RECENT LITERATURE

Edited by Jerome A. Jackson

BANDING AND LONGEVITY

(see also 10)

1. The migration of the Starling (*Sturnus vulgaris*) in Europe: an analysis of ringing recoveries. (Das Zugverhalten des Stars (*Sturnus vulgaris*) in Europa: eine Analyse der Ringfunde.) G. Fliege. 1984. J. Ornithol. 125:393–446. (German, English summary)—The author reports on the analysis of over 30,000 band recoveries of European Starlings. Recoveries of 11,500 birds banded as nestlings were examined in detail. While most birds recovered during their first fall migration were recovered SW of their banding site, movements to the W and S also occurred. Birds banded at individual stations showed the same movement pattern. Two distinct migratory populations were distinguished, with the division between them at about 52°N. However, this division may have been an artifact caused by local hunting practices. In the northern and eastern populations, second year birds tend to return to the breeding grounds later than the older birds. This delay may be associated with delayed maturation.—Robert C. Beason.

MIGRATION, ORIENTATION, AND HOMING

(see also 1)

2. On the migratory restlessness in Blue Tits (*Parus caeruleus*). (Zur "Wanderunruhe" bei Blaumeisen (*Parus caeruleus*). R. Hellmann. 1985. J. Ornithol. 126:207–210. (German, English summary)—Thirty-one hand-reared Blue Tits showed periods of migratory restlessness which coincided seasonally and daily with the migration of free-flying Blue Tits, which peaks between mid-September and mid-October in the morning. The author proposes an endogenous annual rhythm as the basis of migratory activity in this species.—Robert C. Beason.

3. Methods for producing disturbances in pigeon homing behavior by oscillating magnetic fields. P. Ioale and D. Guidarini. 1985. J. Exp. Biol. 116:109–120.—When homing pigeons (*Columba livia*) were subjected to 0.14 Hz square-wave oscillations either prior to release or during homing (using paired coils around the bird's head), their mean vanishing bearings were significantly different from controls. Birds subjected to sinusoidal or sawtooth oscillations at the same frequency showed no differences compared to controls. This experiment may provide some insight into the mechanism of magnetic navigation, but the authors provide no interpretation of their results.—Robert C. Beason.

4. The orientation of pigeons at gravity anomalies. A. J. Lednor and C. Walcott. 1984. J. Exp. Biol. 111:259–263.—Rock Doves (*Columba livia*) were released at gravity anomalies (salt domes in Texas) to test whether the disorientation pigeons show at magnetic anomalies is caused by gravity inhomogeneity rather than magnetic field differences. There was no difference between birds released within or outside the gravity anomalies, nor was there any influence of magnets on the radio vanishing bearings. These findings suggest that the discrimination of pigeons at magnetic anomalies is not due to gravity inhomogeneities.—Robert C. Beason.

5. Pigeon navigation: site simulation by means of atmospheric odours. S. Benvenuti and H. G. Wallraff. 1985. J. Comp. Physiol. A 156:737–746.—This group of experiments was designed to test whether pigeons use odors at their release site to determine their location relative to home. Birds which were exposed to the natural air at the release site for 3 h immediately prior to release showed homeward orientation. Birds which were exposed to the air at a false release site, then transported (while receiving filtered air) to a release site diametrically opposite their home, showed an orientation directly away from home. However, the initial bearings of the false release site birds were consistent with the homeward direction from the false release site. These experiments suggest that the olfactory information available at the release site to the pigeons is an important component of their ability to determine a homeward direction. The experiments used both experienced and first flight birds.—Robert C. Beason.

POPULATION DYNAMICS

(see also 21, 40)

6. Factors determining the population size of arctic-breeding geese, wintering in western Europe. B. Ebbinge. 1985. Ardea 73:121–128.—Certain breeding populations of 3 species of geese breeding in western Europe were analyzed for changes in numbers. These populations were the Pink-footed Goose (*Anser brachyrhynchus*) breeding in Iceland and Britain, White-fronted Goose (*Anser albifrons*) breeding in the Baltic Sea area, and the entire world population of the Brant (*Branta bernicla*) that breeds in Eurasia. While some exchange does take place between populations of the first two species, it is believed small and does not account for any change in numbers. Increase was believed to have resulted from hunting restrictions having been recently applied to them. Man's impact apparently kept the wintering members below the carrying capacity of their arctic breeding grounds. Now that population size has increased, density-dependent limitations are manifested in reproduction by lower brood size and decrease in proportion of potential breeders actually engaged in breeding.—Clayton M. White.

7. The Woodlark (*Lullula arborea*) as a breeding bird in the Netherlands in 1970–84. (De Boomleeu-werik (*Lullula arborea*) als broedvogel in Nederland in 1970–84.) R. G. Bijlsma, R. Lensink, and F. Post. 1985. Limosa 58:89–96. (Dutch, English summary)—Distribution, breeding density, population trends, and habitat choice of the Woodlark were detailed. Those populations breeding on Pleistocene soils showed a sharp increase, especially starting in 1979; many populations more than doubled. Populations in the dunes of Noord- en Zuid-Holland showed considerable fluctuation and apparently decreased during the last decade. Inland dunes and sandy heather had highest densities while coastal dunes were lower. While fluctuations occurred in all habitats, the magnitude in favored habitats suggested that their density was never far from carrying capacity. Increases apparently resulted from creation of more favored habitat by clear-felling of trees after storms and fires. The species has adapted to a changing environment in spite of several factors altering favored habitats.—Clayton M. White.

8. Spacing of Sparrowhawks in relation to food supply. I. Newton, I. Wyllie, and R. Mearns. 1986. J. Anim. Ecol. 55:361–370.—Sparrowhawk (*Accipiter nisus*) nests in Great Britian are regularly spaced within contiguous woodlands, but nearest-neighbor distances vary among woodlands. To examine if regional differences in Sparrowhawk nesting density are related to differences in prey densities, Newton et al. obtained data on nest spacing, soil productivity, and elevation at 19 study sites throughout Great Britain. Small birds were censused in April and May by "point counts" at 14 of the study sites. Significant correlations indicated that nest spacing increased with declining soil productivity, increasing elevation, and declining densities and biomass of small birds. Assuming that soil productivity and elevation influence the densities of Sparrowhawk prey, Newton et al. conclude that Sparrowhawk breeding densities in different woodlands are at least partly dependent on variations in food supply.—Jeffrey S. Marks.

9. Sex-biased philopatry and dispersal in birds and mammals: the Oedipus hypothesis. O. Liberg and T. von Schantz. 1985. Am. Nat. 126:129–135.—Greenwood (Anim. Behav. 28:1140–1162, 1980) argued that sex differences in natal dispersal are a consequence of the type of mating system: dispersal is female-biased in bird species with a resource-defense mating system and male-biased in those with a mate-defense mating system. Liberg and von Schantz propose an alternative model, the "Oedipus" hypothesis, in which sex biases in natal dispersal are the product of parent-offspring conflict in reproduction. According to this hypothesis, offspring that could reduce their parents' reproductive success should be evicted from the natal area. In polygynous and promiscuous species, sons could cuckold their fathers, and daughters could parasitize their parents' nests. In monogamous species, the potential father-son conflict is low (males need only guard a single female), while daughters still could parasitize their parents. Thus, the Oedipus hypothesis predicts natal dispersal of females for monogamous birds, and dispersal of both sexes for polygynous or promiscuous birds.

