RECENT LITERATURE

Edited by Jerome A. Jackson

BANDING AND LONGEVITY

(see 23)

MIGRATION, ORIENTATION, AND HOMING

(see also 24, 29)

1. Water and energy resources of the passerine birds migrating in autumn across Middle Asian deserts. (Vodnye i energeticheskiye resursy vorob'inykh ptits, migriruyushchikh osen'yu cherez pustyni srednyei azii.) M. L. Yablonkevich, A. P. Shapoval, and V. R. Dol'nik. 1985. Zool. Zh. 64:877–888. (Russian, English summary.)—Carcasses of birds freshly killed through collisions or drowning were collected at various oases and villages and analyzed for water and fat content. Of the 20 species collected, the most numerous were *Cyanosylvia svecia, Acrocephalus agricola, Acrocephalus dumetorum, Sylvia curruca, Phylloscopus collybita,* and *Phylloscopus trochiloides.* Four categories of fat content were used to class fallen birds; generally, trends from heaviest to lightest birds were linear. The most emaciated birds were lightest in weight, which was due without exception to a 8–10% reduction in fat reserves; water content was always higher in proportion than that observed for birds with normal fat reserves. The birds with the lowest fat reserves had a calculated flight reserve of about 50 miles, while the heaviest birds had the ability to fly about 500 miles. The authors argue that these kills represent a random sample of the fall migrating birds, and thus allow an insight into the rigors of migrating over the vast deserts of Middle and Central Asia. The authors conclude that by moving in "jumps" alternated with stopovers in oases and villages, these small autumn migrants are able to restore fat reserves and cross the significant desert barriers.—Douglas Siegel-Causey.

2. Pigeon orientation: a comparison between single birds and small flocks. S. Benvenuti and N. E. Baldaccini. 1985. Ornis Scand. 16:45–48.—Orientation in bird flocks may result from (1) a compromise among individuals or (2) the leadership of a single individual. Among studies of homing pigeons, support for the leadership model was provided by Keeton (Auk 87:797–799, 1970) and Wagner (Z. Tierpsychol. 39:61–74, 1975) and for the compromise model by Tamm (Behav. Ecol. Sociobiol. 7:319–322, 1980). In this study, the authors compared the initial orientation of trained homing pigeons released singly vs. those in flocks of 3 and 10. Overall, flocks did not orient more precisely than single birds. The results were mixed, however, and suggested that in larger flocks the leadership of single birds was influenced by others. As can be the case in such studies, this one raises more questions than it answers.—Jeffrey S. Marks.

3. Migration of western populations of the European Roller *Coracias garrulus*. (Le migration des populations occidentales du Rollier d'Europe *Coracias garrulus*.) N. Mayaud. 1985. Alauda 53:29–33. (French, English abstract.)—Populations of European Rollers that nest in the western Mediterranean basin and Morocco migrate to and from their overwintering quarters in southern Africa in a wide front that passes through western Africa. They do not migrate through eastern Africa (e.g., Somalia and Tanzania) with conspecifics that originate in eastern Europe and western Asia.

During prenuptial migration, rollers from these western palearctic populations have been observed in northeastern Gabon (M'Passa) between late January and 1 April, Ghana (Mole) during early April, Gambia in February and March, and Western Sahara, as well as oases in Morocco, Algeria, Tunisia, and Libya in April and May. No data are available for other countries in northwestern Africa.

During postnuptial migration, what few data there are indicate that these western palearctic rollers move south through Morocco (Marrakech), Algeria (Hassi Marroket south of El Golea), Libya (oasis of Sarir, Fezzan; dead specimens also found in Adrar Bous and Ténéré in November), Mauritania (Bank of Arguin, Nouadhibou), and Senegal (near Richard-Toll) between mid-August and mid-September; northcentral Nigeria (Kauna) in

mid-September; north (Tibesti) and northeastern Chad (Abéché) between mid-August and mid-October; Mali (marshes below Lake Debo, flood plains of the Niger River) between August and September, and again in November; and northeastern Gabon (Makokou, M'Passa) in late October and November. In other words, some of them follow the Atlantic coast of Africa south, whereas others use inland routes, crossing the Sahara Desert at many points; rollers migrating south through central Libya veer to the east at the Niger border in order to avoid the mountains there and then turn south again as they pass through Chad.

Small numbers of these rollers overwinter along the Gulf of Guinea between Gambia and southern Nigeria, but most settle farther south, below Gabon.—Michael D. Kern.

4. The Turtle Dove, *Streptopelia turtur,* in Senegambia: annual changes in the population and identification of races. (La Tourterelle des bois, *Streptopelia turtur,* en Sénégambie: évolution de la population au cours de l'année et identification des races.) M.-Y. Morel. 1985. Alauda 53:100–110. (French, English abstract.)—In this jumbled, confusing, and sometimes incoherent article, Morel describes annual changes in the distribution and composition of populations of Turtle Doves (*Streptopelia turtur*) in Senegal and Gambia (with some remarks about neighboring countries). Be prepared to read this article several times to make sense out of it.

Turtle Doves of the north African race *arenicola* and the European race *turtur* occur in Senegambia. Their numbers are small in summer and winter, but substantial during spring and fall migration. Most simply pass through Senegambia enroute to summering and wintering areas elsewhere. Those that remain in winter congregate in the valleys of the Senegal R., the middle valley of the Gambia R., and along the Faleme R. bordering Mali. The composition of the populations overwintering in these areas has not been studied except at Richard-Toll (see below) and along the Faleme R. (where most doves belong to the race *arenicola*). Turtle Doves that pass through Senegambia in the fall probably overwinter in savannahs of Guinea, or farther east in forested parts of Saharan and Sudanese savannahs, especially in the Niger R. delta of Mali and in northern Nigeria (the text does not mention Niger). These migrants do not settle in areas south of the Gambia R., including the Casamance region of Senegal, Guinea-Bissau, and Sierra Leone. The number of doves that pass through *western* Senegal and Gambia during spring migration (February–April) is truly astounding (as many as 1 million), particularly when compared with the much smaller number that pass through the same area during autumn. In *eastern* Senegal and neighboring Mali, the spring migration is much smaller than the autumn one.

