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RECENT LITERATURE

Edited by Jerome A. Jackson

BANDING AND LONGEVITY

(see also 15, 16)

1. Survival of Brown Honeyeaters in south-east Queensland. J. S. Robertson and P. F. Woodall. 1987. Emu 87:137–142.—This is a study that many banders could emulate. The authors measured survival of the nectar-feeding *Lichmera indistincta* by two mark-recapture techniques (see Brownie et al., U.S. Fish Wildl. Serv. Resour. Publ. 131, 1978, for a review) by 14 years of capture data at a small station. Number of captures varied greatly, from seven in one year to a high of 324. This is typical of such operations, and also of varying bird populations. Adults with black gapes (largely males) had a higher survival rate than apparent females. Survival rate was higher (0.56) than in many other small passerines. The problem with this type of data is that one apparently needs fairly substantial captures in order to get estimates with reasonably small errors. Depending upon the recapture rate, this could mean as many as 300 birds in a year. Despite this handicap, a bander could make a good contribution to the literature using these techniques, even with smaller samples.—C. J. Ralph.

2. Natal dispersal in the nuthatch. E. Matthysen and K. H. Schmidt. 1987. Ornis Scand. 18:313–316.—In bird species with a resource-defense mating system, natal dispersal distance is usually shorter for males than for females. In theory, familiarity with the natal area facilitates territory establishment by males, whereas females benefit by dispersing in search of high quality territories held by males (Greenwood, Anim. Behav. 28:1140–1162, 1980). Both sexes of European Nuthatches (*Sitta europaea*) defend territories year-round. Thus, one might predict an absence of sex bias in natal dispersal for this species.

From 1970–1985, 1515 nuthatch nestlings were banded in nest boxes distributed over 400 km^2 in West Germany. This paper is based on 55 of these birds (29 males and 26 females) that were recaptured as adults. Median distance between birth site and recapture site was 800 m for females (range = 36–11,300 m) and 1120 m for males (range = 106–6100 m), which is about 4 or 5 territory widths. There was no difference in mean dispersal distance between sexes nor between young from early and late broods. Territory establishment and pair-bonding in nuthatches may occur only a few weeks after young are independent, and sex roles in establishment and defense of territories appear to be equal. This study provides a nice test of Greenwood's resource-defense hypothesis.—Jeff Marks.

MIGRATION, ORIENTATION, AND HOMING

(see 11, 16, 42)

POPULATION DYNAMICS

(see also 1, 2, 11, 15, 23)

3. Breeding status and population trends of the Goshawk *Accipiter gentilis* in Switzerland. (Bestand und Bestandsentwicklung des Habichts *Accipiter gentilis* in der Schweiz.) U. Bühler und P.-A. Oggier. 1987. Ornithol. Beob. 84:71–94. (German.)—Census data indicate a large decline in Goshawk numbers prior to 1960 in the Swiss Lowlands, and smaller declines in the Jura and Prealps areas. Unrestricted shooting of Goshawks (prohibited since 1962) was an important factor in the population decline during that time. By the end of the 1970s population densities in these areas had recovered considerably. Populations in the central Alps remained stable during the same period. The highest population density during a 1981/1982 census was in the central Alps (4.4–7.0 pairs/100 km^2), and the lowest in the Lowlands and Jura (1.5–3.8 pairs/100 km^2). Changes in land use, resulting in decreased food supply for the birds, seems to be primarily responsible for the current low population densities in the Lowland and the Jura areas.—Robert C. Beason.

NESTING AND REPRODUCTION

(see also 15, 24, 26, 27, 41, 43)

4. Nesting of the Hobby (*Falco subbuteo*) on electric pylons. (Des nidifications sur pylônes électriques chez le Faucon hobereau, *Falco subbuteo.*) C. Dronneau and B. Wassmer. 1986. Nos Oiseaux 38:363–366. (French, English summary.)—Hobbies on the plains of Alsace, eastern France, commonly breed in old nests of Carrion Crows (*Corvus corone*) on electric pylons. Nineteen of 65 nests discovered between 1982 and 1985 were on pylons. These pylons were in wooded as well as tree-poor areas, hence, not alternative nest sites. Nor did their use seem to be a specialization on the part of individual pairs of hobbies. The authors did not observe chick mortality from electric shocks nor deleterious effects of electric ionization on the eggs or young. Hobbies nesting on pylons averaged 2.83 young/breeding pair vs. 2.38 for hobbies nesting in trees.—Michael D. Kern.

5. Data concerning the breeding biology of the Short-toed Treecreeper, *Certhia brachydactyla*, in the French mediterranean region. (Données sur la biologie de reproduction du Grimpereau des jardins, *Certhia brachydactyla,* en région méditerranéenne française.) P. Isenmann, P. Cramm, and A. Clamens. 1986. Nos Oiseaux 38:359–362. (French, very brief English summary.)—This little-studied species is the only treecreeper that nests in mediterranean southern France. Data reported are for two oak woods near Quissac in the Montpellier region, 1982–1986. Densities in these woods (up to 9.4 pair/10 ha) were higher than those most often cited (1–3 pair/10 ha). The large nest consisted of a frame of branches and twigs and a small cup of moss, wool, and feathers. Nest-building occurred in late March and required 17–31 d. First clutches were laid between 5 Apr. and 8 May (average = 18 Apr.), as in more northerly situated populations. However, the clutch size (4–6 eggs; 5.0 on average) was significantly smaller by one egg than in central European populations (Switzerland, Luxembourg, and East Germany). The nestling period was 17–18 days, as reported in Germany. Reproductive success (=mean number of chicks fledged/eggs laid by nest) was 0.57. Second clutches averaged 4.5 eggs.—Michael D. Kern.

6. Notes about nesting Squacco Herons. (Notes sur des Hérons crabiers nicheurs.) J.-Y. Berthelot and G. Navizet. 1986. Nos Oiseaux 38:353–358. (French, very brief English summary.)—Observations from a mixed heron rookery in Camargue, France, where several pairs of Squacco Herons (*Ardeola ralloides*) nest with *Nycticorax nycticorax* and *Egretta garzetta.* For Squacco Herons, (1) possession of a finished nest is not indispensible for pair formation, (2) the male is initially responsible for choosing the nest site and beginning the construction of the nest, (3) the female becomes progressively more involved in nest-building and eventually monopolizes the activity, the male bringing her branches, which she puts in place, (4) on each return of members of the pair to the nest, there is a greeting in which the two birds puff up their plumage, (5) copulation (described in detail; on average 1 every 4 h) is similar to that performed by *Ardea cinerea* and requires no special preliminary behavior, and (6) approach of a conspecific heron within 5–6 m of the nest provokes aggressive flight by the male and bristling of the plumage of both birds in the pair.—Michael D. Kern.

7. Breeding periodicity, productivity and conservation of the Martial Eagle. K. Hustler and W. W. Howells. 1987. Ostrich 58:135–138.—Between 1973 and 1984, 28 Martial Eagle (*Polemaetus bellicosus*) territories were monitored in Hwange National Park, Zimbabwe. Chicks reared per breeding attempt averaged 0.52; of attempts that failed, most did so during nest building or with eggs. Nesting was either annual or biennial. The authors hypothesize that frequency of nesting depends on one or two factors influencing the length of the post-nestling dependence period: (1) survival of chicks to the end of the period may preclude annual nesting, but young being shot when preying on livestock may cause more frequent nesting attempts; (2) weather may cause variation in food availability, so that in dry years the dependence period is prolonged, preventing annual nesting. Conservation of Martial Eagles is also discussed.—Malcolm F. Hodges, Jr.

8. A review of parent-offspring conflict and brood reduction in the Pelecaniformes. H. Drummond. 1987. Colonial Waterbirds 10:1–15.—The author examines four families of Pelecaniformes to test predictions of the theory of parent-offspring conflict. In

1974 Trivers suggested that natural selection should produce predictable levels of conflict between parents and their offspring. Drummond discusses the predictions generated by this and other parent-offspring models. The evidence presented concerns the conflict in parental distribution of food resources among brood members, in brood reduction, and parental investment between broods.

In the Sulidae the apparent obligate brood reduction in Masked Booby (*Sula dactylatra*), and Brown Booby (*S. leucogaster*) suggests parent-senior chick cooperation rather than the predicted conflict, and a similar pattern is found in Blue-footed Boobies (*S. nebouxii*). However, there is evidence of parent-offspring conflict over food distribution among sibs in the same and successive broods.

