodges, Jr.

9. Co-operative breeding in the Pied Starling. A. J. F. K. Craig. 1987. Ostrich 58:176–180.—Breeding behavior of a colony of Pied Starlings (*Spreo bicolor*) on a farm in

South Africa was studied. Pairs built nests, females incubated, and both parents and helpers fed the young. Helpers were mostly subadults and juveniles. The breeding pair usually contributed most of the food for their young, but some helpers fed young at more than one nest. Helper associations may last up to three breeding seasons. Items fed the young and histories of some helpers are summarized.—Malcolm F. Hodges, Jr.

10. Using paired nesting boxes to reduce swallow-bluebird competition. H. W. Prescott. 1988. Sialia:23–27.—Nesting boxes were placed in pairs along bluebird trails in Willamette Valley (Oregon??) in an attempt to alleviate nest-site competition by Tree and Violet-green swallows (*Tachycineta bicolor* and *T. thalassina*) on Western Bluebirds (*Sialia mexicana*). Distances between paired boxes varied from 8 cm to 11 m. At eight of 14 locations bluebirds nested in one box of a pair, and either Tree or Violet-green swallows nested in the other. At six other locations Tree Swallows occupied one box of a pair while Violet-green Swallows occupied the other. Distance between paired boxes did not appear to influence bluebirds in their choice of nest sites. Notably, at none of the locations did members of the same species occupy both paired boxes, suggesting that Tree and Violet-green swallows, as well as bluebirds, are intraspecifically territorial during the breeding season. Thus, by placing boxes along bluebird trails in pairs or in groups of three, competition among swallows and Western Bluebirds for nest sites may be reduced.—D. J. Ingold.

11. Brood size and chick position as factors influencing feeding frequency, growth, and survival of nestling Double-crested Cormorants, *Phalacrocorax auritus*. C. Leger and R. McNeil. 1987. Can. Field-Nat. 101:351–361.—Leger and McNeil weighed 34 chicks from 13 broods of tree-nesting cormorants at 3-d intervals. The growth curve of all chicks was sigmoid with an asymptote at 1889.4 g, about 98% of adult weight. The growth rate/chick and the asymptote were similar for broods of two, three, and four chicks. Feeding frequency (feeds/chick/h) was not correlated with growth rate, asymptote, or brood size. These data suggest that cormorants adjust the amount of food brought to the nest on each visit according to brood size, and that chicks are fed the same amount of food irrespective of brood size.

Most nestling deaths occurred within the first 5 d after hatching. Analysis was based on brood size following these early deaths. This procedure may have been necessary given the small number of nests available for analysis, but may introduce parental quality as an important variable (Coulson and Porter, Ibis 127:450–466, 1985). The authors discuss the problem, but have no data on which to base evaluation of parental quality.—Edward H. Burtt Jr.

12. Location and density of nests of the Red-tailed Hawk, *Buteo jamaicensis*, in Richmond, British Columbia. C. S. Runyan. 1987. Can. Field-Nat. 101:415–418.—Surprisingly, a suburban habitat supported one Red-tailed Hawk nest/3.6 km^2, a much higher density than the typical average of one nest/10.1 km^2. Four nests were within 100 m of major highways (600–6000 vehicles/h) and one nest, only 50 m from a major highway, was occupied in 5 of 6 yr. Is the unusually high density the product of crowding that has resulted from habitat destruction or the product of outstanding habitat? Reproductive success would indicate which, but was not measured.—Edward H. Burtt Jr.

BEHAVIOR

(see also 1, 4, 5, 8, 9, 10, 59, 61, 62)

13. Home range and activity patterns of Turkey Vultures in Puerto Rico. C. E. Santana, G. A. Potter, and S. A. Temple. 1986. Caribb. J. Sci. 22:175–177.—The authors observed Turkey Vultures (*Cathartes aura*) at varying intervals on 3 d in October and December 1982, and January 1983. Counts were made of vultures seen from a water tower near the town of Lajas. One Turkey Vulture was trapped and fitted with a radio transmitter. Its movements were recorded on 11 d in an 8-mo period. Turkey Vulture activity was found to be highest between 0900 and 1700 (peak between 1300 and 1500). The minimum home-range size estimated for the radio-fitted bird was 458 km^2, which represents almost 25% of the species' range on the island.—Tristan J. Davis.

14. Crow predation on Coot eggs: effects of investigator disturbance, nest cover and predator learning. T. Salathe. 1987. Ardea 75:221–229.—Predation by the Carrion Crow (*Corvus corone*) on eggs of the Coot (*Fulica atra*) was studied to test what degree differences in nest cover influenced possibility of predation, what impact regular nest visits had on predation frequency and how crows reacted to the investigator. Nests were visited at 10-d intervals on three marshes differing in vegetation structure, and additionally nest visits were undertaken daily at one marsh. Observations from a concealed elevated platform were made to determine degree of predation without human disturbance.

There was about one crow/10 ha with 10 coot pairs. Normal predation was about 18% of eggs laid. Nest success was lowest on marshes with dense *Phragmites* reeds, followed by marshes with *Tamarix* trees in which coots nested. Marshes with open reedbeds of *Typha* and *Scirpus* had highest predation rates. While there was an increased predation as a function of human visits, only those nests visited on a daily basis had a significant increase of predation. There, crows specialized on egg predation. Crows found artificial eggs within 5 h and developed a specific search image for them in heavily disturbed marshes.—Clayton M. White.

15. Cooperative hunting in Harris' Hawk (*Parabuteo unicinctus*). J. C. Bednarz. 1988. Science 239:1525–1527.—Cooperative hunting, in which individuals coordinate their hunting activities in order to obtain one large prey which is shared, is characteristic primarily of social mammalian carnivores. Cooperative hunting may have influenced the evolution of our own social behavior, and thus is of fundamental interest to a diversity of biologists and anthropologists. Bednarz studied cooperative hunting in radio-transmitter-equipped Harris' Hawks in New Mexico. He found they generally hunted in groups of two to six individuals during the nonbreeding season. Small groups would "leap-frog" their way through their home range by alternately making short low flights between high perches. Once prey (desert cottontail, *Sylvilagus audubonii*; or black-tailed jackrabbit, *Lepus californicus*) was spotted, it was pursued by use of multiple, short rapid dives by different hawks before it was killed. If the rabbit took temporary refuge under a plant, the hawks used a flush-and-ambush strategy, in which the birds surrounded the site and one or two hawks attempted to penetrate the cover. Once the rabbit was flushed one or more of the perching hawks swooped down to kill the prey. A less frequently used hunting tactic was termed a "relay attack" in which the lead pursuit position alternated among different hawks.

Cooperative hunting improved the hawks' capture success and increased the average energy available per individual and allowed the hawks to kill prey larger than themselves. These benefits derived from cooperative hunting may explain the evolution of group living in Harris' Hawk as well as in other social carnivores.—J. M. Wunderle, Jr.

16. The mating system of the Buff-breasted Sandpiper: lekking and resource defense polygyny. R. V. Cartar and B. C. Lyon. 1988. Ornis Scand. 19:74–76.—In much of their breeding range, Buff-breasted Sandpipers (*Tryngites subruficollis*) have a lek mating system. Males display in groups that are visited by females seeking copulations. After copulating, females nest away from male territories.

Cartar and Lyon observed an assemblage of unmarked sandpipers between 9 Jun. and 1 Aug. 1984 on Jenny Lind Island in the Canadian arctic. Six of seven nests found were within territories of displaying males, suggesting that the sandpipers had a resource-defense mating system rather than a lek system. Suitable nesting habitat appeared to be scarce and may have been economically defendable by males, opening the door for resource-defense polygyny to arise. Thus, Buff-breasted Sandpipers might offer the rare opportunity to use intraspecific comparisons to evaluate current models of lek evolution. This interesting note left me with one question: were females nesting on territories of the males with whom they copulated?—Jeff Marks.