Morel gives a detailed (if disjointed) description of the population of Turtle Doves at Richard-Toll (northwestern edge of Senegal) and how it changes during the year. Her conclusions are based on the plumage color and wing length measurements of 739 specimens collected there between 1972 and 1984, along with some banding data. Doves of the race *arenicola* are present at Richard-Toll throughout the year. The same may or may not be true of the race *turtur* (wing length data are equivocal on this point), but doves of this race are present in September (during the autumnal migration) and between December and May (i.e., they overwinter at Richard-Toll). Both races migrate through the area in the spring (February–May) and the fall (August–September), but few doves summer or winter there. Between October and November, the population consists almost entirely of first-year birds, probably of both races.

Banding data indicate that Turtle Doves move between Morocco and Senegal. It is probable that some of the *arenicola* which nest in Morocco spend the winter in Senegal. However, it is unlikely that all of the *arenicola* that overwinter at Richard-Toll come from Morocco.

Groups of Turtle Doves in Senegambia consist of individuals that vary considerably in wing length and plumage color. Some are so orange that they can be mistaken for doves of the race *hoggara,* whereas others are dull brown with blue-gray heads. Groups exhibit such differences in size and color because they contain both north African (*arenicola*) and European (*turtur*) birds.—Michael D. Kern.

POPULATION DYNAMICS

(see 3, 4, 5, 8, 29)

NESTING AND REPRODUCTION

(see also 10, 11, 20, 26, 29)

5. Nesting ecology of Anatidae and Charadriiformes on the islands of Tendrov Bay in the Chernomorskii nature preserve. (Gnezdovaniye utinykh i rzhankoobraznykh na ostrovakh tendrovskogo zaliva chernomorskogo zapovednika.) T. B. Ardamatskaya. 1984. Ornitologiya 19:41–49. (Russian.)—Fifty years of nesting records allow the author to track population changes in 20 species of waterfowl and shorebirds breeding in this central Russian preserve. Some species (*Recurvirostra avosetta, Anas clypeata*) have gradually increased in numbers over the years, reflecting a much larger pattern observed in other areas. Other species (*Tadorna tadorna, Mergus serrator*) increased to a plateau, and then have kept more or less stable population levels in the past decades. A third group (*Larus melanocephalus, Sterna sandvicensis*) have populations growing at least at a linear rate; some congeners occur sporadically throughout the years. It appears that for most species studied here, habitat change and land use have had a great impact on the breeding waterbirds. It is not clear, however, whether these population changes reflect general trends occuring in the south central USSR, or if these demonstrate only local effects. This exemplary study, typical of Russian long-term studies, illustrates the complex interrelationships among species in a community and the need for detailed studies over many years.—Douglas Siegel-Causey.

6. Biology of the reproduction of the House Martin *Delichon urbica* in the Lena River Valley. (Biologiya razmnozheniya gorodskoi lastochki *Delichon urbica* v dolinye reki leny.) N. I. Germogenov. 1985. Zool. Zh. 64:409–416. (Russian.)—House Martins breeding in this far northern valley system have a reduced period of breeding initiation, but mass laying occurs earlier during a shorter period and produces larger clutch sizes than in populations to the west and south. The initiation of breeding coincides with a rise in air temperature greater than 10°C, 5–8°C lower in more temperate populations. The author believes that environmental factors such as more rapid change in day length, lower diurnal temperatures, and greater aridity help force breeding synchrony among individuals. Although a lower temperature threshold is implied as a mechanism, Germogenov does not distinguish between adaptation or individual physiological shifts in tolerance.—Douglas Siegel-Causey.

7. Snowpack and variation in reproductive ecology of a montane ground-nesting passerine, *Junco hyemalis*. K. G. Smith and D. C. Andersen. 1985. Ornis Scand. 16: 8–13.—The authors studied *J. h. mearnsi* for 5 nesting seasons in north Utah. Snowmelt on the study area was unusually early during a drought year, normal during 2 years, and late during 2 years. Modal clutch size was 4. Five-egg clutches were most common during the 2 years of late snowmelt, whereas 3-egg clutches were most common in the drought year and in second nesting attempts in normal years. Mean clutch size and the mean hatching date of 4-egg clutches were significantly positively correlated with the timing of snowmelt. Three female juncos collected during a late snowmelt year had higher lipid reserves than 6 males collected during the same period, suggesting that females were not physiologically stressed while awaiting snowmelt.

Early snowmelt had little influence on the timing of nesting because juncos arrived on the breeding grounds at about the same time each year regardless of snow conditions. In early and normal snowmelt years, more pairs attemped to raise 2 broods, whereas late snowmelt delayed the onset of breeding and prevented second nestings. While awaiting snowmelt, female juncos continued to feed and may have stored enough reserves to lay a larger clutch. Insect densities also appeared to be related to the timing of snowmelt, and juncos may have been able to determine the peak of insect abundance (and time the production of young accordingly) by tracking the timing of snowmelt. The timing of snowmelt may thus be an important proximate environmental factor in the reproductive ecology of juncos and other ground-nesting passerines.—Jeffrey S. Marks.

8. Lifetime reproductive output of female Sparrowhawks. I. Newton. 1985. J. Anim. Ecol. 54:241–253.—Ian Newton has studied marked Sparrowhawks (*Accipiter nisus*) in south Scotland since 1971. Female Sparrowhawks may begin breeding at 1–4 yr old, and the oldest Sparrowhawk on record lived 10 yr. Owing to differential mortality, adult

females outnumber males by about 2:1. In this paper, Newton provides the first data on lifetime productivity (i.e., the number of young raised to fledging stage for each female) available for any bird species.

The variation in individual lifetime productivity was considerable: 16% of 142 females produced no young and the rest produced from 1–23 fledglings (mean = 5.0 fledglings/female). A female's lifetime productivity was positively correlated with longevity and wing length (i.e., body size), and females raised in the study area produced more young there than females that moved in from elsewhere. Overall, 23.5% of female fledglings from any one generation contributed fledglings to the next generation, 72% died before breeding, and 4.5% laid eggs but produced no young. Individual productivity was positively correlated with the number of young subsequently recruited into the breeding population.

There was no difference in mean productivity per first breeding attempt among females that first bred at age 1, 2, or 3, and breeding at an early age did not reduce survival nor lower lifetime productivity. Newton concludes that delayed breeding in female Sparrowhawks results from shortage of mates or food (the "constraint" hypothesis) rather than from individuals holding back to enhance survival (the "restraint" hypothesis).—Jeffrey S. Marks.