In the Pelecanidae most White Pelicans (*Pelecanus erythrorhynchos*) practice siblicidal brood reduction apparently with parent-offspring cooperation. Some observations on pelicans are consistent with Trivers' and others' predictions of parent-offspring conflict over parental investment between broods.

The reported data are less complete for cormorants and anhingas and described as rudimentary for frigatebirds and tropicbirds.

Although close comparison of prediction with data will require further study, the author offers some tentative conclusions. He suggests that brood reduction may be universal among multiple-egg clutch species and that the reduction is probably an adaptation to variation in prey availability, individual feeding skills, and hatching failure. Most brood reduction seems to result from sibling begging competition and aggression without parental intervention, thus suggesting parent-offspring cooperation. The results of prediction and data comparisons with investment between successive broods are subject to a wide variety of interpretation and require further testing.

This is a thorough and thoughtful review paper with more than 100 references.—William E. Davis, Jr.

9. Long-term memory in egg predators: an experiment with a Hooded Crow. G. A. Sonerud and P. E. Fjeld. 1987. Ornis Scand. 18:323–325.—Use of nest sites for 2 consecutive attempts is influenced by the success of the first attempt. This suggests that the risk of nest failure is similar for consecutive attempts at the same site. At least two factors may explain this: (1) nest sites may differ in conspicuousness such that certain nests are more likely to be detected repeatedly by predators, and (2) predators may memorize the location of nests they have preyed upon. The authors tested whether Hooded Crows (*Corvus corone*) memorize nest locations from one year to the next or whether they detect certain nests that are more exposed.

A male crow that nested next to a 20-ha clear-cut was trapped and wing-tagged in 1984. During that year, he preyed upon 10 artificial nests that were randomly set out in the clear-cut. In 1985, the same kinds of nests were set out in 10 pairs—one at each of the exact 10 sites used in 1984 (experimentals) and another 30–40 m away from each of these sites (controls). Nests were set out under cover of darkness, were not marked in any way, and were watched from a blind continuously from sunrise to sunset. Vegetative cover did not differ between paired nests. Within 2 d, the crow preyed upon 18 of the 20 nests. In all but one pair, the experimental nest was discovered before the control nest. The single control nest discovered first was found while the crow was caching eggs from an adjacent experimental nest.

These results strongly support the notion that Hooded Crows memorize the location of sites where they have previously found nests. They also suggest that birds whose nests are taken by corvids should shift nest locations after nest predation, both within and between years.—Jeff Marks.

10. Clutch size, breeding success and brood size experiments in Tengmalm's Owl *Aegolius funereus*: a test of hypotheses. E. Korpimäki. 1987. Ornis Scand. 18:277–284.—The four main hypotheses on the evolution of clutch size in birds state that clutch size is related to: (1) the mean number of young that parents can raise, (2) the amount of food available to the female during egg-laying, (3) the risk of nest predation (smaller clutches are at lower risk), and (4) the size of the nest (larger nests can hold more eggs). These hypotheses have not been tested with data from owls.

From 1973–1985, clutch size of Tengmalm's Owls in western Finland ranged from 1–10 (mean = 5.6, mode = 5–6, n = 412), and the number of fledglings per nesting attempt ranged from 0–8 (mean = 3.0, mode = 4–5, n = 445); 22.9% of these attempts failed. Both mean clutch size and mean number of fledglings per successful nest were significantly correlated with vole numbers each year (r_s = 0.85 and 0.74, respectively). Clutches of 7–10 were more productive per clutch and per egg than were the modal clutch sizes. Pine martens (*Martes martes*) destroyed 5.3% of the clutches. These clutches were significantly smaller than those not preyed upon. The smaller size of depredated clutches was not caused by higher predation during low vole years.

Single owlets (0 to 1 d old) were added to nine broods. Mortality rates of these broods were no higher than those of reduced or control broods. Young of reduced broods tended to be heavier and have longer tarsi than those of enlarged broods, but differences were not significant. There were no significant differences in adult body mass among the three groups, suggesting that brood enlargement did not affect condition of the parents.

Korpimäki rejects hypotheses one, three, and four because larger clutches (both natural and artificial) were more productive than modal ones (hypothesis one), clutches taken by martens were smaller than other clutches (hypothesis three), and nest box size was correlated with clutch size only during peak vole years (hypothesis four). Finnish Tengmalm's Owls lay eggs in early spring when snow is deep and the availability of voles is low. Median laying date is negatively correlated with vole numbers, whereas mean clutch size is positively correlated with vole numbers. Added to the results of the brood-size experiments, these data support hypothesis two, which states that clutch size is related to the amount of food available to laying females. Korpimäki (unpubl. data) has confirmed this by experimentally provisioning female Tengmalm's Owls during the pre-laying and laying periods.—Jeff Marks.

11. Sexual size dimorphism and disassortative mating in the Dunlin *Calidris alpina schinzii* in southern Sweden. P. E. Jönsson. 1987. Ornis Scand. 18:257–264.—Males arrived at breeding areas about 1–2 wk earlier than females and were significantly smaller than females in bill length, tarsus length, wing length, and body mass. Large females tended to arrive earlier and to initiate nests sooner than did small females. There was no correlation between arrival date and nest initiation date for males. New pairs seemed to mate disassortatively: small, short-billed males and large, long-billed females nested earlier than average-sized birds. Large females also laid larger eggs than did small females.

The lack of correlation between arrival date and nest initiation date for males suggests that females selectively mated with small, short-billed males. The activity areas of males overlapped considerably, and aggressive interactions between males were rare. Nests were also clumped, and nesting areas usually abandoned soon after hatching. Thus, differences in territory quality did not seem to be important in female mate choice.

Male Dunlins perform elaborate courtship flights (which include hovering) during the early breeding season. Small males should be more efficient fliers and more maneuverable than large males such that their courtship behavior is more attractive to females.

Small males may also have an advantage during brood-rearing. Adult Dunlins preferred to forage in the littoral zone. Dependent young, however, fed mostly on terrestrial invertebrates in upland habitats. Females abandoned broods 1 wk after hatching, whereafter males alone cared for the young. Brood-rearing males had little time to forage in the preferred habitat, and data suggest that this was a period of energetic stress for male Dunlins. Theoretically, small males should be able to allocate more time to brood attendance than would large males. Likewise, smaller-billed males probably forage more efficiently on uplands than do larger-billed males.

Females fed in the littoral zone year-round, which favors long bills. Large females also would be superior in dominance interactions with smaller females. Both of these factors could favorably influence mate choice, nest initiation, and egg volume.

This paper nicely suggests how mate choice and reversed size dimorphism in Dunlins are influenced both by sexual and natural selection.—Jeff Marks.

12. Bigyny in Tengmalm's Owl *Aegolius funereus*: effect of mating strategy on breeding success. B. G. Carlsson, B. Hörnfeldt, and O. Löfgren. 1987. Ornis Scand. 18: 237–243.—From 1982–1984, the authors recorded the frequency of polygynous (in all cases

bigynous) matings in Tengmalm's Owls nesting in boxes in northern Sweden. During 1982 and 1984, when vole numbers were high, 9% (n = 161) and 14% (n = 77), respectively, of the males trapped were polygynous. Vole numbers were low in 1983, and none of the five males trapped was polygynous. Secondary nests of polygynous males were located 650–2300 m from their respective primary nests and were initiated 2–42 d later. Polygynous males produced significantly more fledglings than did monogamous males (7.8 vs. 4.2 and 9.5 vs. 5.1 in 1982 and 1984, respectively). Moreover, site-tenacious polygynous males (i.e., nesting within 3 km of the previous year's nest) tended to produce more fledglings than did other polygynous males (8.8 vs. 7.3 and 10.8 vs. 8.7 in 1982 and 1984). Primary females produced significantly more fledglings than did secondary females (5.1 vs. 2.8 and 6.2 vs. 3.3 in 1982 and 1984), the difference being due mainly to poorer survival of nestlings at secondary nests. The number of stored prey in primary vs. secondary nests was equal during the laying and incubation periods but higher at primary nests after the eggs hatched.