17. Food size and aggressive interactions between two species of gulls: an experimental approach to resource partitioning. D. C. Duffy, S. Heseltine, and G. D. LaCock. 1987. Ostrich 58:164–167.—The authors fed different-sized chunks of fish to Hartlaub's (*Larus hartlaubi*) and Kelp (*L. dominicanus*) gulls to test for competitive interactions between them. They found that the smaller gull (Hartlaub's) was usually first to reach the food, but that the larger gull was dominant in aggressive encounters. Hartlaub's

took longer to eat prey of the same size than the larger Kelp Gull, and thus tended to lose larger prey to the Kelp Gull, so that food size partitioning was accomplished by interspecific aggression and differential agility or speed.—Malcolm F. Hodges, Jr.

18. Flocking and cooperative breeding behavior of Formosan Blue Magpies. L. L. Severinghaus. 1987. Bull. Inst. Zool., Acad. Sin. 26:27–37.—The Formosan Blue Magpie (*Urocissa caerulea*) is endemic to Taiwan and is the only known species in Taiwan to participate in cooperative breeding. All flock members participate in nest construction and nest defense. Incubation and brooding are completely carried out by the female, while feeding is carried out by the male and one or more helpers. If the first clutch fails, the entire group will make a second attempt. Formosan Blue Magpies remain in flocks year-round, sometimes maintaining the same association of individuals.—Robin J. Densmore.

19. Effects of group size and sex on vigilance in Ostriches (*Struthio camelus*): antipredator strategy or mate competition? J. Burger and M. Gochfeld. 1988. Ostrich 59:14–20.—Vigilance behavior (time devoted to watching for predators or intraspecific mate competitors) was observed in 173 Ostriches in 5 game parks in Kenya from late December 1984 until mid-January 1985. Group size ranged from one to 10 and averaged 2.8. Fifty-six percent of all birds were males, while 88% of the solitary birds were males. Using a focal animal sampling technique and 1 min sampling intervals, the authors recorded time spent eating, preening, resting, head-up, walking, and other behavior. Multivariate regression techniques revealed that the model which accounted for the greatest amount of variance in both vigilance and feeding behavior included sex, flock size, distance to flock, nearest neighbor distance, and park (but not vegetation height). Overall, vigilance was negatively correlated with group size, and for females, vigilance decreased monotonically with group size. For males vigilance decreased with group size until group size reached seven, and then it increased sharply. In addition, vigilance in females appears to relate primarily to predation pressure, while in males (in heterosexual groups) it relates to both predation pressure and social factors (male-male competition). Vigilance behavior in Ostrich males and females may have evolved under separate selection pressures.—D. J. Ingold.

20. Breeding biology of the Whiteheaded Vulture in Hwange National Park, Zimbabwe. K. Hustler and W. W. Howells. 1988. Ostrich 59:21–24.—Thirty-five pairs of White-headed Vultures (*Trigonoceps occipitalis*) were observed during the breeding seasons from 1973–1984. The crowns of flat-topped, thornless trees were preferred for nesting and 57% of the observed pairs had one or more alternate nest sites. Most nests were used for 3 yr, with 40% of all known nests being used for 4 yr or more. Mean inter-nest distances varied with soil type (10.96 km—basalt; 29.15 km—Kalahari sand; 14.72 km—ecotone). All clutches were of single eggs. Laying occurred largely in May through July although a single pair laid in August. From 46 complete breeding attempts, 0.65 chicks were reared/pair/yr, while 35% of all known breeding pairs failed to breed in any given year. High fecundity and strong nest-site fidelity suggest that recruitment of adult birds from outside populations is down, paralleling a decline in vulture numbers outside of protected areas.—D. J. Ingold.

ECOLOGY

(see also 1, 8, 17, 20, 49, 58)

21. Habitat choice of feeding Rooks *Corvus frugilegus* in SE. Drenthe. (Terreinkeuze van voedselzoekende Roeken *Corvus frugilegus* in Zuidoost-Drenthe.) R. M. A. P. A. Aerts and A. L. Spaans. 1987. Limosa 60:123–128. (Dutch, English summary.)—On an annual basis Rooks used mainly one or two types of fields for feeding. In all seasons pastures were most used. In summer, Rooks concentrated on pastures with a relatively high ground water table, where they gathered invertebrates to feed young. The adults, however, fed largely on sown grain during the breeding season. In autumn, stubble-covered or plowed fields were important. During frost spells Rooks fed almost exclusively in fields where fluid organic manure had been sprayed.—Clayton M. White.

22. Mast production and winter populations of Red-headed Woodpeckers and Blue Jays. K. G. Smith and T. Scarlett. 1987. J. Wildl. Manage. 51:459–467.—Fall mast abundance for several tree species groups was compared to Christmas Bird Count (CBC) data for *Melanerpes erythrocephalus* and *Cyanocitta cristata* in 17 Missouri counties from winter 1960–1961 through 1983–1984. Correlations among tree species groups in mast production and between mast production and winter bird abundances were examined.

Walnuts (*Juglans* spp.), hickories (*Carya* spp.), and white oaks (*Quercus* spp., subgenus *Lepidobalanus*) showed positive intercorrelations for both number of trees with large mast crops and an index of mast production. Red oak (*Q.* spp., subgenus *Erythrobalanus*) mast levels were also generally correlated with the other three mast groups despite a longer time to maturity for red oak mast. Pecan hickory (*Carya illinoensis*) mast production was unrelated to that of the other groups. In most counties, winter numbers of Red-headed Woodpeckers were positively correlated with acorn abundance, but Blue Jay numbers were not. No significant relationships were found between bird and mast abundance for the other mast groups.

The authors conclude that Red-headed Woodpeckers had greater dependence on acorn mast for winter food than Blue Jays because jays were able to use alternative food sources (they also store acorns). The evidence suggests tracking of fluctuating mast resources by Red-headed Woodpeckers on a local scale. This study is a good example of new insights into ecological processes that can be gained from use of large-scale avian data bases (CBC's and others such as Breeding Bird Surveys), that show trends in species abundances, in conjunction with more intensive, local-scale field studies that help to explain the mechanisms producing larger patterns.—Richard A. Lent.

23. Spring and winter bird populations in a Douglas-fir forest sere. D. A. Manuwal and M. H. Huff. 1987. J. Wildl. Manage. 51:586–595.—In the Cascade Mountains of southern Washington, bird species richness, abundance, and guild structure were examined over 2 yr in young (42–75 yr), mature (105–165 yr), and old-growth (250–500+ yr) Douglas-fir (*Pseudotsuga menziesii*) forest stands in both the breeding and winter seasons. Stands were at least 40 ha in area, with 12 bird and vegetation sampling points in each. Avian detection rates within 125 m of the sampling point were used as an index of abundance, an improvement over the older variable circular-plot method (Reynolds et al., Condor 82:309, 1980) because abundances can be calculated for rare species for which density estimates are not possible or reliable.

The most abundant winter species were Chestnut-backed Chickadee (*Parus rufescens*), Golden-crowned Kinglet (*Regulus satrapa*), Pine Siskin (*Carduelis pinus*), and Red Crossbill (*Loxia curvirostra*); abundant breeding species were Winter Wren (*Troglodytes troglodytes*), Western Flycatcher (*Empidonax difficilis*), Varied Thrush (*Ixoreus naevius*), Hermit Warbler (*Dendroica occidentalis*), and the chickadee. Vaux's Swift (*Chaetura vauxi*) had the strongest association with old-growth in spring, being found in every old-growth stand and recorded only occasionally in younger stands. Gray Jays (*Perisoreus canadensis*), Red-breasted Nuthatches (*Sitta canadensis*), Brown Creepers (*Certhia americana*), and crossbills showed significantly greater winter abundances in old-growth versus young stands. Winter species richness, diversity, and abundance were all greater in old-growth versus younger stands. Spring species richness increased slightly from young to old stands, but few differences in bird abundance, richness, diversity, evenness, and species composition were seen. Structural diversity of vegetation increased with stand age, and this was probably related to observed variation in winter bird community characteristics through differences in such factors as foraging opportunities, roost sites, and cone crops. Only six foraging guilds were represented in winter versus 11 in spring. Total species abundance declined 77% from spring to winter in young stands but only 41% in old-growth.