9. Preliminary study of several aspects of the reproductive biology of the Hen Harrier *Circus cyaneus* L. at Anjou. (Etude préliminaire de quelques aspects de la biologie de la reproduction du Busard Saint-Martin *Circus cyaneus* L. en Anjou.) J.-P. Cormier. 1983. Oiseau Rev. Fr. Ornithol. 53:241–249. (French, English summary.)—Cormier summarizes data collected 1965-1981 at 111 aeries of Northern Harriers (*Circus cyaneus*) in the Maine-et-Loire district of France, south of the Loire River between Cholet and Montreuil-Bellay.

Clutch size in 26 nests averaged 3.92 eggs (range 2–6; generally 3–5; mode 4 eggs). Since more than half of these data were gathered late in the egg-laying period, mean clutch size may in fact be somewhat higher (published values range from 4.0 to 4.7).

Data from 13 nests suggest that females began to incubate while still laying eggs, particularly late in the nesting season. During April hens began to incubate on days 2–7 of egg-laying (4 clutches), but during 1–20 May they began on days 0–3 (7 clutches), and thereafter they began on day 0 (2 clutches). Laying occurred between 11 April and 10 June.

All chicks in many nests hatched in a span of 1–2 d, but in other nests at intervals of as long as 7 d. A mean of 3.81 chicks hatched per nest (n = 26 nests). Put another way, 76.5% of the eggs in these 26 clutches hatched, a percentage that is rather high compared with many published reports for this species (42–65%). Such high hatchability may be related to the fact that Northern Harriers at Anjou are monogamous.

A mean of 3 young fledged from each nest. The sex ratio of fledglings was 1.05 in favor of females. Young harriers made their first flights from the nest earlier at nests visited by the author (at about 28 days of age) than at undisturbed nests (at 30–37 days of age).—Michael D. Kern.

BEHAVIOR

(see also 2, 20, 25, 29, 31)

10. Behavior of the Booted Eagle *Hieraaetus pennatus*. Supplemental notes. (Sur le comportement de l'Aigle botté *Hieraaetus pennatus*. Notes complémentaires.) J. Carlon. 1985. Alauda 53:111–114. (French, English abstract.)—Carlon adds the following notes about the behavior of Booted Eagles (*Hieraaetus pennatus*) to an earlier, lengthy article that appeared in *Alauda* in 1984 (reviewed in J. Field Ornithol. 56:293–294, 1985): (1) Booted Eagles generally reach their breeding sites several days before their presence is obvious. (2) Inclement weather stopped incubation in 2 aeries that were examined regularly. Neither pair of eagles from these aeries laid replacement clutches. One left the study area altogether. The other pair established a new territory and performed several "subdued" nuptial displays there, but did not lay eggs. (3) Male Booted Eagles relieved their mates for periods of 15–24 min during incubation at two aeries. This is the first time that the male was seen tending the nest in the female's absence. (4) In broods of two chicks, the older one developed

more quickly and fledged sooner than the younger one. The disparity in the development of the two chicks became especially pronounced 34 d after the first had hatched because it could feed itself then, whereas the younger chick could not, and the female apparently stopped feeding each chick after that. The older chick grew rapidly thereafter and its younger sibling was forced to eat whatever it left uneaten. The older chick fledged at age 50 d, but the younger fledged at 56 d. (5) According to the literature, young Booted Eagles are independent of their parents 2 wks after fledging, but in 3 cases, young birds were fed by their parents for 21–30 d after leaving the nest.

Carlon also describes a previously unknown nuptial display in which the female Booted Eagle flies in regular tight circles just above the trees with rapid, continuous, short wing strokes. He compares her wing-beat to the "trembling" or "shivering" wing-beat of circling Merlins (*Falco columbarius*).—Michael D. Kern.

11. Rearing of a young Avocet *Recurvirostra avosetta* by a pair of Oystercatchers *Haematopus ostralegus* in Marquenterre (Somme). (Elevage d'une jeune Avocette *Recurvirostra avosetta* par un couple d'Huîtriers pies *Haematopus ostralegus* dans le Marquenterre (Somme).) P. Triplet and F. Sueru. 1983. Oiseau Fr. Rev. Ornithol. 53:251–260. (French, English summary.)—A pair of Oystercatchers adopted an Avocet chick that hatched from an egg in their clutch. The Avocet's behavior suggested that it imprinted on its foster parents. It rested with the other chicks in the brood near or under the adults and, like them, was fed by the adults. However, it also searched for food on its own as is normal behavior for Avocet chicks. It responded to the alarm and feeding calls of its foster parents, regularly used the resting site that they established for the family, and copied the adults' display postures.

Other Avocets rejected and attacked this adopted chick. When very young, it sought refuge with its foster parents (which protected it) or exhibited appeasement behavior when threatened by other Avocets. Later, it became more aggressive, using the threat posture typical of Avocets when 42 days of age, and chasing other Avocets when 70 d of age.

Quantitative analysis of the daily activities of Oystercatcher chicks, normal Avocet chicks, and the adopted chick indicate that the latter spent much less time foraging on its own and much more time resting and being fed than is normal for Avocet chicks. Its daily activity rhythm was generally similar to that of Oystercatcher chicks of the same age, and distinctly different from that of normal Avocet chicks.

The preening and head-scratching behavior of this fostered chick were like those of Avocets, but its feeding techniques were not. Very young Avocets peck at food on surfaces, but older ones use pinching (straining) methods to procure food. This chick was still pecking for food when 60 days of age. It did exhibit the pinching technique when foraging, but to a much less extent than the probing technique typical of Oystercatchers. Avocets do not "drill" the ground for food as Oystercatchers commonly do. However, the adopted chick tried to do that beginning at 37 d of age, pushing its bill into the substrate while moving its head side-to-side.

Oystercatchers normally feed their own young until they are about 37 d old, but this pair continued to feed the Avocet chick until it was 63 d old. Thereafter, the Avocet foraged independently and very inefficiently, using fishing techniques similar to those of egrets: it ran through the water picking up worms that were visible on the bottom and remained immobile several seconds before quickly stabbing its head into the water. Worms are a dietary item that is normally little used by Avocets. The authors conclude that cases of adoption between *dissimilar* species such as these are maladaptive.—Michael D. Kern.