Polygyny in Tengmalm's Owl usually occurs during years of vole abundance and may be simultaneous or sequential. Some polygynous males appear to be polyterritorial. The seasonal pattern of food storage at primary and secondary nests is consistent with the "deception hypothesis," wherein females are unable to correctly assess the mating status of polyterritorial males.—Jeff Marks.

BEHAVIOR

(see also 6, 8, 9, 11, 17, 18, 24, 48)

13. The paradox of age-related dominance in Brown-headed Cowbirds (*Molothrus ater*). P. J. Weatherhead and K. L. Teather. 1987. Can. J. Zool. 65:2354–2357.—Does dominance in one situation also mean dominance in another? The paradox established by this paper is that apparently it does not—at least not if all published results are taken at face value. Weatherhead and Teather report that during interactions at a food dish in an aviary, adult males tended to be dominant over yearling males (54 of 66 interactions), and that this difference was not entirely a function of the relative sizes of the birds in the two age classes. On the other hand, published field studies indicate that adult and yearling males are equally successful at obtaining mates. Either dominance in one situation is irrelevant to dominance in the other situation or one of the results is in error. Weatherhead and Teather suggest that the resolution may be that yearling males consort with females equally well as adult males, but that dominance of adult males may exist in terms of frequency of actual copulations. Resolution of the paradox will come only with further observations.—A. John Gatz, Jr.

ECOLOGY

(see also 29, 30, 43, 44, 48)

14. Seabirds found dead on New Zealand beaches since 1985, and a review of *Pterodroma* species recoveries since 1960. R. G. Powlesland. 1987. Notornis 34:237–252.—For many years the Ornithological Society of New Zealand has coordinated what must be the most comprehensive beached-bird study in the world. While the data from individual years are likely to be of interest only to specialists, the long-term data are of broader interest. These are now sufficiently extensive to allow an overview of mortality patterns and their associations with the natural history of individual species, as well as with annual variations in weather conditions. Powlesland's synopsis of mortality among various species of *Pterodroma* from 1960–1984 is worth emulating, as it illustrates the value of beached-bird studies, long-term research, and the contributions that amateurs can make to field biology.—J. R. Jehl, Jr.

15. Status of the Golden Eagle in one part of the Swiss Prealpes. (Situation de l'Aigle royal dans une partie des Préalpes suisses.) C. Henninger, G. Banderet, T. Blanc, and R. Cantin. 1986. Nos Oiseaux 38:315–322. (French, English summary.)—Collected observations of a population of 18 pairs of Golden Eagles (*Aquila chrysaetos*) in a 1600-km^2 study area in the Prealpes of SW Switzerland between 1963 and 1984. Average territory

size (89 km^2) was smaller than in the Alpes (100–300 km^2) probably because of differences in prey abundance. Each pair used 2–8 nests, 950–2050 m up in cornices and rock faces protected by overhangs (73%), rock faults (21%), or holes (6%); average dimensions were 200 × 150 cm and 60 cm thick. Most eyries were oriented SSE. For 12 pairs, nesting success was 0.5 chick/pair per year, which is about the same as at Ecos, NW France (0.58), where this species' density is high, but lower than in the Alpes (0.74–0.97), where density is low. In years when the birds bred, 72% fledged chicks successfully, a success rate surpassed only by populations in Languedoc (S France) and Sicily (76%) and in Alpes Grées (85.8%) on the French-Italian frontier. Most pairs reared only one chick at a time, but two and even three chicks have fledged successfully. Of 502 prey items observed at the eyries of 12 pairs of eagles over 10 years, the most frequently encountered mammals were alpine marmots (*Marmota marmota*; 222), *Capreolus capreolus* (48), *Ovis aries domestica* (34), *Lepus timidus* (31), *Vulpes vulpes* (29), *Rupicapra rupicapra* (25), *Martes martes* (25); and birds, *Corvus corax* (21) and *Pyrrhocorax graculus* (20). Although the authors banded 70 eaglets, only seven were recovered, too few to draw conclusions about the dispersal of young.—Michael D. Kern.

16. Observations on the Jackal Buzzard in the Karoo. M. B. Schmidt, S. Baur, and F. von Maltitz. 1987. Ostrich 58:97–102.—Jackal Buzzards (*Buteo rufofuscus*) were observed on regular excursions through the Karoo, a montane region in South Africa. Density of the birds in this area was 62.4 km of road per bird observed. Also, 128 Jackal Buzzards were captured using modified Balchatri traps, and from these birds mensural, plumage, and molt data were obtained. Plumage was highly variable. Young birds molted primaries descendantly, secondaries ascendantly, and rectrices irregularly, but all flight feathers were molted symmetrically; in contrast, molt became mostly irregular and asymmetrical in adult birds. Recaptures, recoveries, diet, and possible migration are also discussed.—Malcolm F. Hodges, Jr.

17. A field study of the Spotted Crake *Porzana porzana* at Ndola, Zambia. P. B. Taylor. 1987. Ostrich 58:107–117.—Spotted Crakes are Palearctic migrants recorded between December and April in southern Africa. In this study, between 1974 and 1980, they were found to be highly mobile, frequenting temporary habitats such as flooded fields and grassy areas near swamps, as well as sewage settling ponds. The birds were not observed to occupy a feeding territory for more than 25 d, moving into an area after heavy rainfall, and moving out mostly due to major changes in habitat. Such habitat preferences and movements were found to be unique to the Spotted Crake among rallids of this area. Behavior, field identification, diet, activity times, territory size, interactions, and voice are also described.—Malcolm F. Hodges, Jr.

18. Birds associating with fire at Nylsvley Nature Reserve, Transvaal. W. R. J. Dean. 1987. Ostrich 58:103–106.—Seventy-six species of birds were observed feeding along fire fronts and in recently burned areas at this South African reserve, which is primarily savanna woodland. The 54 fires occurred from 1979 to 1982. Insectivores predominated along the fire front, taking prey in the air and on the ground, while both seed eaters and insectivores used recently burned areas.—Malcolm F. Hodges, Jr.

19. Edge effect on breeding birds along power-line corridors in east Tennessee. R. L. Kroodsma. 1987. Am. Midl. Nat. 118:275–283.—Breeding bird territories were mapped during 2 yr along 17.5 km of forest edge paralleling power-line corridors through forest. Mean bird density (averaged over years and corridors) along a defined edge width of 5 m equaled 266 pairs/40 ha compared to 236 pairs/40 ha in the corridor interior and 149 pairs/40 ha in the forest interior. Mean bird density along a defined edge width of 37 m was 153 pairs/40 ha; significantly less than the density of birds both in the corridor interior and 5 m edge ($P < 0.05$). The densities of corridor species such as Prairie Warblers (*Dendroica discolor*), Common Yellowthroats (*Geothlypis trichas*), and Rufous-sided Towhees (*Pipilo erythrophthalmus*) were greater in the corridor interior than at the edge ($P < 0.05$). Conversely, the densities of forest species in the interior such as Northern Cardinals (*Cardinalis cardinalis*) were not significantly different ($P > 0.05$) from those at the forest edge. Numbers of corridor and forest species were less at the edges than in the interiors. No

species seemed dependent on the presence of forest-edge; to the contrary, forest-corridor edges appeared to serve primarily as boundaries between forest and corridor bird communities.—D. J. Ingold.

20. Effects of prescribed fire on snags and cavity-nesting birds in southeastern Arizona pine forests. S. P. Horton and R. W. Mannan. 1988. Wildl. Soc. Bull. 16:37–44.—Snags on three experimental plots dominated by ponderosa pines (*Pinus ponderosa*) were quantified and categorized (based on degree of decay) before and after prescribed burning. Numbers of cavity-nesting bird species and active cavity nests were also recorded. A single application of a moderately intense surface fire on all three plots eliminated approximately one half of the ponderosa pine snags >15 cm dbh. Large snags in the middle stages of decay were most susceptible to burning. Few large trees were killed immediately and thus a 45% decrease in the number of snags >15 cm dbh occurred in the first year after the fire. However, of 15 avian species recorded, none disappeared in the first breeding season after the fire despite a 33% decrease in the density of snags preferred for nesting (snags >50 cm dbh in the beginning stages of decay). Only Northern Flickers (*Colaptes auratus*) and Violet-green Swallows (*Tachycineta thalassina*) decreased on experimental stands relative to their abundance on control stands. These decreases, however, did not appear to be the result of a loss in suitable nest snags, but were possibly the result of changes in prey populations and/or shifts in areas used when foraging.—D. J. Ingold.