This interesting idea unfortunately will be very difficult to test. One wonders how parents are able to force their young to disperse, and why offspring would pose any greater threat to their parents than would individuals less closely related.—Jeffrey S. Marks.

NESTING AND REPRODUCTION

(see also 17, 19, 21, 24, 32)

10. Notes on incubation by male kestrels in West Virginia, Pennsylvania and southern Quebec. T. J. Wilmers, R. Bowman, and D. E. Samuel. 1985. N. Am. Bird. Bander 10:6–8.—"Both sexes of the American Kestrel (*Falco sparverius*) possess well-developed incubation patches. . . . In captive pairs, the female does nearly all of the incubating." So starts this article that then reports the results of the authors recording the sex of kestrels found incubating eggs in 84 active kestrel nests in West Virginia and Pennsylvania during 1980–1982 and 71 active kestrel nests in southern Quebec during 1981–1983. Most nest cavities were checked only once, when it was likely that eggs were at the mid-point of incubation. The authors found that on 84.8% of the visits females were incubating and 15.1% males were incubating. About 35% of the instances when males were incubating occurred within 3 h prior to sunset.

The statement that "capture and banding of kestrels in a wild population has not been previously documented" was corrected, by an editor's note in N. Am. Bird Bander 10:45, to read "capture and banding of kestrels at night in a wild population have not been previously documented." All 12 birds found in nests checked after sunset were females. The presence of brood patches in males with the relatively low incidence of their incubating eggs suggests that further study is needed on this aspect of the kestrel's nesting cycle.—Richard J. Clark.

11. Note about the breeding of Bonelli's Eagle *Hieraaetus fasciatus* in northwest Africa. (Note sur la reproduction de l'Aigle de Bonelli *Hieraaetus fasciatus* en Afrique du nord-ouest.) P. Bergier and R. de Naurois. 1985. Alauda 53:257–262. (French, English abstract)—The large populations of Bonelli's Eagles in north Africa (e.g., 500–1000 pairs in Morocco) are not well studied compared to those from mediterranean Europe. The authors review what is known about the breeding of this eagle in Tunisia, Algeria, and Morocco. They summarize published literature, personal observations, and records kept at the Centrale Ornithologique Marocaine. They review 37 cases of breeding in Algeria and Tunisia and 38 in Morocco.

In northwest Africa, unlike Europe, Bonelli's Eagles frequently nest in trees: whereas 26 (or 48%) aeries were in rocks, 28 (or 52%) were in trees, mainly *Pinus halepensis*. Nests most frequently faced south, never north; and were usually protected from the sun at the hottest times of the day.

Estimated average egg-laying dates are 28 Feb ± 16 days in Algeria and Tunisia (late Jan–early Apr; n = 28), and 7 Feb ± 23 days in Morocco (late Dec–late Mar; n = 19), or 19 Feb ± 21 days overall. The earlier date for Morocco is probably due to west-to-east differences in climate, since Morocco has milder, shorter winters than Algeria and Tunisia. Also, data for Algeria were mostly from montane areas. Clutches reported in late March and early April in Algeria were probably replacement attempts.

Fecundity of Bonelli's Eagles in northwest Africa was comparable to that elsewhere: 92% of clutches consisted of 2 eggs, 8% of 1 egg. Productivity (number of young fledged/pair of eagles examined) was 1.00 in Algeria and Tunisia (n = 2 pairs), 1.48 in Morocco (n = 25), or 1.44 overall. Hence, the Moroccan population is healthy, productivity exceeding mortality.—Michael D. Kern.

12. Nest sites and density of a population of Carrion Crows *Corvus corone* L. in the Limousin region, central France. (Sites de nidification et densité d'une population de Corneilles noires *Corvus corone* L. en Limousin.) A. Jollet. 1985. Alauda 53:263–286. (French, English summary)—Jollet studied populations of Carrion Crows in two communes, Department of Haute Vienne (45°N, 1°E), on the northwest edge of the Central Massif in France: Condat-sur-Vienne (1547 ha) and Aixe-sur-Vienne (2285 ha). Both sites are sparsely forested plateaus (whose floristic composition is described in detail in the text) gashed by deep valleys. The breeding density of crows in 1980 and 1981 is based on periodic counts of their nests during 1979–1981.

Of 382 nests 47% were in hedgerows, 22% in thickets, 16% in woods, 7% in groves of trees, 4% in plantations, and 4% in isolated trees. The percentages were similar in 1980 and 1981, except in groves: 9% in 1980, but only 4% in 1981. Most nests in thickets, woods, and plantations were in or near the edge, rather than deeply placed among the trees.

Crows used 17 species of trees as nest sites, but preferred oaks (80%), particularly *Quercus pedunculata,* and pines (*Pinus sylvestris*; 10%). Most nests were in crotches (73%), others were at points where branches emerged from the trunk of the tree (27%). Nest height averaged 13.8 m (14.6 m in 1980, 13.1 m in 1981; $P < 0.001$) and relative height (nest height/tree height) 0.91. Nests were either "inverted cones" or "platforms," their morphology depending to some extent on the type of tree in which the nest was built.

Two factors were particularly important in the crow's selection of a nest tree: (1) the presence of forks or crotches in which to seat the nest—this explains why chestnuts, which were abundant in both communes, were rarely used (0.8%); and (2) crotches or forks far above the ground—when several occurred in one tree, the crows chose the highest one for a nest site.

On average, nests were 131 m from the nearest cultivated field. Mean distance between nests built in a single year was 202 m (189 m in 1980, 214 m in 1981; $P < 0.05$). Mean distance between a nest built in 1981 and the nearest nest built (probably by the same pair) in 1980 was 140 m. Nest density was 6.8/km^2 or 56.21/km^2 of agricultural land in use. The breeding density of crows in these two French communes was higher than that at other European sites which have been examined; yet nests were more scattered due to the large number of available nest sites and the uniformity of the study area.

Crows at Condat (1) nested more frequently in oaks and less frequently in pines, (2) more often placed their nests in forks, (3) built their nests higher off the ground in oaks (i.e., used larger oaks for nest trees), and (4) more often constructed platform-type nests than birds at Aixe.

In view of the many habitats and types of nest trees that these crows used at Condat and Aixe, the most important factor determining their choice of nest tree was the presence of a fork suitable for the nest. This in turn determined how frequently various species of trees were used as nest sites and the relative height of the nest in each of these trees.—Michael D. Kern.

13. Breeding success in Brant in relation to individual feeding opportunities during spring in the Wadden Sea. W. Teunissen, B. Spaans, and R. Drent. 1985. Ardea 73:109–119.—Individually marked Brant (*Branta bernicla*) were watched as they foraged in plots of fertilized vegetation (enhanced in biomass and protein content). Treated plots were preferred as indicated by longer time spent there, higher rates of interaction, increased bites per stops, etc. Males feeding on enhanced plots had higher status as indicated by proportion of interactions won. Mates of males with higher status on the enhanced plots were presumed to accumulate more body reserves prior to breeding. Finally, the pairs on the enhanced plots in spring were accompanied by more young in the autumn, suggesting a better breeding success.—Clayton M. White.