ECOLOGY

(see 1, 5, 6, 7, 12, 13, 29)

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 29, 30)

12. Breeding bird response to greentree reservoir management. S. P. Christman. 1984. J. Wildl. Manage. 48:1164–1172.—Greentree reservoirs (GTR's) are created in

forested river bottoms by wildlife managers to provide habitat for migrant waterfowl. They are seasonal impoundments, usually flooded to shallow depths in the fall and drained in the spring. Christman examines the effects of this proven waterfowl management technique on breeding songbird densities in the White River National Wildlife Refuge in eastern Arkansas. Birds were censused over 2 seasons in a series of strip transects, 10 in a GTR, 13 in an unmanaged control area. Habitat structure was measured in the same transects.

GTR management "caused a reduction in understory vegetation that reduced foraging and nesting opportunities for bird species that use the ground and lower levels of the forest." Relative abundances of Tufted Titmice (*Parus bicolor*), Carolina Wrens (*Thryothorus ludovicianus*), Kentucky Warblers (*Oporornis formosus*), Yellow-breasted Chats (*Icteria virens*), Northern Cardinals (*Cardinalis cardinalis*), and Rufous-sided Towhees (*Pipilo erythrophthalmus*) were reduced in the GTR area versus the unmanaged control area. Bird species richness was significantly lower in the GTR area for both years of the study. Generalization of these results to other GTR areas would have been enhanced by greater replication of treatments (Hurlbert, Ecol. Monogr. 54:187–211, 1984; Verner, Stud. Avian Biol. 6:543–547, 1981), but overall this is a well-analyzed study of the effects of game management on non-game species.—Richard A. Lent.

13. Predicting avian community response to lakeshore cottage development. K. L. Clark, D. L. Euler, and E. Armstrong. 1984. J. Wildl. Manage. 48:1239–1247.—This paper examines recreational lakeshore cottage development and its effects on breeding birds in central Ontario, Canada. The authors present a way to "predict changes in avian species composition caused by cottage development that could be used to model the impact of habitat disturbance on wildlife communities."

Seventy-three 1-ha study plots, bordering lake shoreline, were arranged in a continuum from undisturbed habitat (no cottages) to disturbed habitat (1 cottage per 15 m of shoreline). Both deciduous and coniferous forest areas were represented. Singing male birds were counted in the plots 3 times each breeding season in 1978 and 1979. A brief description of bird census methods is given: "A species was considered breeding if a singing male was encountered on two or three visits or was encountered at least five times on one visit." Habitat structure and human disturbance intensity were also quantified in the same plots.

The bird community changed significantly as habitat disturbance increased. Development along coniferous shorelines caused a greater change in the avian community than development along deciduous shorelines. Bird species fell into 3 groups relative to their response to disturbance: (1) intolerant of development (i.e., Ovenbird [*Seiurus aurocapillus*]), (2) tolerant of some development (i.e., Chestnut-sided Warbler [*Dendroica pensylvanica*]), and (3) associated with development (primarily edge species such as Eastern Phoebe [*Sayornis phoebe*]). Membership of these groups varied according to whether the forest was primarily deciduous or coniferous.

These results allow prediction of the amount of habitat disturbance to be expected from planned cottage developments, and the impacts of proposed development to the breeding bird community. An ecologically sound goal for planners of lakeshore communities would be that "representative avian populations should be maintained and no species extirpated from lakeshore communities," requiring that some, preferably large, areas of lakeshore developments be left undisturbed. The authors' simple model can be applied by resource managers seeking to assess impacts of lakeshore development on bird communities.—Richard A. Lent.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see 12, 13, 20, 30)

PHYSIOLOGY

(see also 1, 7)

14. Seasonal changes in the effects of starvation on metabolic rate and regulation of body weight in Svalbard ptarmigan. A Mortensen and A. S. Blix. 1985. Ornis Scand. 16:20–24.—Svalbard Rock Ptarmigan (*Lagopus mutus hyperboreus*) store large

amounts of fat (up to 350 g!) in autumn and consume these reserves during the 3 months of darkness in winter (latitude 77–81°N; see Mortensen et al., Ornis Scand. 14:144–148, 1983). In this paper, captive ptarmigan were starved for four 1-wk periods from September/October to January to assess the seasonal effects of starvation on energy expenditure and body mass.

Control birds fed ad libitum reached maximum body mass in late September and reduced food intake and lost mass steadily thereafter. Experimental birds lost an average of 18.7, 16.3, 11.0, and 12.9 g/day during the 4 starvation periods, respectively. Experimentals increased food intake after starvation until their mass reached that of controls, after which both groups lost mass at the same rate. There was a significant drop in metabolic rate of starved birds in September (when food intake normally is highest) but not in December (when food intake normally is lowest), and there was little difference in energy expenditure measured for starved birds and calculated for control birds at the same time of year. The authors conclude that body mass in Svalbard ptarmigan is regulated by a seasonally changing set-point. During periods of reduced food availability in winter, Svalbard birds use fat reserves and save energy by reducing food-searching activity.—Jeffrey S. Marks.

15. Seasonal changes in the body composition of the Norwegian Rock Ptarmigan *Lagopus mutus*. A. Mortensen, E. S. Nordøy, and A. S. Blix. 1985. Ornis Scand. 16: 25–28.—*Lagopus m. mutus* were collected at 70°N in northern Norway. Body composition changed little throughout the year, but the caeca more than doubled in mass from autumn to winter. The authors speculate that enlarged caeca improved digestion of the ptarmigan's fiber-rich winter food. Unlike its close relative *L. m. hyperboreus* (see review **14**), *L. m. mutus* does not store large amounts of fat and thus cannot withstand prolonged periods of starvation.—Jeffrey S. Marks.

PLUMAGES AND MOLTS

16. Information about the wing molt of the Red-crested Pochard *Netta rufina* (Pallas) in northern Spain. (Contribution à la mue des rémiges chez la Nette à huppe rousse (Pallas) en Espagne du Nord.) J. van Impe. 1985. Alauda 53:1–10. (French, English summary.)—Aside from Lake Constance and reservoirs in the Teichgebiet region of Ismaning, the whereabouts during molt of the 12,000–17,000 ducks comprising the central European populations of Red-crested Pochards (*Netta rufina*) is an enigma. However, molting pochards have been reported at two locations in northern Spain since the early 1970s: Laguna de Gallocanta in the extreme southwestern part of the province of Saragosse, a 1400-ha lagoon, hyperhaline in summer and dry in late July and August; and Pantano del Ebro, especially its eastern part near Concorte, a freshwater reservoir in the province of Sandander. Substantial numbers (2950) of molting pochards were at the former site during 1980 (27 June–4 July), but not 1981 and 1983 (when the lagoon was dry or nearly so). Many (3200–3800) used the latter site in 1981 (late July) and 1983 (early August), molting in open water several kilometers from shore.