21. Selection of old trees for cavity excavation by Red-cockaded Woodpeckers. R. S. DeLotelle and R. J. Epting. 1988. Wildl. Soc. Bull. 16:48–52.—Three populations of Red-cockaded Woodpeckers (*Picoides borealis*) were studied in longleaf pine (*Pinus palustris*) forests (two in Florida and one in North Carolina) to determine the ages of trees used for nest and roost cavities. Cavity trees ranged in age from 54 to 158 yr, with a mean of 104.1 yr. On all three study areas cavity trees were older than other trees within territories, suggesting that Red-cockadeds have a strong preference for older trees. Nest trees were nearly always chosen from 60-year-age classes or older indicating the potential presence of a threshold age level of approximately 60 yr for the use of longleaf pines for cavity trees. Colony-tree data were available only for the two Florida sites. Cavity trees were significantly older than surrounding colony trees on one of these sites. In addition to stand age, the selection of colony sites by Red-cockadeds is probably also influenced by other factors including the amount of hardwood understory in colonies and territory configuration relative to neighboring territories.—D. J. Ingold.

22. Ecology of Brown and Striated thornbills in forests of south-eastern New South Wales, with comments on forest management. H. F. Recher, W. E. Davis, Jr., and R. T. Holmes. 1987. Emu 87:1–13.—These two species (*Acanthiza pusilla* and *A. lineata*) are very abundant and largely sympatric in mature forests. In the authors' study sites, the two species co-existed, with the Striated being a specialist on eucalypt foliage and the Brown a generalist on bark, debris, and foliage. In this excellent and detailed study, the authors found good separation by foraging height as well, although the birds often flocked together. As is often the case, the more specialized species was affected by logging, while the generalist increased in the dense ground and shrub vegetation after logging or fire. The authors suggest that the two birds could be used as "indicator species" which signal change in the forest community as a whole by changes in their numbers. However, it could be that measuring the vegetation, which the birds apparently respond to, would be just as convenient . . . and less expensive.—C. J. Ralph.

23. Avian community structure changes in a mature floodplain forest after extensive flooding. W. C. Hunter, B. W. Anderson, and R. D. Ohmart. 1987. J. Wildl. Manage. 51:495–502.—From 1976 to 1983, vegetation structure and bird densities were studied in a 120-ha cottonwood-willow (*Populus fremontii-Salix gooddingii*) gallery forest on the Bill Williams River (a tributary of the Colorado) in Havasu National Wildlife Refuge, Arizona, where water release from a nearby dam caused extensive flooding from October 1978 to April 1981. Birds were surveyed during breeding and nonbreeding seasons in two 800-m Emlen transects located in a 40-ha study plot. Foliage height diversity and tree data were also collected. Comparisons were made between pre- and post-flooding periods.

Flooding killed 99% of the cottonwoods and 64% of the willows on the study plot, resulting in a 75% loss of trees by 1983. Cattails (*Typha* spp.) had become the dominant plant by 1982. Foliage density became concentrated in the ground layer, versus being distributed among all layers before flooding. The flood eliminated cottonwood-dominated habitat, leaving only some remnant habitat fragments, and caused a deterioration in habitat quality for many associated bird species. Most riparian birds declined in abundance, except for European Starlings (*Sturnus vulgaris*) and Brown-headed Cowbirds (*Molothrus ater*), which primarily foraged outside of the riparian zone. Ground insectivores such as Abert's Towhee (*Pipilo aberti*), Winter Wren (*Troglodytes troglodytes*), and Hermit Thrush (*Catharus guttatus*) "declined in numbers most dramatically" following flooding. "Marsh obligates," such as rails and other waders, increased in density following the flood in both breeding and non-breeding seasons. Some marsh breeding species, e.g., Marsh Wren (*Cistothorus palustris*) and Red-winged Blackbird (*Agelaius phoeniceus*), were not detected on the study plot until after the flood.

Although periodic flooding is a normal phenomenon in this riparian community, persistence of high water through three breeding seasons was "unprecedented" and resulted in loss of remnant gallery forests and associated bird communities. Lack of vegetation regeneration "is caused, at least in part, by river management activities." Proper coordination of flood-control procedures with wildlife management is needed for continued existence of cottonwood-willow bird communities along the Colorado River and tributaries. Long-term effects of flood management on riparian ecosystems are presently unknown.—Richard A. Lent.

24. Distribution of breeding male Sage Grouse in Northeastern Utah. K. Ellis, J. Murphy, and G. Richins. 1987. Western Birds 18:117–121.—The reproductive success of Sage Grouse (*Centrocercus urophasianus*) is highly influenced by the lek and its surrounding habitat. The spatial and temporal distribution of the male Sage Grouse during the breeding seasons of 1983 and 1984 were studied by use of radio telemetry. The primary day-use areas for both years were similar, with a slight shift in the second year. This suggests, along with data from other studies, that breeding male Sage Grouse use the same day-use areas year after year. Alteration of these areas can have a serious influence on recruitment into the population.—Robin J. Densmore.

25. Seasonal abundance and distribution of birds on the Swartkops estuary, Port Elizabeth. A. P. Martin and D. Baird. 1987. Ostrich 58:122–134.—The authors counted birds over a two-year period in the tidal portion of a South African estuary. Birds were most numerous during the austral summer, and 74% of those recorded were five charadriiform species, four of which were Palearctic migrants. Birds were most numerous on intertidal mud and sand, where a major prey species of mudprawn (*Upogebia africana*) predominated.—Malcolm F. Hodges, Jr.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 19, 20, 21, 23)

26. A comparison of wooden boxes and plastic buckets as waterfowl nest structures. H. W. Heusmann and T. Early. 1988. Wildl. Soc. Bull. 16:45–48.—Pairs of nest houses (one bucket and one box) were erected in western and southeastern Massachusetts (in areas not previously exposed to any type of nest structures) to determine potential nest site preferences of Wood Ducks (*Aix sponsa*) and Hooded Mergansers (*Lophodytes cucullatus*). Duck use was higher for wooden boxes (26%) than for plastic buckets (12%) for the 5-yr study period. Only one of 10 Hooded Mergansers pairs nested in a bucket compared to 17 of 54 Wood Duck pairs. Average nest success rate was less for buckets (67%) than for boxes (85%). Buckets were rarely used until the rate of box use exceeded 30%. Buckets were also less durable and had to be repaired or replaced more often than boxes. Thus, the lower cost of constructing plastic nest buckets for duck use does not appear to offset their detriments.—D. J. Ingold.

27. Naphthalene shows no repellency for starlings. R. C. Dolbeer, M. A. Link, and P. P. Woronecki. 1988. Wildl. Soc. Bull. 16:62–64.—Nesting European Starlings

(*Sturnus vulgaris*) using nest boxes were exposed to two treatment levels of naphthalene during two years. There was no significant difference in the reproductive success of starlings nesting in boxes with 0, 0.6, and 8.0 g of naphthalene respectively. Thus, although starlings have olfactory abilities, the levels of naphthalene used in this experiment had no apparent repellent effect.—D. J. Ingold.

28. Least Bell's Vireo management by cowbird trapping. J. A. Beezley and J. P. Rieger. 1987. Western Birds 18:55–61.—Trapping Brown-headed Cowbirds (*Molothrus ater*) has been used as a method to reduce nest parasitism of endangered passerines, most notably for Kirtland's Warblers (*Dendroica kirtlandii*) in Michigan. Similar methods were recently undertaken to assist in the recovery of Least Bell's Vireo (*Vireo bellii pusillus*) in southern California.

These trapping efforts were not a complete success. Lower than expected numbers of female cowbirds were captured, suggesting trap bias. Their trapping success varied considerably between riparian and non-riparian habitats as well as with time of year. Their greatest success was achieved immediately following the return of cowbirds in April but declined markedly after the birds dispersed into their breeding habitats.

While cowbird trapping may be useful for reducing brood parasitism of endangered passerines, trapping should not be undertaken until cowbird population size, site fidelity, and host selection has been studied in an area. Additionally, the authors recommended trapping at foraging sites well in advance of the breeding season to achieve the greatest success, at least in southern California.—Bruce G. Peterjohn.