14. A summary of Trumpeter Swan production at Malheur National Wildlife Refuge, Oregon. J. E. Cornely, S. P. Thompson, E. L. McLaury, and L. D. Napier. 1985. Murrelet 66:50–55.—Between 1939 and 1958, Trumpeter Swans (*Cygnus buccinator*) from Red Rock Lakes, Montana were transplanted to Malheur National Wildlife Refuge in southeastern Oregon in an effort to establish a new population of what then was a de facto endangered species. Twenty-three adults and 114 cygnets were released during this 20-yr period. This paper documents the reproductive history of this introduced population of Trumpeter Swans through 1984.

The first brood was produced in 1958, and broods were produced each year thereafter except 1959, 1961, and 1977. An average of 3.7 successful broods (range = 0–10) was produced per year; brood size at fledging averaged 2.9 (range = 1–6); 288 cygnets were fledged. A severe drought occurred in 2 of the 3 yr with no swan production, and production was best in years when water and submergent vegetation (i.e., swan food) were abundant. An abundance of water was a double-edged sword, however, because the major cause of nest failure was flooding.

Productivity of Malheur Trumpeter Swans compares favorably to that reported elsewhere (e.g., Red Rock Lakes, Alaska, Alberta, and the Yukon), and this introduced population appears to be self-sustaining.—Jeffrey S. Marks.

15. Nesting features of falcons in north Kazakhstan. (Osobennosti gnezdovaniya sokolov v severnom Kazakhstane.) V. I. Pererva. 1985. Zool. Zh. 64:1556–1562. (Russian, English summary)—Five falcons breed in the Naurzaum Reserve in northern Kazakhstan: the Saker (*Falco cherrug*) and Red-footed Falcon (*F. verspertinus*), the Hobby (*F. subbuteo*), the Merlin (*F. columbarius*), and the Common Kestrel (*F. tinnunculus*). Common Kestrels use abandoned Magpie (*P. pica*) nests early in the season; Hobbies and Red-footed Falcons occupy others about a month later. Kestrels select nests within a very narrow range centered around 7 m above the ground; Hobbies and Red-footed Falcons have similar preferences, differing only in the range of nest elevations (6–9 m vs. 5–11 m). Although the author does not indicate this, the broader range and variance in nest heights selected by the Red-footed Falcon suggests a bimodal distribution in nest heights. Furthermore, the significant range of its nest site preference exceeds the heights of most available Magpie nests, which may indicate a greater effort needed to procure nests in its lower range. Nests in the upper range (7–11 m) may partially be satisfied by using Black Kite (*Milus migrans*) nests. Finally, the Saker Falcon seemed to prefer abandoned Imperial Eagle (*Aquila heliaca*) nests located 11–13 m above the ground, and to a much lesser extent, Black Kite nests. Merlins nested only in the last year of the study and in insufficient numbers to allow accurate interpretation.

Nest orientation seemed tied strongly to the prevailing northwestern winds, i.e., Kestrels and Hobbies that selected nests with southeastern exposures had the highest proportional productivity. Red-footed Falcons demonstrated a similar relationship with nests facing southwest, but the author believes this result may be biased by a smaller sample.

It is difficult to gauge the degree of competition among these falcons; indeed, it is barely mentioned in the article since the main thrust of the work is in elucidating the relationship between exposure and productivity. Unfortunately, results are not closely examined for statistical relevance, so it is left up to the reader to apply simple summary statistics.—Douglas Siegel-Causey.

16. Common Gulls successfully nesting on a roof in Aberdeen. M. A. Sullivan. 1985. Scottish Birds 13:229.—A pair of Mew Gulls (*Larus canus*) fledged 2 young from a clutch of 3 eggs on a flat office rooftop. A pair of oystercatchers (*Haematopus ostralegus*) also fledged 2 young from the same rooftop.—Jerome A. Jackson.

BEHAVIOR

(see also 2, 3, 4, 5, 9, 30, 38)

17. Replacement male Red-winged Blackbirds fail to kill unrelated offspring. S. Rohwer. 1985. Murrelet 66:37–43.—Red-winged Blackbird (*Agelaius phoeniceus*) males inhabiting small, isolated marshes in eastern Washington were removed from their territories early in the nesting season. Fifteen replacement males were exposed to eggs or young that were not their own. Rather than kill these unrelated offspring (thus forcing females to renest), replacement males treated them as they would their own young. Rohwer suggests that male Red-wings adopted unrelated young for future benefits, such as attracting additional mates that prefer already-mated males, and increasing the likelihood that original females would nest in the same territories in subsequent years.—Jeffrey S. Marks.

18. Elements of the nuptial behavior of the Little Bustard (*Tetrax tetrax*). (Elementy tokovogo povedeniya strepeta (*Tetrax tetrax*).) T. S. Ponomareva. 1985. Zool. Zh. 64:1747–1750. (Russian, English summary)—Unlike in the two other Soviet bustards, the male Little Bustard uses distinctive vocalizations (not given), and open-winged jumps to attract females in the distance. The author postulates a low population density and low visibility in the high grass steppes as possible selective forces in the development of these novel behaviors. Some new information is given concerning nesting behavior and other natural history.—Douglas Siegel-Causey.

19. Dipper covering eggs. M. Purvey. 1985. Scottish Birds 13:230.—Dippers (*Cinclus cinclus*) covered their completed clutch with dead leaves during nest absences.—Jerome A. Jackson.

20. Glider attacked by Golden Eagle. M. Gregory. 1985. Scottish Birds 13:230-231.—An adult male Golden Eagle (*Aquila chrysaetos*) made a steep dive at a soaring glider, striking it on the tail. The glider landed safely; the eagle did not. The eagle was found dead and had suffered a broken leg, a broken wing, and a crushed sternum. Its crop was empty. Tests for organochlorine residues showed low levels. No known breeding territory was near.

Three similar instances are cited (Gordon, The Golden Eagle, Collins, London, 1955: 112, 134; and two described in 1984 issues of the magazine Sailplane and Gliding—complete citations not given).—Jerome A. Jackson.

ECOLOGY

(see also 6, 7, 12, 18, 25, 26, 28, 29, 35, 36, 38, 42)

21. Contribution to our knowledge of the biology and ecology of the Pale-bellied Francolin *Francolinus ochropectus* Dorst and Jouanin. (Contribution à la connaissance de la biologie et de l'écologie de *Francolinus ochropectus* Dorst et Jouanin.) J. Blot. 1985. Alauda 53:244-256. (French, English abstract)—Pale-bellied Francolins occur in declining numbers in two areas of Djibouti north of the Gulf of Tadjourah: in the Godas Mountains (part of Day Forest) and the Mablas Mountains (in vestiges of forest in the Sismo Valley).

This paper deals with the natural history of the species in Djibouti and explores reasons for its decline. Males are larger than females. Body weight averages 707 g, wing length 204 mm, and tarsus length 68 mm. The nesting period is Jan-Apr. The nest (n = 1) consists of twigs, some moss, and a few feathers. The eggs are dull white.

Stomach samples indicate that the male's diet consists of termites (30%); snails, ants and other insects (10%); seeds (especially those of *Buxus hildebrandtii, Clutia abyssinica,* and *Juniperus procera;* 55%); and bits of grass leaves (*Gastridium ventricosum*) plus young shoots of *Digitaria* sp. (5%). Females and young birds (n = 1 in the latter case) consume fewer termites (10%), an equivalent percentage of insects and snails, and more seeds (70%) and plant parts (20%).