The pochards' wing molt began at the end of June and was in full swing during July and August. The majority of molting birds were males (sex ratios varied from 148 to 485 males per 100 females), possibly because males arrive in northern Spain earlier than females.

Molting pochards rested during the day and swam and foraged most frequently during the evening. They preened throughout the day, but preening never constituted more than 10–35% of their activities and was usually much less (3–10%). Feeding with head and neck submerged was most common (85% of observations), but ducks also tipped the body (12%) and dove (3%) in search of food. Pillwort (*Pilularia globulifera*) was an important (and previously unknown) food.

Although many apparently suitable areas of the Iberian peninsula are not used by pochards, it seems likely, given the large number of dams there, that this species molts in places besides Laguna de Gallocanta and Pantano del Ebro. The number of Red-crested Pochards that use the peninsula may be growing because of deleterious changes in the water quality of central European lakes undergoing eutrophication. Pochards that congregate in

autumn on lakes in central Europe (e.g., at Camargue and in Bavaria), including L. Constance, may have molted on the Iberian peninsula, since many disappear from Pantano del Ebro during November and December, which is precisely the time pochards begin to assemble at the above European sites.—Michael D. Kern.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 3, 16)

17. Distributional and zonal groups of birds on Wrangel Island. (Biotopicheskoye razmescheniue i shirotnolandshaftnye gruppy ptits na ostrovye vrangelya.) M. S. Stishov. 1985. Zool. Zh. 64:722–730. (Russian, English summary.)—Using botanical and geological criteria, Stishov identified 16 micro-habitats within the Arctic and Sub-polar life zones present on Wrangel Island in the Chukchi Sea. The breeding birds were classified by independent criteria of breeding distribution and behavior, habitat use and diet, and placed into 1 of 4 categories: Euarctic, Hemiarctic, Hypoarctic, and Polyzonal. Unsurprisingly, the predominantly Arctic (Euarctic) breeding bird fauna was correlated with the high proportion of arctic-polar micro-habitats on Wrangel Island. Of greater importance was the finding that the high diversity of breeding birds on Wrangel Island seemed less a function of size, but more likely related to the diversity of breeding habitats. Similar-placed islands of approximately similar area in the Barents, Belya, and Arctic seas do not have as great a diversity of breeding birds as known for Wrangel Island. It is not clear from the data presented here how widespread are some of the microhabitats. It may be that some of them are artifacts of sampling, and the birds confined to a single rare habitat represent the effects of chance rather than ecological principle.—Douglas Siegel-Causey.

18. Distribution peculiarities of the mountain birds of the Southern Palearctic: endemism of the mountain avifauna. (Osobennosti rasprostraneniya gornykh ptits yuzhnoi palearktiki—endemizm gornoi avifauny.) R. L. Boehme. 1984. Ornitologiya 19:3–12. (Russian.)—Boehme compared the distribution of subspecific forms (primarily of *Picoides tridactylus* and *Pyrrhocorax graculus*) throughout the Soviet Arctic region. Endemic forms were found more often in montane regions or isolated mountain ranges compared to the distributions in the steppes and plains of central and southern Siberia. This effect seemed enhanced with increasing latitude. The degree of endemism is thus correlated with the degree of isolation (altitude and latitude) and mobility. These results are somewhat confounded by the method of analysis and the paucity of data. Boehme compared distributions through visual inspection and inferred environmental parameters through the agency of secondary sources. In some cases (high latitude ranges) this may present only a small source of error; in other cases (southern Siberia), endemism seems equated with a small area of distribution. Species that are widespread but nonetheless restricted to a geographical subset of a discrete biotope probably should be considered endemic. If more quantitative data were used, a very interesting test of "mountain ranges as islands" might be possible, since it appears that other forces besides area and isolation are important in the Soviet Arctic.—Douglas Siegel-Causey.

19. Peculiarities of distribution and the expansion of several bird species in the Kola peninsula. (Osobennosti rasprostraneniya i rasseleniya nekotorykh vidov ptits v tundre kol'skovo poluostrova.) K. E. Mikhailov and A. V. Fil'chagov. 1984. Ornitologiya 19:22–29. (Russian.)—Eighty years of distribution data were compiled in order to examine the process of species expansion in this high Arctic region north of Moscow. *Motacilla flava,* dominant in forest tundra throughout northern Siberia, has gradually penetrated south in the interior but never reaching the shores of the Barents Sea. *Emberiza schoeniclus* and *Acrocephalus schoenobaenus* have recently penetrated east to the shores of the Barents Sea. Other species such as *Turdus ericetorum, T. pilaris, Emberiza pusila* have moved only along the coastline restricted to the coastal flora. It would appear that species expansion is limited by the availability of appropriate habitat, the short breeding season, and harsh climate. As a general process, active expansion is limited to movement between isolated, narrow bands of forested tundra that separate this far western Arctic peninsula, rather than gradually expanding populations along a broad front.—Douglas Siegel-Causey.

20. Distribution and biology of the Spotted Owl in Oregon. E. D. Forsman, E. C. Meslow, and H. M. Wight. 1984. Wildl. Monogr. No. 87. 64 p. $3.75.—The authors studied Northern Spotted Owls (*Strix occidentalis caurina*) from 1969–1980 to determine their distribution, numerical status, and habitat affinities in Oregon. They also describe general life history (including breeding biology, home range characteristics, diet, activity patterns, and vocalizations) and provide management recommendations. With help from various state, federal, and private biologists, Spotted Owls were censused using tape-recorded calls along forest roads and trails throughout western Oregon. Two study areas were selected in which 18 owls (14 adults and 4 juveniles) were radio-tagged for intensive study.