Old-growth "provided better winter habitat for many species of birds than did young and mature forests." Results suggest that intensive timber management would have the least impact on spring migrants, and the most severe impact on permanent residents that appear to require old-growth for winter cover and food.—Richard A. Lent.

24. Nest tree preference of Ospreys in northcentral Florida. T. C. Edwards, Jr. and M. W. Collopy. 1988. J. Wildl. Manage. 52:103–107.—Characteristics of 84 *Pandion*

haliaetus nest trees on two lakes in Alachua County, Florida, were studied to determine whether they differed from 80 trees selected at random. Variables measured on nest and random trees were tree species and height, nest height, tree diameter at nest height, number and diameter of lateral limbs supporting the nest, height of four nearest-neighbor trees, and surrounding stem density. Nest trees were compared to random trees using multivariate (principal components) and univariate analyses.

Baldcypress (*Taxodium distichum*) was the only tree species used by nesting Ospreys at both lakes. Nest and random trees differed only in surrounding stem density and mean surrounding canopy height, random trees having greater values of both variables. However, nest trees tended to be relatively higher than the surrounding canopy. Three principal components (interpreted respectively as vertical structure, nest support, and surrounding stem density) explained 90% of the variation in randomly-selected trees. Only 14 of 84 nest trees differed from random trees in the multivariate sense, differences occurring along the first and third principal components. Thus there were no large differences between nest and random trees, and "Ospreys at both lakes did not appear to exhibit preference for any particular aspects of available trees."

An important feature of this study is the manner in which random trees were selected. The authors state that they "purposely avoided sampling trees too small to be considered potential nest trees to minimize our chance of making inappropriate comparisons." Some might argue that the lack of any clear differences between nest and random trees resulted from the authors' definition of suitable nest trees. However, Edwards and Collopy's approach guards against finding spurious nest tree "selection" that results from obviously unsuitable trees being included in comparisons with nest trees.

The wide tolerance for nesting substrates exhibited by Ospreys in northcentral Florida makes it difficult to manage for specific features of nesting habitat; rather, a habitat-level management approach is suggested.—Richard A. Lent.

25. Effects of forest fragmentation on depredation of artificial nests. R. H. Yahner and D. P. Scott. 1988. J. Wildl. Manage. 52:158–161.—Predation on artificial ground and arboreal nests was examined in mature forest stands in Pennsylvania having 0, 25, and 50% of the surrounding woodland fragmented by clearcutting. Nests contained two chicken eggs; ground nests were placed in leaf litter depressions and arboreal nests were made of chicken wire and placed 1.5 m above ground. Effects of fragmentation intensity, nest location, and time period (seven trials from May–August 1986) on nest predation was examined using multiway contingency table analysis. Numbers of potential nest predators (e.g., Crows [*Corvus brachyrhynchos*] and Blue Jays [*Cyanocitta cristata*]) in the study area were examined in relation to fragmentation intensity and nest disturbance.

Of 420 nests, 31% were disturbed during all trials. Nest fate did not differ among trials. Highest nest predation rates occurred in the 50% fragmentation zone and were lowest in the 0% zone. Arboreal nests were disturbed more often than ground nests, a result opposite to those of other studies, but apparently dependent on the identity of local predator species and the extent of nest screening by dense vegetation. Crows were the major predators in the 50% fragmentation zone, while both Crows and Blue Jays preyed upon nests in the 25% zone. Results "suggest that fragmentation of surrounding mature forest stands may negatively impact avian nesting success, especially when the principal nest predators are corvids" because forest fragmentation may concentrate edge-adapted corvids. The authors also note that findings based on artificial nests may not accurately reflect predation rates on real nests (birds may be better at concealing nests than are field biologists). Such studies would benefit by validation with data from natural populations.—Richard A. Lent.

26. A comparison of losses in artificial and naturally occurring Capercaillie nests. T. Storaas. 1988. J. Wildl. Manage. 52:123–126.—Yahner and Scott (**Review 25**) suggested that studies of artificial nests needed validation with data from real nests; this paper is an example of that approach. Outcomes of 821 artificial nests (shallow ground depressions containing two domestic hen eggs), 96 Capercaillie (*Tetrao urogallus*) nests, and 12 Black Grouse (*T. tetrix*) nests were studied at Varaldskogen, Norway during 1980–1984. Nest concealment was measured using a density board technique. In most years artificial nests with poor cover (eggs easily seen from a distance of 1 meter) experienced higher losses than

natural Capercaillie nests. In 1981, however, natural Capercaillie nests had greater losses than poorly-concealed artificial nests. Storaas suggests that corvid sight predators were less active in that year, but notes that "it was very difficult to identify the predators by signs at the nest." Predators probably found natural nests by scent, while artificial nests were detected visually (indicated by the higher loss rate of artificial nests in poor cover). Predation rates on artificial nests were thus not an index to predation on real nests. Results of artificial nesting studies "can be greatly misinterpreted especially if olfaction is involved in finding nests, the female covers the eggs with nest material or her cryptic body, or female activity attracts predators to the nest."—Richard A. Lent.

27. Factors influencing the abundance of piscivorous birds on Lake Kyle, Zimbabwe. F. J. R. Junor and B. E. Marshall. 1987. Ostrich 58:168–175.—Numbers of piscivorous birds were censused on Lake Kyle, Zimbabwe from 1966–1970. Eight species were present in significant numbers, with Reed Cormorant (*Halietor africanus*) being the most abundant. Dabchicks (*Tachybaptus ruficollis*) were piscivorous on the lake due to lack of vegetation, and for the same reason moved to small bodies of water to breed during the wet season. Other species were normally most abundant during the rainy season. During dry years all species were more abundant on the lake probably because smaller bodies of water were dry. Besides these factors, fish abundance was the variable that most affected bird numbers. The effect of piscivorous birds on human fishing is discussed.—Malcolm F. Hodges, Jr.

28. Avian community organization in a mahogany plantation on a neotropical island. A. Cruz. 1987. Caribb. J. Sci. 23:286–296.—From 1981–1986, the author studied avian communities in a plantation in eastern Puerto Rico. Using multivariate analyses, a classification of how the avifauna exploits food resources is provided. Frugivores and nectarivores foraged predominantly in the understory where flowering and fruiting plants were most abundant. Among the insectivores, foliage-gleaners were more concentrated in the upperstory, while sally-hoverers predominated in the understory. Results imply that understory and upperstory are distinct foraging environments, and that certain species are highly dependent on them. Therefore, reduction of understory vegetation would probably cause pronounced decreases in the numbers of the understory guild.—Tristan J. Davis.