Predators on francolins include eagles, accipiters, genets, feral cats, monkeys, and snakes. However, the most important predators are humans who hunted francolins in Day Forest as recently as 1982, even though the latter is a national park where hunting was outlawed in 1972. Hunting is now very limited.

Pale-bellied Francolins occur in six habitats of which an open forest community dominated by junipers is the most important. Other habitats are dominated by *Olea africana, Buxus hildebrandtii, Ficus, Tarchonanthus camphoratus,* or a combination of *Buxus* and *Terminalia.* Each habitat is detailed in the text.

Pale-bellied Francolins forage (in the soil and leaf litter) during the early morning and late afternoon. They avoid areas where cattle graze. Between April and December, they live in small, stable, territorial groups, whose size averages 8 birds, but appears to vary as a function of habitat (just how is not explained). Pair formation occurs in late December.

Census data outside the breeding period show that the population of Pale-bellied Francolins in and around Day has fallen at an alarming rate since the late 1970s: from 5600 in 1978, to 3100 in 1981, to 1500 in 1984. The principal reason for the decline appears to be overgrazing of the birds' habitats by cattle, although hunting, lumbering, and fires associated with the recovery of honey have also contributed. As a result there has been substantial erosion of habitat, coupled with removal, earlier death and higher rates of parasitism of trees, loss of plant cover, and changes in microclimate. The reduction of ground vegetation, directly or indirectly tied to human activity, poses a serious threat to the Pale-bellied Francolin, which is now restricted to an area of about 5000 ha in Djibouti.—Michael D. Kern.

22. Species-specific acceptance levels in the mapping method. (Interpretatiecriteria voor broe-dvogelinventarisaties met de territoriumkartering.) R. G. M. Kwak and R. Meijer. 1985. Limosa 58:97–108. (Dutch, English summary)—These authors review the census techniques used in obtaining territory size of various species and the fashion in which they are mapped. They suggest that efficiency of the mapping applies only when "standard fieldwork conditions" apply (e.g., early morning, fair weather, 30–40 min/10 ha visits). They, however, found large differences between species. Some are easy to map and others difficult. They suggest that contemporary contact between adjacent territories is needed to acknowledge territories. Methods to exclude migrants during the census are suggested. Species-specific acceptance levels are necessary to be comparable on an international level. The authors provide a table of European species giving acceptance levels and identifying species in need of study.—Clayton M. White.

23. Wellingtonias and Treecreepers. N. Rankin. 1985. Scottish Birds 13:228.—Both European and North American populations of *Certhia familiaris* excavate roost sites into the bark of the giant redwood (*Sequoia gigantea*). Twenty-nine excavations were found in a single tree (ca. 120 years old) in Scotland.—Jerome A. Jackson.

24. European Starling–Eastern Bluebird nest site competition revisited. P. A. Zerhusen. 1986. Sialia 8:45–47.—This is a repeat of a study done in 1984. A single nest box of appropriate size for European Starlings was used to trap starlings from February through August 1985. Captured starlings were "disposed of." Captures of adult starlings were greatest from late February through April; captures of immatures peaked in July. Sixty-five adults and 28 immatures were captured. Although starlings are well-known cavity usurpers, competition with bluebirds or any other cavity-nesting species was not studied. No mention is made of other species that might have been captured in the nest box.—Jerome A. Jackson.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 29)

25. Bird populations and vegetation characteristics in managed and old-growth forests, northeastern Oregon. R. W. Mannan and E. C. Meslow. 1984. J. Wildl. Manage. 48:1219–1238.—Old-growth forests of western North America develop over a long time free of catastrophic disturbances. Their big trees are valuable timber resources. Old-growth also provides a wildlife habitat structure that is not found in younger forests managed for timber production. The authors of this paper state that "At current rates of harvest, all old-growth forests not associated with some form of reserve system will be eliminated within 4 decades," pointing to an important conservation issue. Mannan and Meslow tested the hypothesis that the differing habitat structure found between old-growth and managed forests influences the densities of bird populations through differences in the amount of nesting and foraging substrates. Their results have important implications for wildlife management and conservation.

Study sites were established in Oregon's Wallowa-Whitman National Forest. Four sites were in 85-yr-old managed forest and 4 in old-growth forest 200+ yr old. Old-growth stands were about 50 ha in area; managed stands were 65–75 ha. Dominant trees were Douglas-fir (*Pseudotsuga menziesii*) and Ponderosa pine (*Pinus ponderosa*). Bird populations were censused (variable circular plot method) for 3 yr at 120 sample points, 8 points per site. Vegetation structure was measured at the same points. Stepwise discriminant function analysis selected vegetation variables that best distinguished between old-growth and managed forest. Nest site vegetation structure versus that of randomly located plots and the foraging ecology of selected bird species were examined to see how birds used the vegetation in each type of forest.

Mean values of the number of large trees, snags (dead trees), small understory trees, and tree height diversity were all greater in old-growth forests. These variables "distinguished old-growth forests from managed forests" and "could be associated, either directly or indirectly, with differences in bird populations between managed and old-growth forests." Large dead trees were of particular importance in differentiating bird populations of the 2 forest types. Bird species typically more abundant in old-growth were Townsend's Warbler (*Dendroica townsendi*), Golden-crowned Kinglet (*Regulus satrapa*), and Red-breasted Nuthatch (*Sitta canadensis*). Hole-nesting birds were more abundant in old-growth stands; all used snags as nest sites. Typically abundant birds of managed stands were Dusky Flycatcher (*Empidonax oberholseri*), Chipping Sparrow (*Spizella passerina*), and Ruby-crowned Kinglet (*Regulus calendula*). Degree of canopy openness was an important influence on densities of those bird species more abundant in managed forest. Several preferences of foraging birds for certain tree species are documented.

The authors conclude by listing species that will either increase or decrease if old-growth forests are eliminated from intensive timber management areas. They state that the Northern Goshawk (*Accipiter gentilis*), Vaux's Swift (*Chaetura vauxi*) and the Pileated Woodpecker (*Dryocopus pileatus*) (along with its associated secondary cavity nesters) "may be extirpated on a region-wide basis" if old-growth is eliminated. They suggest the maintenance of patches or islands of old-growth habitat in areas intensively managed for timber, a concept expanded upon by Harris (The fragmented forest: island biogeography theory and the preservation of biotic diversity, University of Chicago Press, 1984).—Richard A. Lent.

26. The effects of forest management on cavity-nesting birds in northwestern Washington. J. E. Zarnowitz and D. A. Manuwal. 1985. J. Wildl. Manage. 49:255-263.—Populations and nest site characteristics of cavity-nesting birds were studied in 4 successional stages of managed western hemlock (*Tsuga heterophylla*)-Douglas-fir (*Pseudotsuga menziesii*) forest in Olympic National Forest. Sixteen study plots contained either few ("clean plots") or many ("snag plots") snags (dead trees). Successional stages were 1-15 yr (clear-cut), 25-50 yr, 60-120 yr, and >200 yr (old-growth).

Spot-mapping detected 14 cavity-nesting species; active nests were found of 11 species. Richness, diversity, and density of cavity-nesters increased with increasing snag density. Active cavity nests were more abundant in snag vs. clean plots. The Hairy Woodpecker (*Picoides villosus*) was the most abundant cavity-nester, occurred in all successional stages, and selected western hemlock snags for nest sites.