29. Impacts of center pivot irrigation systems on birds in prairie wetlands. T. L. Peterson and J. A. Cooper. 1987. J. Wildl. Manage. 51:238–247.—Center pivot irrigation system (CPIS) technology involves construction of elevated causeways in wetlands to allow movement of irrigation equipment, requiring partial filling of wetlands and having the effect of dividing a wetland into smaller compartments. Impacts of CPIS travelways on bird richness, diversity, nest density, and nest success, as well as the relation between nest-site characteristics and nest success, were examined over two seasons on 18 prairie wetlands in Minnesota. A paired experimental design used nine wetlands crossed by travelways as treatments (mean size, 1.4 ha) and nine without travelways (1.0 ha) as controls.

Although CPIS travelways increased shoreline length and vegetation diversity, they did not enhance bird nest density, species diversity, or species richness. Species richness was greater on larger wetlands. Most nest losses were due to predation. Travelways increased predator access, decreasing nest success from that of undisturbed marshes, and also increased loss of nests to flooding. Red-winged Blackbird (*Agelaius phoeniceus*) nests comprised 82% of all nests found. There were no significant relationships between nest-site characteristics and nest success.

The authors conclude that "widespread construction of CPIS travelways in small prairie wetlands will be detrimental to the waterfowl resource" . . . [and] "high predator pressure in small wetlands may adversely affect nongame bird populations."—Richard A. Lent.

30. Breeding bird response to cattle grazing of a cottonwood bottomland. J. A. Sedgwick and F. L. Knopf. 1987. J. Wildl. Manage. 51:230–237.—Habitat relationships and fall-winter grazing impacts on breeding birds in a Colorado cottonwood (*Populus sargentii*) bottomland were studied. Five 16-ha plots were controls; five fenced and grazed plots were treatments. Analyses of breeding bird densities concentrated on species judged to be most dependent on the herbaceous-shrub vegetation layer, and thus most likely to be impacted by grazing: House Wren (*Troglodytes aedon*), Brown Thrasher (*Toxostoma rufum*), American Robin (*Turdus migratorius*), Common Yellowthroat (*Geothlypis trichas*), Yellow-breasted Chat (*Icteria virens*), and Rufous-sided Towhee (*Pipilo erythrophthalmus*). Ground and shrub vegetation was sampled in 0.04-ha circular plots centered on singing males. Analysis of variance evaluated differences in bird densities between years and treatments and was used to compare mean habitat characteristics among species. Stepwise discriminant analysis described species habitat associations.

"Moderate, late-fall grazing had no detectable impact on calculated densities of any of the six species, implying that proper seasonal grazing of a cottonwood floodplain is, at least initially (3 yr), compatible with migratory bird use of a site for breeding." Yellowthroats

and chats were ordinated at the extremes of two discriminant axes representing habitat structure (Axis 1, shrub cover and mid-level vegetation density; Axis 2, forb cover) and thus were considered to be the "most unique" of the six species in habitat use, suggesting that they are good ecological indicators of ground-shrub habitat quality.

The authors give the following cautions for implications of their study. (1) Long-term grazing effects on overstory vegetation may impact overstory-dependent birds. (2) Density may be a misleading indicator of habitat quality (see Van Horne, J. Wildl. Manage. 47: 893, 1983): grazing may affect reproductive success more than density of the ground-shrub bird guild. With those cautions in mind, results of this study illustrate a practical approach for evaluation of grazing impacts on breeding birds.—Richard A. Lent.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see also 14, 20, 21, 23, 40, 50)

31. Impacts on waterbirds from the 1984 Columbia River and Whidbey Island, Washington, oil spills. S. Speich and S. Thompson. 1987. Western Birds 18:109–116.—Two oil spills caused significant damage to waterbirds in Washington in 1984. The Columbia River oil spill resulted in damage or death to at least 450 birds. Western Grebes (*Aechmophorus occidentalis*), Common Murres (*Uria aalge*), and White-winged Scoters (*Melanitta fusca*) were the most common species found oiled, constituting 50%, 26%, and 17%, respectively. The Whidbey Island spill resulted in damage or death to at least 1500 birds. Western and Red-necked (*Podiceps grisegena*) grebes, Black Scoters (*Melanitta nigra*), Horned Grebes (*P. auritus*), Common Loons (*Gavia immer*), and Common Goldeneyes (*Bucephala clangula*) were the most common species found oiled, constituting 21%, 17%, 11%, 9%, and 9%, respectively. Damage to waterbirds as a result of oil spills is not well documented. Standard survey techniques are needed to analyze the actual impact of oil spills on waterbirds.—Robin J. Densmore.

32. Industrial, agricultural, and petroleum contaminants in cormorants wintering near the Houston Ship Channel, Texas, USA. K. A. King. C. J. Stafford, B. W. Cain, A. J. Mueller, and H. D. Hall. 1987. Colonial Waterbirds 10:93–99.—The Houston Ship Channel is considered the most polluted stream in Texas with both agricultural and industrial wastes, particularly from petrochemical plants which line its 72 km length. This paper complements previously published reports on pollutants in birds breeding in the area, with a study of the concentrations of industrial and agricultural pollutants in wintering Double-crested Cormorants (*Phalacrocorax auritus*). Ten birds were collected soon after they arrived in November, and 10 more in late February. PCB's (polychlorinated biphenyls) were the industrial pollutant most frequently found, but concentrations did not significantly increase between November and February. However, DDD, dieldrin, chlordane, HCB, and heptachlor epoxide pesticides were not detected in November specimens but were present in February birds (concentrations were not considered biologically significant). DDE did not significantly increase from November to February but concentrations were twice as great in immature birds. PCS (polychlorinated styrenes) concentrations were nearly three times as great in February birds. Eight aromatic hydrocarbons were detected in February birds but only two in November. There was little difference between the saturated hydrocarbon concentrations in the two samples. The authors suggest that the hydrocarbon pollutants were probably of petroleum rather than biogenetic origin.—William E. Davis, Jr.

33. Can the western subspecies of the Yellow-billed Cuckoo be saved from extinction? S. A. Layman and M. D. Halterman. 1987. Western Birds 18:19–25.—The western subspecies of Yellow-billed Cuckoo (*Coccyzus americanus*) was formerly widely distributed in riparian woodlands throughout the western United States and southern British Columbia. Its population started to decline during the 1920s and subsequently disappeared from most of its historic range. Present breeding populations are fragmented and widely scattered in portions of California, Arizona, New Mexico, western Texas, and northern Mexico.

The authors surveyed riparian habitats in southern California and along the Colorado River in California and Arizona to establish recent population trends. Yellow-billed Cuckoos

were known to have greatly declined in southern California due to extensive habitat destruction. Only one small population composed of nine pairs plus small numbers of isolated pairs and unmated cuckoos were located. More disturbing was a dramatic decline along the lower Colorado River below Davis Dam. Only 5–10 pairs were discovered in this area, a 92–96% decline from the 122 pairs estimated in 1977. This decline was attributed to changing water regimes eliminating native riparian habitats and replacing them with extensive stands of salt cedar (*Tamarix pentandra*).

As a result of this study and surveys in other states, only 475–675 pairs of cuckoos are estimated in the western United States. An unknown number of additional pairs reside in northern Mexico. Although these populations are declining, their trends are not irreversible if remaining riparian habitats are protected and new habitats created. The subspecies can be saved, but only if resource agencies, conservation organizations, and individuals develop an interest in preserving the valuable riparian habitats in our western states.—Bruce G. Peterjohn.

PHYSIOLOGY

34. Active and resting metabolism in birds: allometry, phylogeny and ecology. P. M. Bennet and P. H. Harvey. 1987. J. Zool., London 213:327–363.—This review paper includes data on the correlation between body weight and resting metabolic rate (RMR) and active metabolic rate (AMR) from 399 species of birds. The relationship between RMR (kcal/bird/d) and body weight (g) is: log(RMR) = 0.67 log(body weight) − 0.25 for 78 families combined. Deviations from this relationship are correlated to differences in behavior and ecology. Woodland species have the lowest RMR, followed by grassland species and forest species, which are all below the average. Marine species have the highest RMR, followed by tundra species and freshwater and marsh species. Nocturnal species have lower RMR than diurnally active species. The RMR also follows a latitudinal gradient with higher rates in the polar regions and lowest in the tropics.—Robert C. Beason.