29. Home range and habitat utilization of breeding male Merlins, *Falco columbarius*, in southeastern Montana. D. M. Becker and C. H. Sieg. 1987. Can. Field-Nat. 101:398–403.—Three radio-tagged, male Merlins had elongate home ranges of 13–28 km^2. Each of the home ranges overlapped the home range of at least one other Merlin and one nest was in an area of overlap. The home ranges encompassed sagebrush-grassland, riparian, and ponderosa pine habitats, all of which were used significantly more than expected based on the area of each habitat. The home ranges included grassland and agricultural habitat also, both of which were used less than expected based on their area. The chief prey were Horned Larks (*Eremophila alpestris*, 27%), Lark Buntings (*Calamospiza melanocorys*, 18%), and Vesper Sparrows (*Pooecetes gramineus*, 13%). These species are characteristic of grasslands and suggest that importance of the grassland may be underestimated because of lack of hunting perches where the Merlins could sit and provide an easily located radio signal. All nests were located in pine habitat and species of the pine forest comprise 7% of the diet, which the authors consider to represent only marginal use of pine woods for hunting. However, pine habitat comprises only 1–2% of the area of the home ranges, which suggests that Merlins take a disproportionate amount of prey near the nest in pine woods. The authors conclude that management for Merlins should emphasize sagebrush-grassland, grassland, pine, and riparian habitats, not a surprising recommendation, but one now supported with data.—Edward H. Burtt Jr.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 3, 10, 12, 21, 23, 24, 25, 27, 28, 29, 32, 33, 34)

30. Waterfowl damage and control methods in ripening grain: an overview. C. E. Knittle and R. D. Porter. 1988. U.S. Fish and Wildl. Serv. Tech. Pap. 14.—This brief review of the problem of crop damage by waterfowl includes an historical perspective,

discussion of the nature and economic value of losses, and a review of methods used to control or minimize losses. More grain is trampled by waterfowl than consumed, and annual losses in central North America are estimated to be $6–10 million! Control methods focus on diversionary feeding stations, scare methods, chemical deterrents (none registered for use as such yet), and manipulation of farming practices. Both diversionary feeding stations and no-till farming show positive results in reducing damage while protecting both the birds and the crops. Also discussed are the availability and controversial nature of waterfowl depredation insurance and compensation programs. A need for better dissemination of information about the problems and controls is one of the major conclusions reached. This publication should help achieve that goal if appropriately dispersed and read.—Jerome A. Jackson.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see also 3, 5, 12, 20, 45, 49, 66)

31. Status of the endangered Puerto Rican Nightjar in 1985. R. E. Noble, F. J. Vilella, and P. J. Zwank. 1986. Caribb. J. Sci. 22:137–143.—During 1984–1985, call counts were used to index populations of the Puerto Rican Nightjar (*Caprimulgus noctitherus*). This species is endangered and was presumed extinct until its rediscovery in 1961 in the Guánica Hills of southwestern Puerto Rico. The species is now known to occur in three areas of southwest Puerto Rico: Guánica, Susúa, and Guayanilla. The authors estimate that 324 breeding pairs occupied Guánica Forest and the vicinity, while 68 pairs inhabit Susúa Forest and the surrounding areas. The 1984–1985 counts resulted in similar numbers to those found by previous investigators in Guánica Forest, but were higher than previously reported for Susúa Forest. The authors argue that the nightjar populations are stable and secure if the forests are maintained in their present status.—Tristan J. Davis.

32. Song Thrushes *Turdus philomelos* wintering in Spain as biological indicators of the Chernobyl accident. X. Ruiz, L. Jover, G. A. Llorente, A. F. Sanchez-Reyes, and M. I. Febrian. 1988. Ornis Scand. 19:63–67.—Song Thrushes collected (n = 144) at two wintering localities in Spain during October 1986 had high levels of ^{134}Cs and ^{137}Cs. The ratio between these two radioisotopes in thrush tissues left no doubt that the pollutants came from the Chernobyl accident of 25 Apr. 1986. Radioisotope levels differed significantly between the two collection sites, suggesting that the two groups of thrushes came from different breeding populations.

Each year, humans consume millions of thrushes in Spain. Fortunately for the humans, consumption of 10 kg of tainted thrush tissue would yield a dose of cesium radioisotope far less than the maximum dose considered safe by the International Commission on Radiation Protection.—Jeff Marks.

33. Bird kill at an oil industry flare stack in northwest Alberta. R. R. Bjorge. 1987. Can. Field-Nat. 101:346–350.—Approximately 3000 migrating passerines died at a 104 m oil industry flare stack in northwestern Alberta 26–28 May 1980. The continuously burning flame extended about 10 m beyond the end of the stack. At the time of the kill light rain and fog prevailed. The dead birds lacked skeletal injuries, suggesting that collision was not the cause of death. Feathers were not singed, indicating that direct contact with the flame was not the cause of death. Congestion and edema of the lungs and congestion of the breast musculature suggest that death may have resulted from inhalation of SO_2 and H_2S emitted from the flare stack. This is the first known occurrence of a major kill at an oil industry flare stack in Canada. The frequency and importance of such kills is unknown.—Edward H. Burtt Jr.

34. Eggshell quality and organochlorine residues in eggs of Merlins, *Falco columbarius*, in southeastern Montana. D. M. Becker and C. H. Sieg. 1987. Can. Field-Nat. 101:369–372.—The weight and thickness of eggshells collected from nests of Richardson's Merlin (*F. c. richardsonii*) in southeastern Montana were below those of pre-DDT eggshells from the same population. Four eggs were analyzed for organochlorine compounds.

All contained DDE residues and three contained more than 6 ppm. Trace amounts of dieldrin, heptachlor epoxide, oxychlordane, cis-chlordane, and PCB were found in some eggs. Only eggs that failed to hatch were included in the sample of current eggs, which may bias the results in favor of finding a difference between the current sample and the pre-DDT sample. Nonetheless, the results are a sobering reminder that organochlorine pollutants remain a threat to wildlife.—Edward H. Burtt Jr.

PARASITES AND DISEASES

35. Waterfowl mortality surveys on the Southern High Plains of Texas. A. M. Fedynich and R. D. Godfrey, Jr. 1988. Southwest. Nat. 33:185–191.—Surveys of waterfowl carcasses washed up on shores of 15 Texas lakes were conducted during the winter of 1985–1986. Most were Mallards (*Anas platyrhynchos,* 45%), followed by American Wigeons (*A. americana,* 22%), Green-winged Teals (*A. crecca,* 20%), and Northern Pintails (*A. acuta,* 7%). Significantly more male Mallards and wigeons were collected, which skewed the sex ratio of the entire data set significantly. Of species tested, only Mallards showed a significantly larger number of adults collected, which altered the ratio of all birds in which age was looked at. Ratios were similar to those found in live-trapped birds, so that differential mortality by sex or age was not detected. Of 21 birds necropsied, most of the non-hunting mortality was due to avian cholera (10 of 12 cases). Disease did not appear to be an important cause of death in ducks for the winter studied.—Malcolm F. Hodges, Jr.

36. Parasites of the Eastern Bluebird. T. H. Roberts. 1988. Sialia:28–30.—A survey of the literature suggests that parasites are not causing serious reductions in Eastern Bluebird (*Sialia sialis*) populations. Among the ectoparasites, the blowfly (*Apaulina* spp.) is the most detrimental, but even so it is generally only a serious problem in instances of high infestations. The influence of others, particularly fleas, is poorly understood in Eastern Bluebirds in spite of evidence suggesting that fleas are serious pests in other bird species. Protozoan, nematode, and trematode endoparasites have been reported in bluebirds, but apparently none is a serious problem. However, data to support this idea are few.—D. J. Ingold.

PHYSIOLOGY

(see also 59)

37. High levels of energy expenditure in shorebirds: metabolic adaptations to an energetically expensive way of life. M. Kersten and T. Piersma. 1987. Ardea 75:175–187.—Basal metabolic rates (BMR), existence metabolism (EM), and daily energy expenditure (DEE) were measured in captive individuals of Black-bellied Plover (*Pluvialis squatarola*), Ruddy Turnstone (*Arenaria interpres*) and Eurasian Oystercatcher (*Haematopus ostralegus*). In all three species BMR was above that predicted from their body mass and likewise the BMR of six additional shorebirds (ranging in body mass from 36 to 543 g) was about 42% higher than predicted values for non-passerines. EM and DEE were high as well.