Calling surveys revealed that Spotted Owls were closely tied to old-growth coniferous forest: 98% of the locations where habitat was reported ($n = 595$) were in old-growth conifers (>200 yr old) or mixtures of old-growth and mature conifers (100–200 yr old). Of the 47 nests found during the study, 42 were in multi-layered, old-growth forest. Radio-tagged owls strongly preferred old-growth forest year-round for foraging and roosting and rarely used second-growth forest that was less than 60 yr old. The statewide population estimate was 1000–1200 pairs of Spotted Owls. By checking for reoccupancy at 98 traditional nesting areas, the authors estimated that the population declined 0.8% per year from 1972–1978. Seven of 8 cases of nest site abandonment occurred after major portions of the forest surrounding the nest had been harvested. Once established on a territory, adult Spotted Owls probably remain there for life unless displaced by habitat destruction.

The modal clutch size was 2. On average, 62% of the pairs attempted to nest each year ($n = 14–37$), and 81% of all nesting attempts were successful. The mean number of young fledged per successful attempt ranged from 1.46–2.14. Home ranges of radio-tagged owls varied from 549–3380 ha, and there were no significant differences between the sexes. The combined home range size of pairs ranged from 1149–4225 ha. Although their home ranges overlapped considerably, paired owls seldom used the same foraging locations. All radio-tagged pairs had at least 396 ha of old-growth forest within their home ranges. Small mammals constituted more than 90% of the prey biomass ($n = 4527$ prey items). Northern flying squirrels (*Glaucomys sabrinus*), red tree voles (*Phenacomys longicaudus*), and dusky-footed woodrats (*Neotoma fuscipes*) were the most common species in the diet. There was no evidence that male and female owls ate different-sized prey.

Spotted Owls have at least 13 vocalizations, and excepting copulatory calls, all are given by both sexes. The hooting calls (primary song?) of males are lower-pitched than those of females, making it easy to sex owls by voice.

The value of this study is two-fold. First, it provides a wealth of new life history information on Spotted Owls. Second, and most important, this study provides unequivocal testimony of the dependency of Northern Spotted Owls on old-growth forest. Thus, owing in large part to the efforts of Forsman et al., the Spotted Owl is playing a major role in slowing the rate of destruction of old-growth forest in the Pacific Northwest.—Jeffrey S. Marks.

21. Birds of Hope Bay, Antarctic Peninsula (63°24′S, 56°59′W) (Les oiseaux de la baie de l'Espérance, Péninsule antarctique (63°24′S, 56°59′W).) J.-R. Cordier, A. Mendez, J.-L. Mougin, and G. Visbeek. Oiseau Rev. Fr. Ornithol. 53:261–289. (French.)—This is the second in a series of papers (see J. Field Ornithol. 56:447–448, 1985, for a review of the first paper) devoted to the status of the birds at Hope Bay, Antarctica, in late November 1979–early January 1980. Here the authors examine Wilson's Petrel (*Oceanites oceanicus*), Blue-eyed Cormorant (*Phalacrocorax atriceps*), Georgian Teal (*Anas georgica*), Snowy Sheathbill (*Chionis alba*), Southern Black-backed Gull (*Larus dominicanus*), and the Stercorariidae, including Great (*Stercorarius skua lönnbergi*), McCormick's (*S. maccormicki*), and Chilean (*S. chilensis*) skuas. Emphasis is on arrival and departure dates; distribution and size of nesting groups; clutch and egg size; dates of egg-laying, hatching, and fledging; nesting success; growth rates of chicks; stomach contents (diet); and comparisons with published information about each species at Hope Bay and elsewhere in the Antarctic and Subantarctic zones. The text is supplemented with extensive notes. As was true of the first paper in this series, this article is *must* reading for anyone working on marine birds. In the

following paragraphs, I will highlight some of the more important data presented by the authors.

Wilson's Petrel was first reported at Hope Bay in 1905, but little is known about its breeding cycle there. The authors found only one (poorly attended) nest. They estimate that the breeding population was several dozen pairs and show by measurements that the birds belonged to the Antarctic race *O. oceanus exasperatus*. Blue-eyed Cormorants do not nest at Hope Bay, but one to several dozen were present almost daily during the fall. The nearest breeding colony of this species is on Anderson Island about 25 km away. Four adult female Georgian Teal were seen routinely at sea, on beaches, or on inland lakes throughout the winter. They belonged to the continental race *A. g. spinicauda*, whose nearest breeding area is at Tierra del Fuego, about 1000 km from Hope Bay.

Snowy Sheathbills were numerous and 15 pairs bred successfully during 1979/1980. Although their density (7.5 individuals/km of coastline) was typical for breeding populations of this species, their abundance relative to penguins (1 breeding sheathbill/7800 penguins) was surprisingly low in comparison to other sites. Hence, food supply is not the only factor that determines their abundance. Most of their nests were near the shore and near colonies of penguins. Their egg-laying schedule at Hope Bay was somewhat different from that reported elsewhere: 27 November–31 December, with a peak in the first week of December. The intervals between the laying of successive eggs in the clutch were also longer than reported previously: 2–3 d between eggs 1 and 2; 2–7 d between eggs 2 and 3. Serious incubation began after the second egg of the clutch had been laid and hatching therefore occurred over a period of 1–5 d. The period in which the chicks were reared (47–52 d) was short compared to that on Signy Island (50–60 d), likely because penguins leave Hope Bay at the end of February, but remain on Signy Island until mid-May. Indeed, as the authors demonstrate convincingly, the chronology of the sheathbill's breeding cycle is closely synchronized with that of penguins on which they feed. Sixty-nine percent of laid eggs hatched, 82.8% of the chicks survived, and hence overall nesting success was 57.1%. Nothing has been published previously about the nesting success of Snowy Sheathbills; however, the above values are much higher than those reported for the Black-faced Sheathbill (*C. minor*).

As many as 80 nonbreeding skuas populated Hope Bay in 1979/1980, but only 6 pairs of Great Skuas and 1 pair of McCormick's Skuas nested there. Chilean Skuas were extremely rare (the authors saw only one bird). The northern limit of the breeding range of McCormick's Skua on the Antarctic Peninsula was previously at Melchior Island (64°19'S); hence, the discovery of a nest of this species at Hope Bay represents an extension of this limit by about 1°. The number of breeding pairs of skuas at the bay has decreased from 10 in 1948 and the nests themselves were more widespread than in 1900. Great Skuas had an interrupted period of egg-laying (28 November–5 December; 25–29 December), possibly because the breeding population was so small. The relationship between egg-laying and latitude that was documented previously for Great Skuas was reinforced by data from Hope Bay: laying was about 1 month later there than in Subantarctic areas. Nesting success of Great Skuas at Hope Bay was only 44.4%. Fledglings were fed the remains of Adelie Penguins (*Pygoscelis adeliae*) exclusively.