Each snag and clean plot was visited 7 times. Clean plots were censused in 1979 in the morning and afternoon. Snag plots were censused in 1980 in morning only. There is no discussion of potential effects on census results of this differing sampling regime, nor of possible effects of annual variation in cavity-nester populations.

This study illustrates "the dependence of cavity-nesting birds on snags," which are "a limited and limiting resource" in managed forests of the Pacific Northwest. Creation of young stands (<50 yr old) and elimination of large snags will have an impact on cavity-nesting birds. The authors recommend forestry practices that retain enough snags of sufficient size to maintain diversity of cavity-nesters, admitting that practices such as leaving large snags in clear-cuts "will require innovative silvicultural techniques."—Richard A. Lent.

27. Amelia R. Laskey, 1885-1973. B. Wheeler. 1986. Sialia 8:69-70.—This brief "obituary" discusses a bluebird trail in Nashville, Tennessee, begun in 1936 and continued now by park staff. Mrs. Laskey was given the North American Bluebird Society Research Award posthumously in 1983.—Jerome A. Jackson.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see also 25, 26)

28. The breeding birds of agricultural land in south-east (Scotland). S. R. D. da Prato. 1985. Scottish Birds 13:203-216.—This single season (1984) survey of 1735 ha of predominantly agricultural land in SE Scotland provided the results we have come to expect:

as structural diversity of the habitat increased, so did the number of bird territories/km². The greatest density (2250 territories/km²) was found in an area under consideration as a nature reserve. Habitat there included regenerating scrub with some mature trees. Lowest density (83 territories/km²) was associated with "farmland."—Jerome A. Jackson.

29. Effects of even-age timber management on bird communities of the longleaf pine forest in northern Florida. R. W. Repenning and R. F. Labisky. 1985. J. Wildl. Manage. 49:1088–1098.—This study examines effects on breeding and wintering birds of converting natural longleaf pine (*Pinus palustris*) forests to slash pine (*P. elliottii*) plantations in the Apalachicola National Forest. The hypothesis tested was "that breeding and winter bird communities of the longleaf pine forest were similar to those of different-aged stands of planted slash pine in the managed forest."

Thirty-two species of breeding birds were detected by replicated transect sampling in a natural longleaf pine forest (50+ yr old) and 4 age-classes (1, 10, 24, and 40 yr old) of slash pine plantation. Density, species richness, species diversity, and biomass of breeding birds in the longleaf pine stand were all significantly greater than in any plantation age class. These community parameters were positively correlated with stand age, although the paper's abstract conflicts with the text (p. 1091) by stating that breeding bird biomass was not correlated with stand age. There was little similarity in breeding bird species composition between longleaf pine forest and slash pine plantations. Density of breeding season bark foragers increased with increasing stand age. Ground, foliage, and cavity nesters all showed greater species richness and density in longleaf pine than in any slash pine plantation. Winter bird species richness (39 species total) and diversity did not differ among stands. Winter density and biomass were different only between one- and 24-yr-old plantations.

Plantations did not support a breeding bird community similar to that of a natural longleaf pine forest, although the 40-yr plantation did support a similar winter bird community. The authors note that longleaf pine forest apparently has a "population augmentation" function in southern pinelands by acting as a source of bird species that colonize and use sub-optimum plantation habitat. Conversion of longleaf pine forest to slash pine plantations thus "has a long-term negative effect on the breeding bird community of natural longleaf pinelands."—Richard A. Lent.

30. Bird impact by middle-sized wind turbines—on flight behaviour, victims, and disturbance. (Vogelhinder door middelgrote windturbines—over vlieggedrag, slachtoffers en varstoring.) J. E. Winkelman. 1985. Limosa 58:117–121. (Dutch, English summary)—Medium-sized wind turbines (tower height 10–30 m, rotor diameter 7–25 m, power 50–300 kW) were studied at 6 sites to determine effects on birds. Of the 6200 bird flocks observed, only 13% of the migrant flocks and 5% of the local flights showed flight behavior changes. Some flight patterns suggested habituation by local birds to turbines. Flock size did not seem to influence response. Of the 50 groups within reach of the rotor, 38% showed a reaction. No dead birds were found within 50 m of the turbines. The conclusion was that chance of collision with medium-sized turbines in daylight and good weather is almost zero.—Clayton M. White.

31. Oil-related eider mortality in Scapa Flow, Orkney. E. R. Meek. Scottish Birds 13:225–228.—During February-March 1984, 97 Common Eiders (*Somateria mollissima*; 80% males) were found dead. Although some birds had heavy parasite loads, the ultimate cause of mortality was thought to be a spill of crude oil which occurred 6 days prior to the first notice of mortality. Biodegraded crude oil was found on the plumage and in the digestive tract of birds examined.—Jerome A. Jackson.

PARASITES AND DISEASES

(see 31)

PHYSIOLOGY

32. Changes in the content of magnesium, copper, calcium, nitrogen and phosphorous in female House Sparrows during the breeding cycle. B. Pinowska and K.

Krasnicki. 1985. Ardea 73:175–182.—Concentrations of Mg and Cu increased until the day preceding ovulation. Mg then decreased through ovulation but remained constant thereafter. Mg was lowest in non-breeding females. Cu concentrations fell after the last ovulation. No changes were noted in Ca, P, or N levels. Clutch size depended on Mg retained at the onset of laying.—Clayton M. White.

33. Sound transmitting functions of the middle ear in birds. 3. Dynamic state regimes of the sound-transmitting system and reflex activity of the middle ear muscle. (Zbukoperedayushchie funktsii srednego ukha ptits. 3. Rezhimy dinamicheskogo sostoyaniya zvukoperedayushchey sistemy i reflektorhaya aktivnost sredneushnoy myshtsy.) V. D. Anisimov and V. D. Ilyichev. 1985. Zool. Zh. 64:1672–1684. (Russian, English summary)—This article continues these authors' previously published work on acoustic mechanisms of the avian middle ear. In this work, direct measurement of the muscle reflex activity revealed a 3-stage intensification of sound response in relation to intensity, and a tuning mechanism for biologically relevant sounds. In 7 species of birds (Strigidae and Corvidae), the specific regulatory and protective reflexes operate to selectively transform the external signal to the cochlear membrane. The findings are supported by detailed illustrations and frequency-response diagrams of the dynamic and morphological responses to sound stimuli.—Douglas Siegel-Causey.

MORPHOLOGY AND ANATOMY

(see also 39, 44)

34. Terrestrial isopods for preparing delicate vertebrate skeletons. V. C. Maiorana and L. M. Van Valen. 1985. Syst. Zool. 34:242–245.—Preparation of vertebrate skeletons usually employs dermestid beetles. This is largely successful, but specimens, particularly small ones, that are left too long may become disarticulated or lose smaller elements. It is reported here that terrestrial isopods also produce good skeletal preparations of small specimens, but largely without disarticulation or element loss. Furthermore, isopods, requiring moist habitats, present little danger to research collections. Procedures for collecting and maintaining isopod colonies are discussed.—Peter F. Cannell.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 7, 9, 11, 42)

35. The distribution of Buller's Shearwater (*Puffinus bulleri*) in the North Pacific Ocean. T. R. Wahl. 1985. Notornis 32:109–117.—Recent systematic surveys plus many casual observations show that Buller's Shearwater arrives in subarctic areas of the North Pacific in June and spreads eastward to the coast of Alaska by August. Wahl interprets sightings off the west coast, from British Columbia to southern California, in August–October, as pertaining to non-breeders. Limited data seem to confirm a suggestion by D. Ainley that major concentrations on the west coast of North America precede periods of above-average surface-water temperatures.—J. R. Jehl, Jr.