The authors suggested that a high DEE, mainly generated by skeletal muscles, required a high level of support by organs in the abdominal cavity which in turn results in a high BMR. They also suggested that a high DEE in temperate wintering shorebirds must be considered in relation to peak energy demands in their annual cycle. Candidate times for peak demands are the periods of premigratory fattening and mid-winter. The captive birds showed annual fluctuations in body weight associated with premigratory fattening resembling wild conspecifics. Food intake increased with average body weight in all captive groups, but BMR of an individual turnstone did not, suggesting that fat had a low metabolic activity which in turn implied that additional energy was required to carry a fat load associated with activity.—Clayton M. White.

38. Dietary discrimination by molting White-crowned Sparrows given diets differing only in sulfur amino acid concentration. M. E. Murphy and J. R. King. 1987. Physiol. Zool. 60:279–289.—Captive, molting White-crowned Sparrows (*Zonotrichia leucophrys gambelli*) were able to detect a dietary deficiency in sulfur amino acid concentration.

They compensate for this deficiency by adjusting their feeding behavior when a choice of foods is available. Loss of body mass during reduced food intake may have helped realign nutrient requirement with nutrient availability. Specific appetite in free-living birds may affect choice of food and theories of optimal foraging should take this under consideration.—Charles R. Blem.

39. Seasonal changes in standard metabolic rates in the White-browed Scrubwren *Sericornis frontalis* (Acanthizidae) from arid, semi-arid and mesic environments. S. J. Ambrose and S. D. Bradshaw. 1988. Comp. Biochem. Physiol. 89A:79–83.—There are significant differences in the standard metabolic rates of scrubwrens from different Australian habitats. Arid zone birds had markedly lower summer rates than those from semi-arid and mesic areas, a finding similar to that of several other studies. The effect could have been clarified further by a thorough analysis of the body composition of birds from each population.—Charles R. Blem.

40. Energy utilization by Wilson's Storm-Petrel (*Oceanites oceanicus*). B. S. Obst, K. A. Nagy, and R. E. Ricklefs. 1987. Physiol. Zool. 60:200–210.—Wilson's Storm-Petrels are the smallest endotherms (mass 40 g) living in the Antarctic. This comprehensive analysis of the bird's energetics quantifies the cost of flight, free existence, and incubation, as well as most aspects of standard metabolism. The Wilson's Storm-Petrel must consume 120–154% of its body mass in krill per day to meet its energy requirements while breeding.—Charles R. Blem.

41. Metabolic compensation for gradual cooling in developing chick embryos. H. Tazawa, H. Hakayama, J. S. Turner, and C. V. Paganelli. 1988. Comp. Biochem. Physiol. 89A:125–129.—At about day 18 of incubation, a compensatory increase in metabolism of the embryo appears in response to gradual cooling. A stronger metabolic response may be restricted by the low gas conductance of the eggshell.—Charles R. Blem.

MORPHOLOGY AND ANATOMY

(see also 33, 58, 63)

42. *Catamblyrhynchus* and *Paradoxornis*: an unremarked instance of convergence in bill morphology for feeding on bamboo. S. L. Olson. 1986. Bull. Br. Ornithol. Club 106:161–163.—The author discovered striking similarities in bill shape and skull morphology in two widely separated and apparently unrelated genera, and believes these shared features to be adaptations for feeding in bamboo. He urges further investigation of this instance of convergence.—Malcolm F. Hodges, Jr.

PLUMAGES AND MOLTS

(see also 38)

43. Measurements, moult and timing of breeding in the Blue Swallow. R. A. Earle. 1987. Ostrich 58:182–185.—Plumage in the Blue Swallow (*Hirundo atrocaerulea*) is sexually monomorphic but for the length of the longest rectrix, contrary to statements in the literature. Measurements from museum skins are summarized. Molt occurs from April–September, and follows typical passerine patterns. The species breeds during the austral summer (November–January), and is endangered.—Malcolm F. Hodges, Jr.

44. Moult and breeding seasons of the Greyrumped Swallow. R. A. Earle. 1987. Ostrich 58:181–182.—Molt sequence of the Grey-rumped Swallow (*Pseudohirundo griseopyga*) follows the typical passerine pattern: primaries are molted descendently, secondaries ascendently, and rectrices in pairs from the center out. Breeding occurred in the coldest months, peaking in June and July in southern Africa, July and August in central Africa, and August and September in east Africa. Molt was accomplished well outside the breeding season, from October through May.—Malcolm F. Hodges, Jr.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 3, 23, 31, 64)

45. Density and distribution of the Puerto Rican Nightjar in the Guayanilla Hills. F. J. Vilella and P. J. Zwank. 1987. Caribb. J. Sci. 23:238–242.—Call counts were made for the Puerto Rican Nightjar (*Caprimulgus noctitherus*) in the Guayanilla Hills of southwest Puerto Rico. This is one of the three known localities for this recently rediscovered Puerto Rican endemic that is currently considered an endangered species. Using the call counts, 498 ha were surveyed resulting in the location of 32 nightjars. This suggests that at least 263 nightjars may occupy the 4100 ha of suitable habitat in the area. The nightjar appeared to be uniformly distributed at this locality, even in riparian habitats. Overall, 655 Puerto Rican Nightjars are estimated to exist in the three known localities, although further studies might show the species to be more widespread in areas of suitable habitat.—Tristan J. Davis.

46. Waders (Charadrii) and other waterbirds at Langebaan Lagoon, South Africa, 1975–1986. L. G. Underhill. 1987. Ostrich 58:145–155.—Langebaan Lagoon is a 45-km^2 tidal estuary at the southern tip of Africa's west coast. Surveys conducted at midsummer and midwinter attempted to census all birds using the Lagoon at those seasons. A median count of 37,500 birds for the austral summer, 34,500 of which were shorebirds, contrasts with a median count of 10,500 birds for winter, of which 4000 were shorebirds and 4500 were flamingos. Summer shorebirds were 93% Palearctic migrants, winter shorebirds less than 40%. For species which breed on the Taimyr Peninsula, Siberia, a 3-yr cycle of fluctuation in numbers was observed, and thought to be related to cycles in lemming populations. Greater Flamingos (*Phoenicopturus ruber*) account for 73% of energy consumed during the winter. All birds feeding on invertebrates consumed 126.9 $kJ/m^2/yr$, or 24% of the total production of the Lagoon, which harbors 10% of South Africa's coastal shorebird population.—Malcolm F. Hodges, Jr.

47. A list of birds of Rio Grande do Sul, Brazil. W. Belton. 1978. Inheringia, serie Zoologia 52:85–102.—A bird survey has been completed for the first time in the state of Rio Grande do Sul. The study took place over an 8-year period. More than 60 new species were discovered. A list of 575 species is presented which consists of Portuguese and English common names given with the scientific names.—Robin J. Densmore.

48. Minnesota's first Cassin's Finch. D. Kienholz. 1988. Loon 60:2.—On 10–12 Nov. 1987 a single female Cassin's Finch (*Carpodacus cassinii*) was observed near a feeder in Duluth. This is the first official record of this species in the state.—D. J. Ingold.

49. Recent increases in the breeding population of Black-legged Kittiwakes, *Rissa tridactyla*, in Nova Scotia. A. R. Lock. 1987. Can. Field-Nat. 101:331–334.—Black-legged Kittiwakes began breeding on Green Island, off Cape Breton Island, Nova Scotia in the late 1960s or 1970. In 1971 99 pairs were nesting on Green Island and by 1983 the population had grown to 570 pairs scattered among five colonies on the north and east coasts of Cape Breton Island. Lock suggests that the increase and expansion of kittiwakes in the western Atlantic has resulted from over-fishing of clupeid and scombrid fishes and replacement of the large fishes by smaller, faster growing, opportunistic fishes on which kittiwakes feed. He offers circumstantial evidence from other species of seabirds in support of his hypothesis, but no data on fish populations.—Edward H. Burtt Jr.