35. 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 rate (BMR) and daily energy expenditure were obtained from three species of shorebirds: Ruddy Turnstone (*Arenaria interpres*), Black-bellied Plover (*Pluvialis squatarola*), and Eurasian Oystercatcher (*Haematopus ostralequs*). In all three species, the BMRs were above what had been predicted by previous workers. The results of this study indicate that the correct equation for BMR in shorebirds is: BMR (Watts) = $5.06BW^{0.729}$, where BW is body weight in kilograms. Associated with the high BMR was a high daily energy expenditure. Shorebirds use more energy than other non-passerine birds of similar size, but the ratios between active/rest metabolisms is the same as for other species. The possible reasons for this difference include: poor thermal insulation, energy demands of migration, or low ambient temperatures. Premigratory fat deposition had an energy efficiency of 88%.—Robert C. Beason.

36. Multisensory convergence in the thalamus of the pigeon (*Columba livia*). E. Korzeniewska. 1987. Neuroscience Letters 80:55–60.—Single unit extracellular recordings were made from the dorsolateralis posterior thalami (DLP) nucleus of the pigeon to determine their sensitivity to different sensory stimuli. Of 123 cells 72% responded to somatosensory stimuli, and 40% of these cells also responded to either visual or auditory stimulation. Almost half (47%) of the total cells responded to visual stimulation, with 47% of these also responding to skin stimulation. Only 17% of the cells responded to auditory stimulation, with 43% of these also responding to somatosensory stimulation and 5% to visual stimuli. The results of this study confirm that the DLP serves as a thalamic relay nucleus in birds. They also indicate that it is polysensory with large cutaneous receptive fields.—Robert C. Beason.

37. The acuity of sound localization in the pigeon (*Columba livia*). J. Lewald. 1987. Naturwissenschaften 74:296–297.—The angular acuity of sound localization was determined using cardiac conditioning in five adult homing pigeons at various pure tone frequencies between 250 Hz and 6 kHz. The pigeon has poorer discrimination ability in

the range of 1–2 kHz than at higher or lower frequencies. The best resolution of 2° and 4° occurred at 4 kHz and 250 Hz, respectively. Unfortunately, the author did not test frequencies below 250 Hz to determine whether discrimination improved at even lower frequencies.—Robert C. Beason.

38. A comparison of energy metabolism in hummingbirds and sunbirds. (Vergleichende Untersuchungen zum Energiestoffwechsel bei Kolibris und Nektarvogeln.) R. Prinzinger, I. Lübben, and S. Jackel. 1986. J. Ornithol. 127:303–313.—Daily fluctuations in metabolic rates of 12 species of sunbirds and 10 species of hummingbirds were measured at different ambient temperatures. The mean metabolic rates of sunbirds were within the theoretical range for birds of their mass. Hummingbirds had considerably higher metabolic rates than predicted, even taking into account their use of torpor to lower metabolic costs. Unlike hummingbirds, sunbirds do not go into torpor. As a result, hummingbirds show three different metabolic rates (day, night, torpor), while sunbirds have only two (day, night). Only at low ambient temperatures (about 5° C) do the metabolic rates of hummingbirds approach those of the sunbirds. The metabolic rates increase by 2.8 J/g per h per °C in sunbirds and 3.1 J/g per h per °C in hummingbirds.—Robert C. Beason.

MORPHOLOGY AND ANATOMY

39. Bill crossover ratios in Canadian crossbills *Loxia* spp. P. C. James, T. W. Barry, A. R. Smith, and S. J. Barry. 1987. Ornis Scand. 18:310–312.—The four species of crossbills and the Akepa (*Loxops coccineus*) are the only birds with crossed mandibles. Previous studies have shown that the upper mandible of crossbills may cross either left or right of the lower mandible. In this paper, James et al. summarize previous data on bill crossover ratios and provide new data for 383 Red (*Loxia curvirostra*) and 322 White-winged (*Loxia leucoptera*) crossbills.

There was no significant difference in the number of left-billed and right-billed Red Crossbills in the Canadian sample or in the four previous studies (total $n = 999$). For White-winged Crossbills, however, left-billed birds were significantly more numerous than right-billed ones in both the Canadian sample and the single previous study (total $n = 391$). The direction of bill crossover was independent of sex and age for both species in the Canadian sample.

A left-billed crossbill usually holds cones in its left foot and a right-billed bird in its right foot so that individuals are either left- or right-footed. Footedness determines the direction of approach to the cone. Interestingly, the spiral arrangement of scales on spruce cones (a major crossbill food) can be either to the left or right. If cone morphology influences handling time of crossbills, then cones of one type may be less profitable to a crossbill than cones of the other type. James et al. examined 795 cones of four conifer species near Saskatoon, Saskatchewan and found that the two morphs occurred in equal frequencies. Thus, bill crossover ratios of Red Crossbills matched cone ratios. James et al. speculate that cone morph ratios vary with latitude, and that bill crossover ratios of the White-winged Crossbill (which breed farther north than Red Crossbills) could reflect cone morphology in northern latitudes.—Jeff Marks.

PLUMAGES AND MOLTS

(see 16, 42)

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 33, 53, 54, 55)

40. Distribution, abundance, and habitat of Great Gray Owls in southcentral Oregon. T. Bryan and E. D. Forsman. 1987. Murrelet 68:45–49.—Great Gray Owls (*Strix nebulosa*) were found at 63 sites during 1984–1985. All locations were in old-growth or mature pine forest with large overstory trees. Most (95%) of the sites were within 0.3 km of a meadow. Ten of the 11 nests found were in old hawk nests, and one was in a cavity in a large snag.

Bryan and Forsman suggest that Great Gray Owls are declining in south-central Oregon

owing to timber harvest. It seems that the fate of *Strix* owls in the Pacific Northwest rests in the hands of the federal agencies that regulate timber harvest. That's frightening.—Jeff Marks.

41. Observations of Northern Hawk-Owls nesting in Roseau County. P. A. Lane and J. R. Duncan. 1987. Loon 59:165–174.—An influx of Northern Hawk-Owls (*Surnia ulula*) was observed in the fall and winter of 1986–1987 in northern Minnesota and adjacent Manitoba. This "irruption" coincided with an increase in small mammal abundance and a mild winter. A single pair remained in Roseau Co. and nested in 1987, fledging at least six young. Nesting records for this species in Minnesota are rare (only three prior documented records). Hawk-owls were observed caching prey items (voles and other rodents) prior to and during the nesting season.—D. J. Ingold.

42. Distribution, migration and timing of moult in the South African Cliff Swallow. R. A. Earle. 1987. Ostrich 58:118–121.—Breeding distribution of South African Cliff Swallows (*Hirundo spilodera*) was examined using data from banding and field observation records, museum skins, nest record cards, and literature. The species breeds mainly in the highlands of eastern South Africa, but its range expands in years of extensive rainfall. Migration routes are postulated to be mostly through the center of the continent, based on the paucity of migrants seen along the two coasts. Molt takes place mostly on the wintering ground.—Malcolm F. Hodges, Jr.

43. Illinois Birds: Corvidae. J. W. Graber, R. R. Graber, and E. L. Kirk. 1987. Illinois Natural History Survey Biological Notes No. 126. 42 pp.—The eleventh monograph in a continuing series covering the birds of Illinois, this publication describes the jays and crows found within the state. Except for brief discussions of extralimital species, most of the monograph is devoted to the two common resident corvids, Blue Jays (*Cyanocitta cristata*) and American Crows (*Corvus brachyrhynchos*). Its format is identical to other publications in this series with accounts of these species' status during each season of the year, breeding habitat preferences, nesting chronology, food preferences, mortality data, and other related topics. A formidable amount of data is provided for both species, a result of an exhaustive literature search and the author's own research. Additionally, this monograph summarizes the available information on the relatively poorly studied Fish Crow (*C. ossifragus*) in Illinois. This account is primarily limited to distributional information since other data were unavailable.

This excellent monograph maintains the tradition of thoroughly prepared and very informative publications on the birds of Illinois. Its usefulness undoubtedly extends beyond the borders of the state. Those of us in surrounding states can only be jealous of this valuable series of monographs.—Bruce G. Peterjohn.