At Hope Bay, as elsewhere in the Antarctic zone, Southern Black-backed Gulls breed generally in colonies near the ocean, at low elevations, and in open areas. In 1979/1980, there was only one colony of 34 nests plus scattered solitary nests at the bay. In all, the gull's breeding population was only 40 pairs, in contrast to nonbreeding birds which numbered at least 100. Nonetheless, the density of breeding birds (19.5/km of coastline) was significantly higher than that in other parts of the Antarctic and Subantarctic zone (2.2–5.7/km). As elsewhere, the laying period was lengthy: 43 days (18 November–31 December). However, clutch size (2.68 eggs/nest) was significantly higher than that of other neighboring populations of this species (1.93–2.39 eggs/nest). Such differences are probably related to food supply. Sixty percent of the 75 eggs in 3-egg clutches hatched, but only 40% of 20 eggs in 2-egg clutches hatched. Like laying, hatching was also protracted: 15 December–27 January, the mean for 60 eggs being 25 December. The time required for an entire clutch of eggs to hatch was somewhat shorter than reported in the literature: 1–2 d for 2-egg clutches (vs. 2–8 d) and 1–4 d for 3-egg clutches (vs. 4–9 d). Gull chicks were fed

parts of Adelie Penguins, particularly penguin chicks, and marine organisms, particularly crustaceans. Reproductive success (55.8% of 95 eggs produced fledged chicks) was lower than reported in New Zealand (66.1%). Since the authors left the bay on 4 January, they could say little about the growth rates and mortality of gull chicks. However, only 5 (9.4%) of 53 hatchlings died during the first 10 d posthatch; hence, chick mortality was probably very low.—Michael D. Kern.

22. Notes about French ornithology, XII. (Notes d'ornithologie française, XII.) R. Cruon and P. Nicolau-Guillaumet. 1985. Alauda 53:34–63. (French.)—Ten years have passed since the *Notes* were last published and numerous new data have accumulated about birds in France. In this installment of the *Notes,* the authors review all published information about new and new nesting species in France, and about species that are covered in volumes 4 and 5 of *The Birds of the Western Palearctic,* i.e., the nonpasseriform taxa Alcidae through Picidae, and the passeriform taxa Alaudidae through Turdinae. Some redundancy exists between this issue of the *Notes* and the work of the French Comite d'Homologation National (CHN), whose annual reports began to appear in *Alauda* in 1984 (reviewed in *J. Field Ornithol.* 56:205, 444–445, 1985).

Sixteen "new" species, 4 "new" nesting species, and 61 others are described in this article. Three of the new species are introduced forms: California Quail (*Callipepla californica*), successfully implanted in Corsica; Bobwhite (*Colinus virginianus*), first released in France in 1858 and now widespread; and Reeve's Pheasant (*Syrmaticus reevesii*). Others are species that occasionally stray into France: Yellow-billed Loon (*Gavia adamsii*), which normally overwinters (at sea) no farther south than the Norwegian Sea; American Wigeon (*Anas americana*); Lesser Yellowlegs (*Tringa flavipes*); and Franklin's Gull (*Larus pipixcan*). The Ruddy Duck (*Oxyura jamaicensis*), may have its source among ducks that were introduced into Great Britain and now breed there in the wild. Other new species include 2 that were identified long ago, but only recently added to the French species' lists—White-rumped Sandpiper (*Calidris fuscicollis*) and Ring-billed Gull (*L. delawarensis*)—as well as Caspian Plover (*Charadrius asiaticus*), Long-billed Dowitcher (*Limnodromus scolopaceus*), Desert Wheatear (*Oenanthe deserti*), Gray-cheeked Thrush (*Catharus minimus*), Greenish Warbler (*Phylloscopus trochiloides*), and Red-eyed Vireo (*Vireo olivaceus*).

The 4 "new" nesting species were reported in France between 1977 and 1978. Of these, the Red-necked Grebe (*Podiceps grisegena*), in fact, apparently bred in France during World War I; and the recent evidence that the Red-footed Falcon (*Falco vespertinus*) nests in France is not solid. The others are Black Stork (*Ciconia nigra*) and the Dunlin (*C. alpina*).

Accounts of the other 61 species are generally brief (frequently no more than dates and places where birds were observed) with several lengthy exceptions which deal most often with changes in population size or distribution. There is paleontological evidence that the Little Auk (*Alle alle*) was in France 10,000–200,000 years ago. Previous estimates of the number of Barn-Owls (*Tyto alba*) in France (10,000 pairs in 1975) are clearly too low: 50,000–60,000 pairs is more reasonable. Barn Swallows (*Hirundo rustica*) hybridize with House Martins (*Delichon urbica*), as first noted in 1897: 10 cases were reported in France in 1970. Although most French Barn Swallows overwinter in southern Spain and western Africa, some have wintered in southern France since the 1960s. Striking declines have occurred in French populations of Short-toed Larks (*Calandrella brachydactyla*), Red-backed Shrikes (*Lanius collurio*), and Lesser Grey Shrikes (*L. minor*). Contrary to published articles, Rufous Bushchats (*Cercotrichas galactotes*) probably didn't nest in southern France previously and don't likely do so now; nor is there any evidence that the Common Kingfisher (*Alcedo atthis*) nests in Corsica. Eighteen pairs (in 1980) of the Black Wheater (*O. leucura*), an endangered species, still "subsist" in the western Pyrenees. Species rarely seen in France include Little Auk (2 records), Razorbill (*Alca torda*; 4), Brunnich's Guillemot (*Uria lomvia*; 2), European Cuckoo (*Cuculus canorus*; 3), Red-necked Nightjar (*Caprimulgus ruficollis*; one specimen, collected in 1851, at the Museum of Châlons-sur-Marne), DuPont's Lark (*Chersophilus duponti*; 3), Crag Martin (*Ptyonoprogne rupestris*; 2), Swainson's Thrush (*Catharus ustulatus*; except for a controversial record in 1867, the only sighting in France was at the Chèvreloup Arboretum, Yvelines, in 1979—a report that should be examined

by the CHN), and Dusky Thrush (*Turdus naumanni*; 5 specimens reported in the last 25 yrs). American Robins (*T. migratorius*) may have been seen twice: in 1834 at Châlons-sur-Marne (this specimen is in the city's museum collection) and in 1956 (questionable) along the English Channel near Lessay.