SYSTEMATICS AND PALEONTOLOGY

50. The correct specific name for the Akepa of Oahu (Drepanidini, *Loxops*). S. L. Olson. 1986. Bull. Br. Ornithol. Club 106:148–149.—The author investigated the history of the discovery and naming of the (Oahu) Akepa (*Loxops coccineus rufa*), and determined that it should be renamed *L. c. wolstenholmei* (a junior synonym). The species was first called *Fringilla rufa*, a name previously applied to the Fox Sparrow (*Passerella iliaca*).—Malcolm F. Hodges, Jr.

51. A new subspecies of *Turdus swalesi* (Aves: Passeriformes: Muscicapidae) from the Dominican Republic. G. R. Graves and S. L. Olson. 1986. Proc. Biol. Soc. Wash. 99: 580–583.—The authors examined specimens collected at several locations in the Dominican Republic, and determined that a geographically isolated population of the La Selle Thrush represents an undescribed subspecies, which they called *T. s. dodae*. The new race differs from the nominate race by having an olivaceous brown as opposed to a black back.—Malcolm F. Hodges, Jr.

52. *Gallirallus sharpei* (Buttikofer), nov. comb., a valid species of rail (Rallidae) of unknown origin. S. L. Olson. 1986. Gerfaut 76:263–269.—The author calls attention to a species of rail known only from a specimen collected in 1865, about which no locality information exists. Based on plumage and morphological characters, the bird is placed in genus *Gallirallus*. Olson speculates on likely areas where the species may have existed (or may still exist).—Malcolm F. Hodges, Jr.

53. A new subspecies of *Siptornis striaticollis* (Aves: Furnariidae) from the eastern slope of the Andes. G. R. Graves and M. B. Robbins. 1987. Proc. Biol. Soc. Wash. 100: 121–124.—The authors describe a new subspecies, *Siptornis striaticollis nortoni*, which differs from the nominate race by occurring on the eastern slope of the Andes, and having a more streaked breast, less spotted forehead, and paler lores.—Malcolm F. Hodges, Jr.

EVOLUTION AND GENETICS

(see also 1, 16, 42, 61, 63)

54. Associations between heterozygosity and morphological variance. R. M. Zink, M. F. Smith, and J. L. Patton. 1985. J. Hered. 76:415–420.—Recent studies have contrasted the expression of phenotypic traits, such as variance in morphological characters, with levels of genetic variation (heterozygosity) as determined by electrophoretic analysis of protein-coding loci. Lerner's work on genetic homeostasis predicts that within populations increased heterozygosity will produce decreased morphological variance. To determine if a relationship existed between heterozygosity and morphological variance, estimates of heterozygosity and morphological variance across 15 population samples of the Fox Sparrow (*Passerella iliaca*) and 17 samples of the pocket gopher (*Thomomys bottae*) were made. The estimates of morphological variance involved a principal components analysis and the genetic analysis included more than 25 loci. Although several recent studies have reported a significant relationship between heterozygosity and morphological variance, in this study the two measures did not covary significantly. Therefore genetic variation at protein-coding loci seems independent of the variance of morphological traits. This noncorrelation could be attributed to genetic homeostasis, varying environments, demographic factors, or independence of the two sets of loci. The authors conclude that if enzyme polymorphisms are associated with the adaptive expression of some traits, then their maintenance is due potentially to natural selection, and although there is evidence that natural selection governs the behavior of some allozymes, it does not mean that all isozyme loci are under similar selective pressures.—Cathy C. Blohowiak.

55. Chromosome study of Peregrine, Prairie, and Gyrfalcons with implications for hybrids. S. M. Schmutz and L. W. Oliphant. 1987. J. Hered. 78:388–390.—Chromosomal studies incorporated with cladistic approaches are often useful for the investigation of phylogenetic relationships, and may be a preliminary means of predicting fertility of hybrids. Karyotyping was conducted with a Peregrine (*Falco peregrinus*), a Prairie (*F. mexicanus*), an F1 hybrid Peregrine × Prairie, and a Gyrfalcon (*F. rusticolus*) in order to construct a phylogenetic tree. Karyotypes of the Peregrine and Prairie falcons were identical ($n = 48$), while that of the Gyrfalcon differed ($n = 52$). When compared with other reports in the literature it appears that the Gyrfalcon is identical to the Lanner; thus karyotypes of the Falconidae differ greatly from the Accipitridae in the same order, yet are very similar within the family. These karyotypic differences do not fit the phylogeny postulated by behavioral and morphological studies. Since the karyotypes of the Peregrine and Prairie falcons are so similar, and several observations of their wild hybrid progeny have been

documented, a closer relationship than previously believed is possible. The authors predicted that whereas hybrids of Peregrine and Prairie falcon crosses should be fertile, those from both of these species and Gyrfalcons might not be.—Cathy C. Blohowiak.

56. The cytogenetics of domestic geese. F. G. Silversides, R. D. Crawford, and H. C. Wang. 1988. J. Hered. 79:6–8.—Hybrids were produced between two domestic goose breeds, the Pilgrim which is representative of the domestic European *Anser anser,* and the African which is representative of the domestic *Anser cygnoides.* The cytogenetic study of these hybrids helped to clarify the chromosome morphology of the two breeds in relation to their putative ancestral origin. Partial karyotypes revealed a difference in the fourth largest pair of autosomal chromosomes, which was due to a pericentric inversion, and explains how the centromere was moved and how the bands on either side of it were reversed while the length of the chromosome was altered very little. This pair of chromosomes was metacentric in the African, submetacentric in the Pilgrim, and heteromorphic in the hybrids. A similar difference between the putative wild ancestors of the African and Pilgrim breeds had been reported by others and may have been the result of the process of speciation that led to two distinct types of goose ancestral to the domestic forms. These findings provided cytological evidence to support the traditional opinion (based on morphology and plumage patterns) that the African breed was derived from the Asiatic Swan Goose (*Anser cygnoides*) and the Pilgrim breed was derived from the European Greylag Goose (*Anser anser*).—Cathy C. Blohowiak.

57. Distribution of constitutive heterochromatin in the Collared Scops Owl. S. P. Bhunya and M. K. Mohanty. 1987. J. Hered. 78:204–205.—Cytotaxonomic studies have provided valuable clues for tracing phyletic lines of animal groups and interpreting evolutionary data within and between taxa. However, only 6–7% of the avian species have been karyotyped and few have been subjected to studies of the heterochromatin or C-bands. This paper reports an investigation of the species *Otus bakkamoena,* the Collared Scops Owl, from the family Strigidae. Only one bird was sampled. Diploid chromosome number was found to be 2n = 78, comprising 20 macro- and 58 microchromosomes. In all macroautosomes pericentromeric heterochromatin was localized. The Z sex chromosome was devoid of C-bands while the W was totally heterochromatic. The karyotypes of several confamilial species resemble the Collared Scops Owl. Five pairs of chromosomes were found to occur within genera of the family Strigidae, and may be ancestral to this family. Other *Otus* species have derived characteristics; thus *O. bakkamoena* should have the original karyotype of the family Strigidae. It was also evident that the localization of C-bands in the Z chromosome is not uniform throughout avian karyotypes, and that some taxonomically distant avian species show parallelism with respect to the C-band-negative Z chromosome.—Cathy C. Blohowiak.