36. Some data on seabird abundance in Indonesian waters, July/August 1984. G. C. Cadee. 1985. Ardea 73:183–188.—In the Java Sea inshore seabirds decreased with distance from land. In the Indian Ocean more species were present and numbers increased with distance from land. In the Banda Sea variation in abundance was large, apparently a function of spotty and local food sources. There is apparently an area of high productivity in a frontal zone at the edge of lower salinity Arofura Sea water.—Clayton M. White.

37. The biogeographic evidence supporting the Pleistocene forest refuge hypothesis. E. Mayr and R. J. O'Hara. 1986. Evolution 40:55–67.—It has become common to explain distribution patterns of tropical forest organisms, including areas of endemism, in terms of the Pleistocene refuge hypothesis, developed (and defended) in part by ornithologists (e.g., Jurgen Haffer for South America, Alan Keast for Australia). In contrast, John Endler has maintained that observed biogeographical patterns can be explained equally well by current ecological effects. Further, he has argued that 2 of 3 predictions of the refuge hypothesis are not upheld, concluding that "much more work needs to be done to sort out the hypotheses" (Am. Zool. 22:443, 1982).

Here, Mayr and O'Hara, refuge advocates, defend the theory. Like Endler, they compare West African bird distributions to postulated tropical forest refugia, but they examine a somewhat different set of birds based on stricter, probably better, assumptions. They do not discuss or give references to the methods of locating these refuges, but the implication is that they are cross-taxonomic areas of endemism.

Their analysis does uphold Endler's first prediction that contact zones should be roughly between refugia. They then argue convincingly that Endler's second prediction, about contact zone width, is unrealistic and not testable given current knowledge. They continue, arguing that distributions of endemic and disjunct species correspond to refuge locations and lend additional support to the theory.

The article concluded with suggestions of research directions intended to enhance understanding "of tropical diversity." These include further collecting, study of specific contact zone dynamics, and phylogenetic analysis. Except for the last, the bearing on the refuge hypothesis is not addressed. It does seem very likely that refuges existed and that they influenced biotic distributions, but Endler's call for critical evaluation of alternate hypotheses remains valid until an increased level of sophistication can be brought to such studies.—Peter F. Cannell.

SYSTEMATICS AND PALEONTOLOGY

(see 42)

EVOLUTION AND GENETICS

(see also 37)

38. The use of phylogeny in behavior and ecology. F. S. Dobson. 1985. Evolution 39:1384–1388.—It has long been known that history (relationship) and ecology (selection), operating on different time scales, have each influenced current morphologies. Systematists are acutely aware of the problem of convergence, but ecologists have tended to disregard historical components, preferring strictly adaptationist interpretations. Here, Dobson points out that shared features may have been inherited from a common ancestor and not relate to any aspect of the current environment, and discusses tests of this idea. Papers with similar themes include those by Lauder (Paleobiol. 7:430–442, 1981; J. Theoret. Biol. 97: 57–67, 1982), Liem and Wake (pp. 366–377, *in* Hildebrand et al., eds. Functional vertebrate morphology, Harvard Univ. Press, 1985) and a quantitative approach by Cheverud et al. (Evolution 39:1335–1351, 1985).

The idea is simple. Behavioral, ecological, or morphological features may be compared to a phylogeny that is independently derived. Features restricted to a single monophyletic clade may have evolved just once in a common ancestor (which may have lived in a different environment). Derived features which appear sporadically in different lineages are implicated as having evolved independently, perhaps due to selection. The example presented by Dobson is on the occurrence of a particular "run-jump" behavior among prairie dog genera; it appears to be restricted to two sister-genera so that in this case the possibility of common inheritance exists.

The presentation of this article is clear and the point is well taken. The organization of behavioral and ecological data in a form amenable to phylogenetic analysis would be a beneficial by-product of this line of thought. The weakness, mentioned by Dobson, is the requirement of a well-corroborated cladistic phylogeny on which there is "little disagreement." Any practicing avian systematist will agree that these are difficult to find.—Peter F. Cannell.

39. Monophyly of the Tyrannidae (Aves): comparison of morphology and DNA. M. C. McKitrick. 1985. Syst. Zool. 34:35–45.—A review of 11 morphological features that have been associated with the Tyrannidae shows that in a cladistic sense none actually corroborates monophyly of the family as traditionally conceived. Eight characters are simply rejected: some are highly variable or vague in meaning, while others actually represent primitive conditions. The increased rigor of a cladistic approach is apparent.

Three characters do seem to be derived, but at slightly more or less inclusive levels than "the Tyrannidae"; alternative phylogenies suggested by these are presented (the characters are not totally congruent). As in other recent studies, resulting clades include a mixture of cotingids, piprids, and tyrannids in partial modification of traditional treatments.

Results based on DNA-DNA hybridization analyses (Sibley and Ahlquist, Orinthol. Monogr. 36:396–428, 1985) are quite different. McKitrick makes the comparison and asks the question which increasingly confronts morphological systematists: how can one choose among phylogenetic hypotheses based upon such differing methodologies? Sibley and Ahlquist would have us believe that morphological data in conflict with DNA analyses are simply wrong (due to convergence), and that morphology is not useful for assessing relationship, but only for "describing" evolution along individual lineages. Alternatively, the possibility of lurking problems with DNA hybridization analysis does exist. McKitrick discusses the dilemma and makes two suggestions. First, morphologists should continue to test phylogenies with additional data sets; the search for new characters has always been a primary pursuit of systematists. Second, she recommends a critical review of the methods and assumptions of DNA hybridization; this has since been done, at least in part, and results (interesting ones) will be forthcoming.—Peter F. Cannell.

40. Color variation in urban populations of *Columba livia*, a possible mechanism for maintaining polymorphisms. (Izmenchivost okraski v gorodskikh populyatsiyakh sizykh golubey *Columba livia,* vozmozhnye mekhanizmy podderzhaniya polimorfizma.) N. Yu. Obukhova and A. G. Kreslavskii. 1986. Zool. Zh. 64:1685–1694. (Russian, English summary)—The authors continue their pioneering studies on urban populations of Rock Doves with this article that demonstrates several behavioral differences among color morphs. Blue doves did not spend nights in large groups like the other unpaired morphs, but were found alone or in small groups. Blue and blue-checker birds fed in small groups (fewer than 20), black birds usually in groups larger than 50 individuals. Blue doves nested in large territories and were most commonly the dominant pairs in mixed groups. Blue-checker and black morphs were generally found in more dense nesting aggregations, and were generally the subordinate members of groups. In mixed pairs, blue-blue pairs had an average nearest-neighbor distance of about 3.5 m, blue checker about 2.1 m, and black about 1.2 m. Mixed pairs were hierarchically ordered.

Obukhova and Kreslavskii concluded that the black phenotype is higher in urban areas than in the wild because of increased contact between individuals and the year-round resources of the urban environment. Behavioral stereotypy in the blue morphs did not allow them to use these urban differences fully, forcing them to occupy an intermediate niche.—Douglas Siegel-Causey.