44. The composition of avifaunas in typical Swiss forest types. [Die Zusammensetzung der Avifauna in typischen Waldgesellschaften der Schweiz.] P. Mosimann, B. Naef-Daenzer, and M. Blattner. 1987. Ornithol. Beob. 84:275–299. (German, English, and French summaries.)—The species compositions of the avifaunas in seven forest types were analyzed for their similarities. Forty-four forests were censused in 1985 and 1986, 32 of which were sampled in both years. From a total of 77 species, only four were constantly found in all forest types: Eurasian Blackbird (*Turdus merula*), Treecreeper (*Certhia brachydactyla*), Coal Tit (*Parus ater*), and Common Chaffinch (*Fringilla coelebs*). Only the chaffinch was found on every census transect. Broad-leaved forests had the highest densities and the largest number of species. Pine forest had the fewest number of species and the lowest total densities.—Robert C. Beason.

SYSTEMATICS AND PALEONTOLOGY

45. A new species of *Carduelis* (Fringillidae) from La Palma. (Una nueva especie de *Carduelis* [Fringillidae] de La Palma.) J. A. Alcover and F. Florit. 1987. Vieraea 17: 75–86. (Spanish, English summary.)—A new species of Cardueline finch (*Carduelis triasi*) is described from Pleistocene-Holocene cave deposits on the island of La Palma, Canary Islands. This species is characterized by greater body size and smaller wings than its closest living relative, *Carduelis chloris*. The authors suggest that *C. triasi* survived until colonization

of the island by man and that the species may survive still on La Palma!—Jerome A. Jackson.

EVOLUTION AND GENETICS

(see also 8)

46. Hybrid zones in Australian birds. J. Ford. 1987. Emu 87:158–178.—This posthumous contribution from the author's prolific pen summarizes many of the important papers on the unique situation regarding hybridization in the desert continent. Some 100 species showing hybridization were tallied, demonstrating that most hybrid zones occur in semi-arid or sub-humid areas of the continent, and none in the tropical rain forests. He suggests that most zones were formed about 17,000 years ago, and have changed little since then. Ford found no support for the concept of reinforcement of previously acquired differences in signalling systems. Most of his work has been published in The Emu, but should be studied by those interested in the dynamics of species formation in other areas.—C. J. Ralph.

FOOD AND FEEDING

(see also 9, 12, 17, 18, 25, 41, 43)

47. Feeding behaviour and other notes on 20 species of Procellariiformes at sea. P. C. Harper. 1987. Notornis 34:169–192.—On extensive research cruises in the Southern Ocean between January 1965 and March 1967, Harper accumulated thousands of observations of petrel feeding behavior. Most were made at night, many of birds attracted by lights to the vicinity of the ship; however, by using a powerful spotlight Harper was able to study birds that were feeding in the darkness seemingly beyond the influence of the ship. The results confirm that many petrels feed largely or exclusively at night on live squid and crustacea that evidently undergo vertical migrations. Interestingly, however, six species seemed to forage only during the day. There was little taxonomic component to the groupings: some species of *Diomedea* or *Pterodroma,* for example, fed almost entirely either by day or night, although storm-petrels fed by day. This is a unique paper that will be useful to anyone interested in pelagic birds.—J. R. Jehl, Jr.

48. Variations in the temporal spacing of Franklin's Gull (*Larus pipixcan*) flocks. J. G. Kopachena. 1987. Can. J. Zool. 65:2450–2457.—Temporal spacing, i.e., the number of birds passing an observation point per minute, was used as an index of the degree of flocking in Franklin's gulls at several locations in southern Manitoba. Kopachena found that the density of flocks varied inversely with the predictability of food resources when the gulls left the roost to feed. The gulls did not flock when flying to predictable food sources, but formed loose flocks when they were flying to unpredictable food resources. They formed dense flocks when they were returning to the roost after feeding. Flocking behavior in these Franklin's Gulls seemed to be in response to a variety of selective forces including locating food.—A. John Gatz, Jr.

49. Foraging characteristics of Canada Geese on the Nisutlin River delta, Yukon. T. S. Coleman and D. A. Boag. 1987. Can. J. Zool. 65:2358–2361.—Canada Geese (*Branta canadensis*) use the Nisutlin River delta as a staging area annually between August and early October. Water levels determine what food types are available. At sufficiently low water levels, the geese can feed in any of three zones on three different dominant species of plants. In these situations, the geese prefer *Potamogeton richardsonii* in zone 3 to *Equisetum palustre* in zone 2 to *Equisetum fluviatile* in zone 1. Because the most preferred feeding zones are those closest to the roost, it is unclear whether the results reflect actual preferences by the geese for the particular species of plants involved, proximity to the roost, or some combination of these factors. Additional data (e.g., results of food choice experiments) need to be gathered to fully understand the preferences reported here.—A. John Gatz, Jr.

50. Foraging ecology of the Mauritius Kestrel (*Falco punctatus*). S. A. Temple. 1987. Biotropica 19:2–6.—The Mauritius Kestrel is endemic to the island of Mauritius in the central Indian Ocean, and is one of the world's rarest and most endangered avian species.

The most frequently captured prey are geckos of the genus *Phelsuma* (64%), followed by birds (19%), insects (16%), and mammals (1%). In winter, more birds were taken than at other times of the year, apparently because of a decrease in the number of geckos available. Morphologically the species resembles an *Accipiter* more closely than a typical *Falco* in both tail : wing-length ratio and in wing loading. These modifications allow for increased maneuverability within the forest canopy. Unlike typical falcons, the Mauritius Kestrel is a sit-and-wait predator and attacks using horizontal flights rather than vertical dives. The population size of the species has steadily declined as its forest habitat has been logged. Only four individuals were found in the wild in 1974, but the population has increased since. The invasion of exotic plants into the forest is reducing its value to the birds by limiting their hunting. The future of this species appears rather dim without some major conservation efforts.—Robert C. Beason.

51. Avian consumption of *Guaiacum sanctum* fruit in the arid interior of Guatemala. P. W. Wendelken and R. F. Martin. 1987. Biotropica 19:116–121.—*Guaiacum sanctum* is a low shrub-like tree which retains its leaves during the dry season. The fruit is an obovoid capsule with up to five arillate seeds. The fruiting trees are covered with hundreds of conspicuous yellow capsules. The seeds (1 cm long) are covered with a fleshy, edible, red aril. Nineteen avian species (representing 17 genera and 8 families) used the arilloids of the plant, with the most important consumer being the Clay-colored Robin (*Turdus grayi*). Only one consumer species, the Rose-breasted Grosbeak (*Pheucticus ludovicianus*), was a migrant. This plant species seems to be an important source of food to both adult and young birds in the area. A second fruiting period in July–August was heavily used as a food source for feeding nestlings and fledglings.—Robert C. Beason.

SONGS AND VOCALIZATIONS

(see 17, 37)

MISCELLANEOUS

52. Bibliography of the zoological literature of Afghanistan. (Bibliographie der zoologischen Literatur uber Afghanistan.) A. A. Nahif. 1986. Bonner Zoologische Beitraege 37:311–339. (German.)—This extensive bibliography includes 41 references to birds in Afghanistan.—D. J. Ingold.

BOOKS AND MONOGRAPHS

53. A guide to the birds of Colombia. S. L. Hilty and W. L. Brown. 1986. Princeton University Press, Princeton, New Jersey 836 pp, 56 col. plates, 13 black-and-white plates, 100 line drawings. $95.00 ($42.50 paper bound).—This huge tome, no field guide, certainly surpasses its predecessors covering Panama and Venezuela, and is the most important recent "guide" to any part of South America. Useful in western Venezuela, and Ecuador, it gradually loses its usefulness eastward to the Guianas and southwest to north-central Peru and dry southwestern Ecuador. Written "with the field observer in mind," some 1700 species (there are many arguably valid "species") are covered in what cannot be considered a field guide, unless, as I have done, one cuts the plates from the book and uses only them in the field. The text is thorough, covering identification, similar species, voice, behavior, breeding, status and habitat, range, and, often more. Notes show considerable taxonomic insight (at least mentioning taxonomic problems), and provide a wide range of useful information gleaned from Ridgeley, Alden, Parker, Remsen, Willis, and others with extensive field experience in South America. The sections on range, status and habitat, and voice are particularly useful. Only 36 pages are devoted to introductory material, too sparse to cover fully the habitats and review of Colombian ornithology with any degree of thoroughness. Appendices cover finding birds in Colombia (excellent), the birds of Colombia's Caribbean islands of Saint Andrew and Providence, and the subspecies illustrated in the plates. Quite useful maps (20 to a page) the Colombian distributions of 1475 species are included, along with indices to English names, genera, and species. Only the index to English names has the references to plates on which species are illustrated; unfortunately such English names

are not so standard that exclusion of plate numbers in the index to species is warranted. Tody-Flycatchers must be sought within flycatchers, and pewees under pewees, confusing to some. The text is remarkably free of errors and sets a very high standard.