FOOD AND FEEDING

(see also 7, 9, 11, 14, 15, 17, 21, 22, 29, 38, 40, 42, 49)

58. Resource partitioning among sympatric species of tern. K. Hulsman. 1987. Ardea 75:255–262.—Six species of terns were studied on the Great Barrier Reef, Australia. They were grouped into four feeding guilds as determined by multivariate cluster technique based on four morphological characters (weight, bill length, horizontal width of gape, and wing length), use of foraging zones, and prey type and size. Guild membership included: (1) Black Noddy (*Anous minutus*), Roseate (*Sterna dougallii*), and Black-naped (*S. sumatrana*) terns; (2) Bridled Tern (*S. anaethetus*); (3) Lesser Crested Tern (*Thalasseus bengalensis*); and (4) Crested Tern (*T. bergii*). Attributes of both prey size and type were the most important in dividing the terns into guilds. Closely related species were separated by a few attributes, each of which made a large contribution to the difference between them. Species not closely related were separated by many attributes with each making a small contribution to the differences between them.

Some of the dimensions that described the niche of each species were dynamic. Therefore, the extent of resource partitioning between sympatric terns varied through time. The changes in the attributes separating the guilds in the breeding season resulted from seasonal move-

ments and growth of prey or changes in the nutritional requirements of adults or young.—Clayton M. White.

59. Sunbirds prefer to feed in the sun. H. Goldstein, N. A. M. Verbeek, D. Eisikowitch, and Y. Yom-Tov. 1987. Ardea 75:293–295.—The Orange-tufted Sunbird (*Nectarinia osea*) became widespread and more common in Israel after the introduction of many exotic nectar-rich plants. In particular, introduced *Aloe arborescens* was common with some plants growing under permanent shade while others were exposed to sun for up to 8 h. Sunbirds showed a highly statistically significant preference for feeding on *Aloe* growing in the sun. The authors suggested that this preference was related to energy savings attributable mainly to direct solar radiation, but also to higher ambient temperatures in the sun.—Clayton M. White.

60. Fruit consumption by birds in relation to fat content of pulp. V. A. Borowicz. 1988. Am. Midl. Nat. 119:121–127.—Selective foraging by birds is hypothesized to be partially responsible for differences in pattern of autumn fruit disappearance, and fat content in fruit pulp may influence which fruit birds consume. In order to test this assumption, the author presented Northern Mockingbirds (*Mimus polyglottos*), Gray Catbirds (*Dumetella carolinensis*), and White-throated Sparrows (*Zonotrichia albicollis*) with fruit of *Cornus racemosa* (ca. 23% fat/g dry pulp) and *C. amomum* (ca. 6% fat/g dry pulp). In no-choice trials in which fruit of the two dogwood species were presented to the birds on branches, all three species ate significantly more *C. amomum* fruit than *C. racemosa* fruit. When fruit of both species were presented simultaneously on branches, neither mimid showed a preference, while sparrows ate more fruit from *C. amomum*. However, in trials in which fruit from both species were presented concomitantly in dishes, mockingbirds and catbirds ate significantly more high-fat *C. racemosa* fruit, and sparrows showed no preference. Consumption of fruit from these two dogwood species appears to be influenced by factors other than fat content in the pulp.—D. J. Ingold.

61. Prey caching of breeding Tengmalm's Owls (*Aegolius funereus*) as a buffer against temporary food shortage. E. Korpimaki. 1987. Ibis 129:499–510.—A variety of owl species cache surplus food, possibly an important behavioral adaptation for a group which lacks a crop. In this paper the author reports the results of 13 yr of study on the Tengmalm's Owl in western Finland. Caches usually contained voles and were located only in nest-holes. Prey caching was most frequent during egg-laying and hatching when females and young cannot withstand long periods of food stress. Caches were largest in vole peak years, when the owls bred early and thus had a higher risk of encountering adverse weather conditions. Prey caching was highest both before and after snowfalls rather than during the storms. This finding was consistent with the hypothesis that prey caching is a buffer against temporary food shortages while breeding. The author concludes that small body size, availability of caching sites, and cold variable climates with variable food supplies are important factors influencing the evolution of food caching in owls.—J. M. Wunderle, Jr.

SONGS AND VOCALIZATIONS

62. Vocal responses of Green Barbet populations, and the taxonomic implications. F. Dowsett-Lemaire and R. J. Dowsett. 1987. Ostrich 58:160–163.—Sonograms of the songs of four Green Barbet (*Stactolaema olivacea*) subspecies were compared, and found to be similar. Birds hearing taped songs from other populations reacted aggressively. Despite widely separated subspecies, the authors argue that the species has not differentiated greatly, and they see no reason to split off the South African subspecies.—Malcolm F. Hodges, Jr.

BOOKS AND MONOGRAPHS

63. Hindlimb myology and evolution of the Old World suboscine passerine birds (Acanthisittidae, Pittidae, Philepittidae, Eurylaimidae). R. J. Raikow. 1987. Ornithol. Monogr. No. 41. The American Ornithologists' Union, Washington, D.C., viii + 81 pp., 37 text figures, 3 tables. $12.50 ($9.50 to A.O.U. members).—This work offers four rewards. First is the obvious contribution to a particular evolutionary problem. The relationships of

the suboscines, both among themselves and to the oscines, constitute one of the oldest, established, permanent controversies in avian systematics. As in his past studies, Raikow builds a data base from meticulous dissections of hindlimbs, here of 17 species (unfortunately only one specimen of each) in 12 genera. The results are subjected, with appropriate computerized help, to a cladistic analysis. Major points of the analysis are: (1) the Acanthisittidae are not suboscine but a sister taxon of the infraorder Polymyoidi within the oscines; (2) the remaining Old World suboscines form a clade within a larger clade including the New World suboscines; (3) the Pittidae, Philepittidae and Eurylaimidae are each monophyletic, although support for monophyly of the Eurylaimidae is surprisingly weak considering their long recognition as a separate taxon.

The second reward is an exposition of cladistic methodology. Those wishing to introduce students to the mysteries of cladistic philosophy and practice and/or the joys of systematic detective work can do no better than to require reading of this work together with Raikow's earlier (Auk 99:431–445, 1986) demonstration of passerine monophyly. Both studies present data as illustrations that permit the non-expert to readily appreciate the evidence, and in both the rationale for each decision is clearly explained.

Third, the study provides a measure of reassurance for those who are disturbed by the abstractness and lack of "real characters" in high-tech systematics, for Raikow's suggested phylogeny differs in only minor respects from that proposed by Sibley and Ahlquist. Given the vast differences of technique and assumptions between morphological and DNA-DNA hybridization studies, the close concordance of their results lends special credence to the judgment that they do, indeed, trace "a common pattern, which is presumably the true historical genealogy." It is also a delight to witness again that the hoariest technique in the hands of a master can yield new and useful insights.

Finally, the few of us for whom the particulars of anatomy remain a prosaic concern will welcome the thorough descriptions and careful drawings. At any level, this study is worth the price.—Abbot S. Gaunt.

64. Birds of the Okanagan Valley, British Columbia. R. A. Cannings, R. J. Cannings, and S. G. Cannings. 1987. Royal British Columbia Museum, Victoria, British Columbia. 420 pp., one color plate, numerous line drawings, numerous graphs and black-and-white photographs. $27.50 Canadian (softcover), $37.50 Canadian (hardcover).—The Okanagan Valley is well established in the annals of American ornithology because of the very extensive earlier efforts of J. A. Munro. This outstanding volume not only enhances our understanding of the avifauna, but will certainly further the Valley's reputation as a place to find birds in Canada.