FOOD AND FEEDING

(see 8, 13, 21)

SONGS AND VOCALIZATIONS

(see 41)

PHOTOGRAPHY AND RECORDINGS

41. A guide to Mississippi bird songs. W. H. Turcotte. 1985. Mississippi Department of Wildlife Conservation, Jackson, Mississippi. $15 (available from Mississippi Museum of Natural Science, 111 N. Jefferson St., Jackson, Mississippi 39202).—This collection of songs and calls of 115 species of birds known to occur in Mississippi was intended "for educational purposes only." Two cassette tapes and a 19-page explanatory booklet are included within an attractive plastic case. The quality of the recordings is very good, although the narration is sometimes not so good. The duration of individual recordings is exceptionally long. Localities are given for each recording, dates are not. The most curious inclusion is the first recording—of Western Grebe adults and young in South Dakota. The species is only known from Mississippi by a single winter record. Calls of two endangered species are included (Mississippi Sandhill Crane, *Grus canadensis pulla*; Red-cockaded Woodpecker, *Picoides borealis*). Unfortunately this first edition included so few copies that they were quickly sold out. A second edition is being contemplated.—Jerome A. Jackson.

BOOKS AND MONOGRAPHS

42. Neotropical ornithology. P. A. Buckley, M. S. Foster, E. S. Morton, R. S. Ridgely, and F. G. Buckley, eds. 1985. Ornithol. Monogr. No. 36, Am. Ornithol. Union, Washington, D.C. xi + 1041 p. $70.00.—The late Eugene Eisenmann (1906–1981) was one of the best-known and best-loved students of neotropical birds. As a memorial to Eisenmann, the American Ornithologists' Union assembled a collection of invited papers on the general subject of neotropical ornithology. The result is this impressive volume, including 63 papers on a wide range of topics. These have been grouped into "New taxa" (5 papers), "Zoogeography and distribution" (11), "Systematics" (9), "Evolution" (10), "Community and population ecology" (10), "Evolutionary and behavioral ecology" (8), "Breeding biology" (3) and "Conservation" (5). A brief appreciation of Eisenmann's life and work by T. R. Howell and an "Overview" by K. C. Parkes complete the collection.

As noted by Parkes, several areas of research are not represented among the papers. These include physiology, internal anatomy, growth and development, plumages and molts, paleontology, and vocalizations. In some cases, these are indicative of real gaps in the kinds of research being undertaken in the region. Most work presently being carried out is certainly oriented toward taxonomy, evolution, and ecology. Nevertheless, the volume does give a broad perspective of what ornithologists are currently studying in the neotropics. The papers run the gamut from specialized studies like T. W. Sherry's account of the foraging ecology of the Cocos Island Flycatcher (*Nesotriccus ridgwayi*) to broad treatments like J. Haffer's "Avian zoogeography of the neotropical lowlands" or C. G. Sibley and J. E. Ahlquist's "Phylogeny and classification of New World suboscine passerine birds."

Of special interest are the 5 papers describing new taxa—one full species and 5 subspecies—of which all but one are named for Eisenmann. Especially remarkable is the discovery of the Inca Wren (*Thryothorus eisenmanni*), first found in the previously well-studied locality of Machu Picchu, Peru, but not collected until 1974. Four of the new taxa are illustrated by color plates, as are 4 species or species-groups discussed elsewhere in the book.

Conservation problems receive appropriate emphasis, not just in the 5 papers in the "Conservation" section, but in many other papers as well. The article by S. L. Hilty on changes in the avifauna of Colombia merits particular attention; it is perhaps the first attempt to summarize avifaunal changes over such a large area, and the conclusions are alarming. Hilty presents a "Blue list" of 135 species (8% of the total avifauna of 1700 species) which have suffered severe population declines. The deforestation in the densely populated western half of Colombia (total population 28 million) is massive, and is indicative of the situation in many other parts of Latin America. It is to be hoped that accounts like Hilty's will be prepared for other countries, so that conservation and research efforts can be directed where they are most needed.

There are so many outstanding papers in this volume that it is difficult to choose favorites. Suffice it to say that several of the papers are certain to become classics, and that the entire collection is indispensable to the serious student of neotropical birds.

A serious deficiency, noted by the editors, is that only a few articles (5 by my count) are authored by native-born Latin American ornithologists. Although most ornithological research in the region is still carried out by transient North Americans and is published in English, there has been a recent increase in home-grown research and in publication in Spanish-language journals. The inclusion of Spanish abstracts for all the papers in this volume will assist, at least in a small way, in making the results of these studies better known in Latin America.

The American Ornithologists' Union and the editors and authors of this volume deserve congratulations for their efforts. The price of $70.00 is reasonable, and the editing and production are excellent. No ornithologist working in the neotropics should be without this collection, and it is indeed a fitting tribute to the memory of Eugene Eisenmann.—Wayne C. Weber.

43. An annotated bibliography of literature on the Spotted Owl. 1984. R. W. Campbell, E. D. Forsman, and B. M. Van der Raay. British Columbia Ministry of Forests, Land Management Report No. 24, 116 p. (Available from Queen's Printer, Victoria, British Columbia V8V 1X4 for $7.50 Canadian.)—This bibliography covers the literature on *Strix occidentalis* for the period 1859 to 1983 and includes 586 citations. Citations considered of particular importance were annotated, and editorial comments are included parenthetically concerning presumed accuracy. The compilers point out that until relatively recently little has been known about this nocturnal owl, but that has changed. Growing out of our knowledge of this species has been a concern about (a) "the owl's presumed imcompatibility with intensive forest management practices which directly, and indirectly may affect its living space, prey base, and reproductive capacity," and (b) "the possible threat posed by the invasion of the Barred Owl (*Strix varia*) into the range of the Spotted Owl." Each citation is listed alphabetically by author and is numbered serially for indexing. The index is set up according to 39 broad subject categories with six of those categories, i.e., American Birds/Audubon Field Notes, Checklists, Distribution (Specific Location), Foods, Habitat, and Sightings having geographic subdivisions by state and province within them. All citations are complete as possible to facilitate researchers obtaining them (this is especially useful for unpublished government reports which are included). This work should be indispensable for anyone seriously interested in the Spotted Owl.

It is encouraging to see bibliographies (especially those in the working category that have some sort of referencing system included within them) being published. If those that use them in researching the literature would acknowledge their use I think we would see many more of them being published.—Richard J. Clark.

44. Life of the Woodpecker. A. F. Skutch. 1985. Ibis Publ. Co., Santa Monica, California. 136 p. $49.95.—This enchanting narrative, based largely on the author's 40 years of field experience, is a popular book that summarizes much of what is known about the family Picidae. The book begins with an introduction by S. Dillon Ripley, followed by a short preface and a chapter highlighting several of the characteristics and adaptations unique to the Picidae. Subsequent chapters cover woodpecker foods and foraging, excavations and territories, daily activities, drumming, voice displays, and pair formation, nesting, and the fledging of young. Two final chapters deal with usurpers, parasites, and predators of woodpeckers, and the intimate but often precarious relationship between woodpeckers and man. Accompanying the text are 67 color plates by Dana Gardner, a taxonomic list of the woodpeckers of the world, and a useful bibliography.