Most of the plates are by Guy Tudor, whose knowledge of the birds in the field is ever evident in his renderings. There are seven color plates by John Gwynne, seven by Wayne Trimm, two each by Larry McQueen and John Yrizarry, and Pieter Prall did one black-and-white plate (Tudor did nine, Michel Kleinbaum two, and Gwynne, one). I preferred Tudor's plates, although Gwynne's are good. I find Trimm's birds "feathery," as if a hair dryer had been applied before they were sketched. Kleinbaum's line drawings are skillfully and accurately done, and enhance the book's appearance.

Unfortunately the arrangement of the plates leaves much to be desired, partly because plates were used from the Panama and Venezuelan books, and partly because there seems not to have been careful planning. Of the 56 color plates, 17 are fully new, 15½ have major changes on them, 13 have minor changes, and 10½ are the same as in one or the other of the *Guide to the Birds of Venezuela* and *Guide to the Birds of Panama.* Only two of the 13 black-and-white plates are totally new (two show major changes from those in the other books, three show slight changes, and six are the same). These result not only in considerable confusion, but in undue repetition, a pity, since so many species are not illustrated. Buried in the features listed for each species on a plate is a note that it also is illustrated on another plate, if that is the case. The species are numbered on each plate, but these numbers are not used in the index; the species are numbered in the text under each family, and these numbers bear no relation to the numbers on any plate (species illustrated simply have the plate cited by its number). Since plates have as many as 48 species on one (flycatchers, hummingbirds, and finches especially are crowded), this means much searching. The choice of species illustrated often is haphazard. Amazing are the groupings by name opposite the plates, with headings such as "Bush-Tyrants," followed by three such, the Cliff Flycatcher and a Shrike-Tyrant (Plate 38). In plate 39 there are two species of *Myiarchus* at the top (numbers 4, 5) and three at the very bottom (numbers 26 to 28), separated by three rows of others. *Thamnophilus* ant shrikes are partly on plate 27 and partly on plate 29, and so cannot be readily compared.

Perhaps I am "nit-picking." Doubtless the artists were under pressure and plans may have not worked out on schedule, calling for hasty decisions. But, fully respecting both the main artist and the authors, I know they could have arranged the plates more usefully and been more careful in the selection of species to illustrate or omit. I note that, although the authors of the Venezuelan and Panama books are thanked for allowing some plates to be used or recast for the Colombian book, no mention is made of how many are involved. So in one sense I felt a bit cheated!

I stress these points in hopes that those preparing other such guides (Ecuador, Peru) will plan to arrange their volumes as usefully as possible. I also suggest that, if as many details are included with the plate captions as is done in this book, such authors consider printing an inexpensive Spanish version with well-reproduced plates *only,* to be sold within these Latin American countries. It is well and good to stress conservation needs, as Hilty and Brown have done, but to put such books out of reach of the most critical, potential audience, and in English, is not serving a conservation goal. For make no mistake, it is South Americans—and Africans and Asians—who will save what tropical birds can be saved, and we ought not to lament, but to make it easier for them to know and understand something of their (and our) heritage, that they may sooner take the actions demanded if anything is to be saved.—Lester L. Short.

54. A field guide to the birds of Hawaii and the tropical Pacific. H. D. Pratt, P. L. Bruner, and D. G. Berrett. 1987. Princeton University Press, Princeton, New Jersey. 409 pp. 45 color plates. $50 ($19.95 paper).—Another in the outstanding series of field guides published by Princeton, this book is divided into four parts. The first part presents a broad spectrum of general information which would be of interest to a bird student of the tropical Pacific, ranging from brief discussions on taxonomy, English names for birds, and the pronunciation of words in native languages, to the geological classification of island types. There are nearly 10 pages devoted to tropical Pacific habitats, tips on island birding, and the 10-page section on conservation includes a listing of extinct, endangered, and threatened species.

The second part of the book, which occupies about two-thirds of the book's text, features the species accounts. They are preceded by brief family accounts, sometimes including comments on a particular genus or subfamily, or by sections such as "General Comments on Stints." Typically there are five headings per species: appearance, habits, voice, identification, and occurrence, with sections for other names, references, and notes sometimes added. The vast majority of the birds described are illustrated in the color plates or as text figures, with only occasional stragglers not illustrated. No range maps are given, but considering that the book includes some 10,000 small islands in an area of about one-third of the Earth's surface, with many species endemic to an island or two, perhaps the description of occurrence with words is the only reasonable approach. All three authors have extensive tropical Pacific field experience, and the species accounts and notes appear well referenced, suggesting a thorough and competent coverage of an enormous geographic area.

The third part is a series of appendices including an annotated list of hypothetical species, six very useful regional checklists, more than a dozen regional maps illustrating every island mentioned in the text, a glossary, and a bibliography.

The final section contains 45 color plates with short two- or three-line notes which are, as the authors suggest, the "heart of this guide." The plates, except for the last two, which are photographic plates of plants, are excellent artistic renditions by Pratt. They are of uniformly high quality, and the color printing is generally good. The authors have broken with the traditional presentation of birds by taxonomic order in some cases. Although some groups such as the seabirds, shorebirds, and rails are in approximate taxonomic order, many birds are grouped by geographic location, so that birds likely to be seen together are represented in contiguous plates. For example, plates 21–25 depict the Micronesian (one of the five major subdivisions of the tropical Pacific which the authors use) birds, with plate 21 illustrating pigeons and doves, 22 various nonpasserines, 23 widespread species and Mariana endemics, 24 small land birds of Palau and Yap, and 25 small land birds of the eastern Carolines. Plate 26 begins another geographic series with pigeons and doves of central Polynesia. For the taxonomically minded this may be chaos, but for most birdwatchers this simplified geographical grouping should be advantageous. My only specific criticism about the plates is the inclusion of extinct species. In several plates they comprise nearly half of the species illustrated. I think that the authors could have accomplished their goals of emphasizing how much has already been lost and the hope that "extinct" birds may show up in remote places just as effectively by placing the extinct birds on separate plates and thus reducing the confusion and clutter of others. The only general question I might raise is the use of 12 plates to illustrate the seabirds and shorebirds, which are so profusely illustrated, and include so many different plumages, in recent publications by Harrison (Seabirds, 1983), and Hayman et al. (Shorebirds, 1986), both by Houghton Mifflin, Boston.

The few criticisms I have of the book are small. It seems a shame not to have included Easter Island, an isolated island a mere 1200 km to the east of the coverage area. There are few editing errors (although the author's name is misspelled in the copyright statement). The small 5 by 7½ inch size makes it a usable field guide, particularly in soft cover, and the wide geographic coverage probably justifies the extensive text. The book is of generally high quality and is indispensible to anyone planning a visit to the tropical Pacific.—William E. Davis, Jr.

55. The avifauna of Switzerland, an annotated species list. II. Non-Passeriformes. (Avifauna der Schweiz, eine kommentierte Artenlists. II. Non-Passeriformes.) R. Winkler, R. Luder, and P. Mosimann. 1987. Ornithol. Beob., Supplement 6. Schweizerische Gesellschaft fur Vogelkunde und Vogelschutz, Basel. 131 pp., 61 text figures. Fr.18.00.—This volume is a companion to Ornithol. Beob. Supplement 5 which covers the Passeriformes. The last page of this issue also contains a correction page for the Passeriformes issue. This species checklist contains information on the status (breeding, wintering, migrant) and seasonal changes in abundance (shown by graphs), as well as some general biology and distribution information on the species covered (Gaviiformes to Piciformes). Noteworthy historical records of the various species are also included. It should prove a useful reference to those ornithologists visiting Switzerland and those interested in the timing of migration or breeding there.—Robert C. Beason.