The Okanagan Valley, nestled between the Thompson Plateau and the Okanagan Highlands of the southern Canadian Rockies, is an extension of the Great Plains. It is the tremendous diversity of habitat that makes the Valley the birding mecca of Canada that it is. Lush riparian vegetation along the Okanagan River yields to dry grassland, desert scrub, montane forests, and alpine peaks. Within the Valley at least 194 bird species have nested and 307 species have been found.

This comprehensive guide begins with descriptions of the physiography and climate, a history of ornithology in the region, several well-prepared maps, and photos of the range of habitats. A chapter on the Okanagan birding year relates avian phenology with changes wrought by the seasons—a very useful chapter for the birder visiting from afar.

Species accounts include the typical regional bird book information about status and distribution, but also well-prepared graphs illutrating seasonal occurrence and other information. The accounts are well-written, reviewing older records and bringing the species status up to date. Christmas Bird Count records from Vernon, Penticton, and Vaseux Lake are put to good use. So too are data from breeding bird surveys. The species accounts are followed by annotated lists of 21 hypothetical species and 10 species that were rejected from the Okanagan list. The authors are to be commended for including these along with their evaluations—some have since been confirmed in the Valley—others remain as challenges for future birders. The compilation of data concerning bird specimens from the Valley, a gazetteer, and an extensive bibliography add to the scientific value of the book. In sum, this is a regional bird book that deserves a place on any library shelf.—Jerome A. Jackson.

65. A naturalist's sketchbook. C. W. Leslie. 1987. Dodd, Mead & Company, New York 10003. 192 pp. $22.95 (hardcover), $12.95 (paperback).—This is a book of discoveries, discoveries by the author and artist, Clare Walker Leslie, and discoveries by the reader. That is the wonder of drawings, you can look and appreciate what the artist saw and drew, but you can also see relationships of which the artist was unaware, and you can look through the entire book only to return later and discover in the very same drawing something entirely new. Leslie's sketches are deceptive. They appear simple, yet they capture the essence of her plant, animal, and human subjects. The pencilled notes that accompany the sketches call attention to particular details, actions, or questions that lead to a particular sketch. These same notes cause one to stop and study the sketch or, in combination with the sketch, to recall a similar incident from one's own experience. There is a lot of joy in shared experiences and the balance between sketches and brief, suggestive notes is just enough to evoke one's own memories without overwhelming them in the author's own words. This is not a coffee-table book to be shown to impressionable friends. It is a book to be enjoyed in a quiet hour when you can turn your imagination loose and let the sketches and notes come alive in your mind's eye.—Edward H. Burtt Jr.

66. Last of the curlews. F. Bodsworth. 1987. Dodd, Mead & Company, New York 10003. 160 pp. $17.95 (hardcover), $8.95 (paperback).—As scientists we discuss the plight of vanishing species in professional journals, report our findings to government in environmental impact statements, or, occasionally, talk to reporters who occasionally write or talk about endangered species in newspapers or on the local news that whets our appetites for Tom Brokaw, Peter Jennings, or Dan Rather. We rarely use fiction to put the case of an endangered species before the public, yet that is exactly what Bodsworth has done in "Last of the curlews." Don't get the wrong idea. This is not a cute, anthropomorphic story. The central character is a male Eskimo Curlew endowed with believable characteristics by a narrator who remains omniscient and objective. The book opens on the Arctic tundra, in the territory of a male Eskimo Curlew who awaits the arrival of a mate and occasionally courts female Hudsonian Curlews, but never for long. For the fourth year no female arrives and the male eventually heads southeast to Labrador where it fattens before the long journey to South America. We follow him to the pampas, where he explores its estuaries, its grassland, and turns west to begin his spring migration. After crossing the Andes . . . , but you will not enjoy the story if I continue my summation.

Bodsworth's prose is superb. Biological details come alive before your mind's eye and you look at familiar phenomena with a new perspective. For example the over water migration of the curlew accompanied by a flock of Black-bellied Plovers:

> The flock slogged on, a few feet above the sea, struggling laboriously over each crest and snatching a few niggardly seconds of partial rest in the quieter, protected air of each trough. Once a long trough lifted into a seething comber many feet higher than those preceding and the spray of its crest lashed the curlew's wings. The curlew had to battle a maelstrom of air currents for several seconds to keep airborne. When the wave passed two more of the plovers failed to re-appear. But the spray melted much of the snow clinging to the curlew's wingtip feathers. For a minute his unburdened wings could bite into the air with all their old power.

Scientific detail is presented concisely and accurately, but one hardly thinks of that as you picture the elemental struggle. Here is natural selection. Here is a perspective on migration and fitness that I knew existed, but had never had so graphically portrayed.

Bodsworth has further heightened the tension of the book by interspersing his fictional account with published scientific reports of the curlew's biology and decline. These come at intervals, like news flashes, and, like news flashes, they contribute to a mounting sense of despair. The effect is stunning.

The book, originally published in 1954, is republished by Dodd, Mead & Company as part of its Edwin Way Teale Library of Nature Classics. The book is superbly illustrated by T. M. Shortt, whose illustrations graced the original edition, and Michael McCurdy, whose wood engravings were commissioned for this special edition. The publisher, author, and artists are to be congratulated on a work that seeks to awaken our sensibilities to the world around us and the desperate need for preservation of our vanishing wildlife.

In keeping with Bodsworth's use of scientific reports I close optimistically with the following account:

> The eskimo curlew (*Numenius borealis*) has been thought by some people to be extinct or nearly so. A flurry of observations in coastal Texas in the early 1960s raised speculation that the bird still survived at that time. But few observations were made in the following years, and hopes again diminished. In the 1980s, however, there have been several observations of this species on migration in the central and southern United States and in several areas of Canada. One bird was reported on the Platte River in Nebraska in mid-April 1987. At least two more were reported along the Texas coast in late April and early May 1987. Finally, in late May, Canadian Wildlife Service biologists found a pair in the Canadian Arctic. Preliminary reports indicated that a nest may have been located.
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> In response to the increased number of observations of eskimo curlews, a group of shorebird specialists from the United States and Canada at the recent American Ornithologists' Union meeting in San Francisco met to discuss ideas for recovering the species from the brink of extinction. Among the ideas mentioned were increasing public awareness that the species is not extinct; characterizing migration, winter, and nesting habitat; and protecting and managing known migration stopover areas (Endangered Species Technical Bulletin 12, 1987).—Edward H. Burtt Jr.

67. Inventory of bird egg collections of North America, 1985. L. F. Kiff and D. J. Hough. 1985. American Ornithologists' Union and Oklahoma Biological Survey, Norman, Oklahoma. 259 pp.—The Inventory contains information on 72 collections that contain 463,000 sets of eggs, over 93% of the sets in the known egg collections of North America. The book consists of two tables in which the sets of eggs are listed by species and collection, the 36 largest collections in Table 1 and 36 smaller collections in Table 2. The systematic listing is the same used for the skeleton (Wood, Zusi, and Jenkinson. World inventory of avian skeletal specimens. American Ornithologists' Union and Oklahoma Biological Survey, Norman, Oklahoma, 1982a) and spirit inventories (Wood, Zusi, and Jenkinson. World inventory of avian spirit specimens. American Ornithologists' Union and Oklahoma Biological Survey, Norman, Oklahoma, 1982b). The number of sets of eggs and the number of species represented are given for each collection along with the name and address of the curator. Thus the Inventory should promote use of the collections by making them, their holdings, and addresses known to ornithologists throughout the world. Since most egg sets contain information on clutch size, nest site, and often contain information on fertility and date of laying, the records that accompany the eggs may yield valuable information on changes in the breeding biology of species over the last 100 yr. In addition we know little about geographical variation in eggs, changes in shell composition, or the function of colors and surface texture in eggs. The Inventory alerts ornithologists to the existence of suitable study material and the means for gaining access to that material.—Edward H. Burtt Jr.