Woodpeckers range from the diminutive Olivaceous Piculet (*Picumnus olivaceus*) to the likely extinct 22-inch Imperial Woodpecker (*Campephilus imperialis*). The zygodactyl toe arrangement of woodpeckers is found in only two other bird orders. As an adaptation for feeding on prey found in cracks and crevices, many woodpeckers are equipped with a row of recurved barbs on the tip of the tongue for prey capture. Members of this family are also endowed with extraordinarily long tongues that can be extended as much as 10 cm, enabling them to reach food deep within a tree. The latter adaptation is achieved because the tongue extends around the back of the skull, over the crown, and either winds around the right eyeball or embeds in the hollow upper mandible. This structural arrangement not only benefits such species as Pileated (*Dryocopus pileatus*) and Lineated (*D. lineatus*) woodpeckers who probe deep into the crevices of tree trunks for food, but also those species that frequently feed from terrestrial ant hills such as Common Flickers (*Colaptes auratus*), Green Woodpeckers (*Picus viridis*), and Wrynecks (*Jynx torquilla*). Aside from gleaning and probing, Skutch emphasizes other foraging methods found in the Picidae. Such methods include flycatching, perfected to an art by the Lewis' Woodpecker (*Melanerpes lewis*), sapsucking, used extensively among the *Sphyrapicus*, and mast storing, most advanced in the Acorn Woodpecker (*Melanerpes formicivorus*). Skutch repeatedly uses the word "drill" to describe the foraging techniques (and in referring to cavity excavation) of some woodpecker species. This term implies a twisting motion, and words such as "excavate" or "chisel" may be more appropriate.

Many woodpecker species live in treeless habitats. Ground Woodpeckers (*Geocolaptes olivaceus*) of Africa, and Andean Flickers (*Colaptes rupicola*) dig upward slanting burrows along roadside or stream banks in which to nest. Others, even in the presence of trees, occupy unwanted nest sites. Rufous Woodpeckers (*Celeus brachyurus*) of India, Ceylon, and southeastern Asia, excavate nest cavities in the oval nests of ants (*Crematogaster*) found in tree branches from 3–15 m above the ground. The ants, which attack other intruders, crawl over the woodpecker eggs and nestlings without harming them.

Throughout the book, Skutch employs anthropomorphic phrases in describing the various habits and activities of woodpeckers. For instance he states, ". . . like us, they often seem to be impelled by an irresistible compulsion to work, carving more holes than they need, as we too often overwork ourselves to win superfluous goods." Although this is captivating prose, it leaves popular readers with false impressions about woodpeckers.

Aside from his personal experiences, Skutch draws on the knowledge of such noted students of the Picid family as Lester Short, Lawrence Kilham, and L. de K. Lawrence, especially when referring to woodpeckers of North America. Nevertheless the author does present misinformation on a few of the North American species. For instance, he states that only two bird species, the Northern Flicker (*Colaptes auratus*) and the Mourning Dove (*Zenaida macroura*), nest in all of the 49 mainland United States. Several species, including other woodpeckers, are equally wide-ranging. The range map of the major races of Northern Flickers shows their boundaries bordering each other, but with no overlap. This is somewhat misleading since these races commonly interbreed in west-central North America. In referring to territory or range sizes of Red-cockaded Woodpeckers (*Picoides borealis*) in the southeastern United States, Skutch's upper limit of 67 ha (167 acres) is somewhat conservative. Finally, the author, drawing on observations made by L. Kilham, states that those woodpeckers that nest in soft, rotting wood, easily accessed by predators and more apt to topple, such as Downy Woodpeckers (*Picoides pubescens*), have short nestling periods of about 3 weeks. On the other hand, those species that nest in firmer, more stable wood, such as Red-cockaded and Hairy (*P. villosus*) woodpeckers, tend to have longer nestling periods of about 4 weeks. I find this information somewhat inconsistent with my personal observations. For instance, the author states that Red-headed Woodpeckers (*Melanerpes erythrocephalus*) have a nestling period of 30 days, and yet this species often tends to nest in snags so rotten and unstable that they often collapse before the nesting season is complete.

In the chapter on cavity usurpers, predators, and parasites, Skutch mentions the aggressive Tawny-winged Woodcreeper (*Dendrocincla anabatina*) as a threat to roosting Golden-naped (*Melanerpes chrysauchen*) and other tropical American woodpeckers. This small brown woodcreeper attacks woodpeckers flying to their roost cavities, striking them with eough force to cause feathers to fly. More often than not, a Golden-nape that encounters competition from a Tawny-winged Woodcreeper will lose its roost cavity to the latter. European Starlings (*Sturna vulgaris*) are probably the dominant usurper of woodpecker cavities in North America. The author mentions that Northern Flickers (yellow-shafted race) and Acorn Woodpeckers (*Melanerpes formicivorus*) are common victims of Starling competition for cavities, but fails to mention that Red-bellied (*Melanerpes carolinus*), Red-headed, and Hairy woodpeckers also frequently forfeit nest and roost sites to the persistent Starling. As brood parasites of woodpeckers, African honeyguides are very detrimental. Sharp egg teeth on both the upper and lower mandibles of honeyguide nestlings allow them to break unhatched eggs or to peck surrounding woodpecker nestlings to death, thus deriving full benefits from the woodpecker parents.

In the final chapter, the author makes clear his stand on conservation. "Tree-destroying man," he states, is by far the greatest threat to the existence of many woodpecker species. Modern forestry practices do not favor woodpeckers or other cavity-nesting species since most trees are harvested long before they are habitable for nesting by the Picids. Even older dying and dead trees scattered throughout forests, parks, and suburbs are all too often cut without considering the role they play in the survival of various cavity nesting species. A world without trees and woodpeckers to inhabit them would indeed be an impoverished place. "Flourishing trees betoken a healthy environment, and woodpeckers are an index of the abundance of trees in all stages of their natural cycle of germination, growth, flowering, fruiting, and decay."

Life of the Woodpecker may be of only minor use to the professional ornithologist, but it should be a useful and interesting resource for amateurs. The color plates are well done and complement the text.—Danny J. Ingold.

ROGER TORY PETERSON INSTITUTE CREATED

The Roger Tory Peterson Institute for the Study of Natural History began full-scale operations this year with the hiring of its first President, Dr. Harold D. Mahan, former director of The Cleveland Museum of Natural History. The Institute's primary mission is to develop programs to increase the number of serious students of natural history.

The Institute, located in Jamestown, New York, near Lake Chautauqua, has been designated as the permanent repository for Roger Tory Peterson's artwork, correspondence, slides, movies, and other materials related to his remarkable lifetime achievements.

A $5-million headquarters facility is currently being designed, with a mid-1988 opening projected. The building will contain permanent and temporary exhibit areas for wildlife art shows (Peterson and other artists), dramatic displays on world-wide natural history, a 400-seat auditorium with 70 mm film-capability, an extensive natural history library, and research collections of natural history materials. The Institute's staff will eventually include 45 scientists, program coordinators, writers, and editors, with a mission of developing a high-quality, unique program of natural history experiences and publications on a world-wide scale. Ultimately, the Institute will have facilities and programs throughout the United States.

Early members will receive *Field Guide to the Roger Tory Peterson Institute,* a bi-monthly newsletter with articles on the progress of the Institute's construction and program development. All members will receive invitations to special events for groundbreaking and dedication of the Roger Tory Peterson Institute building, and notification of Institute programs across the U.S.

Information about the Institute and its membership program may be obtained by writing: *Roger Tory Peterson Institute, 525 Falconer Street, Jamestown, NY 14701.* (716) 665-5220 ext. 448, or 665-3794.