The *Notes* are valuable not only for themselves, but also because they contain thorough reviews of the literature (some from very obscure sources) for each species.—Michael D. Kern.

23. Increased sympatry in the breeding ranges of *Larus argentatus* and *Larus cachinnans* on the Atlantic coast of France. (Coexistence progressive de la reproduction de *Larus argentatus* et de *Larus cachinnans* sur les côtes atlantiques françaises.) L. Marion, P. Yesou, P. J. Dubois, and P. Nicolau-Guillaumet. 1985. Alauda 53:81–89. (French, erroneous English summary.)—In 1900, few pink- (*Larus argentatus argentatus*) and yellow-footed (*L. cachinnans*) Herring Gulls nested in France, but by 1978 breeding populations of them numbered 76,000–81,000 pairs. This population growth resulted in part (a) from the spread of pink-footed gulls along the coast of France from the North Sea and the English Channel to Oléron I. by 1976 and Bassin d'Arcachon by 1981; and in part (b) from the movement of yellow-footed gulls from the Mediterranean (where they originally bred on Corsica and the Marseille I.) across France: to Camargue (1929), Switzerland (1948–1957), Dombes (1973), Alsace (1977), and more recently parts of northwestern France, Belgium, Holland, and even Great Britain. Yellow-footed gulls also crossed southern France and spread north along the Atlantic coast, becoming sympatric with the pink-footed form at Bassin d'Arcachon in 1976. They numbered 16,000 pairs in 1981.

The breeding range of *cachinnans* continues to creep northward along the Atlantic coast: Oléron and nearby Ré I. were invaded in 1978; Morbihans in 1980; first nests were reported in the marshes of Olonne (Vendée) in 1981, at Grand-Lieu L. in 1982, and on Noirmoutier I. in 1983. (Breeding has also been reported in many spots in southern France since 1982, including L. Artix (Pyrénnés-Atlantiques); Moissac, Carbonne, Beauzelle, and Finham in the Garonne River valley; and Toulouse.) Consequently, the breeding ranges of *argentatus* and *cachinnans* now overlap by more than 250 km on the French Atlantic coast between Bassin d'Arcachon and Grand-Lieu L. However, there is no evidence that the two forms hybridize here, even though some of them breed in mixed colonies (e.g., at Noirmoutier I.). This supports the proposal that *cachinnans* should be accorded the rank of a separate species.

Demographic and banding data suggest that *cachinnans* has spread inland across France along two fronts, one a western route (via the Garonne River valley) to the Atlantic seaboard, from which gulls have then gone north and south; the other an eastern route (via Rhone, Rhine, and Seine river valleys) taking the gulls as far north as Paris, Pas-de-Calais, Belgium, Holland, and Great Britain. In both cases, *cachinnans* has avoided Brittany, possibly because it cannot compete successfully with the large populations of *argentatus* (61,000 pairs in 1978) that are concentrated there. Hence, the authors predict that in the future the breeding range of the yellow-footed form of Herring Gull will spread more rapidly in areas north of Brittany than in Brittany itself.—Michael D. Kern.

24. The status of the Little Bustard *Tetrax tetrax* in Provence. (Le statut de la Canepetière *Tetrax tetrax* en Provence.) G. Cheylan. 1985. Alauda 53:90–99. (French, English summary.)—The Little Bustard is a species with a limited distribution in Eurasia, north Africa, and west Europe. The population in France is estimated at 1000–10,000 nesting pairs. Prior to 1915, Little Bustards were only rare winter visitors in Provence, southern France, and only discovered breeding there in 1955. They have been abundant there since about 1970, probably because of increased use of the area for grain production.

Ninety to 100 bustards occur in 20 Provencial population centers outside of Crau: in the Departments of Bouches-du-Rhône, Vaucluse, Var, and Alpes de Haute-Provence, and at elevations below 550 m. In contrast, Crau has a population of 425–470 males or 567–627 breeding individuals. Bustards are very abundant (5 males/km^2) in the northeastern sector of Crau where the habitat is a mosaic of cultivated fields, fallow lands, and meadows; moderately abundant (2.4 males/km^2) in the southern sector which is uncultivated; and less abundant (1.5 males/km^2) in the northwestern sector, almost all of which is cultivated.

Crau is also the only overwintering area for Little Bustards in Provence. About 1000 birds regularly congregate there between November and February each year. This number corresponds almost exactly to the total number of bustards found in Provence. In years when the number of overwintering bustards at Crau exceeds 1000, it probably includes birds from Languedoc. (Non-Mediterranean populations of Little Bustards in France are all migratory and appear to overwinter in Spain.)—Michael D. Kern.

SYSTEMATICS AND PALEONTOLOGY

(see 4, 23, 28)

FOOD AND FEEDING

(see also 16, 20, 29, 30)

25. Northern Saw-whet Owl winter food and roosting habits in north-central Washington. R. A. Grove. 1985. Murrelet 66:21–24.—Northern Saw-whet Owls (*Aegolius acadicus*) roosted in orchard windbreaks, a backyard, and at a public fishing access. The owls appeared to roost selectively in Douglas firs (*Pseudotsuga menziesii*). Pellets collected at 4 roosting sites during winter 1982 yielded 770 prey items. *Microtus* (54%), *Peromyscus* (24%), and *Reithrodontomys* (15%) were the major prey. The saw-whets also ate at least 14 Dark-eyed Juncos (*Junco hyemalis*), 12 House Sparrows (*Passer domesticus*), 5 White-crowned Sparrows (*Zonotrichia leucophrys*), and a Northern Pygmy-Owl (*Glaucidium gnoma*).—Jeffrey S. Marks.

26. The diet of the Eagle Owl *Bubo bubo* in Provence. (Le régime alimentaire du Hibou Grand-Duc *Bubo bubo* en Provence.) P. Orsini. 1985. Alauda 53:11–28. (French, English summary.)—Orsini determined the diet of Eagle Owls in 13 areas of Provence and two areas in the southern French Alps. He did not study the Maures Massif (where Eagle Owls are abundant), Basses-Alpes, and parts of Provence north of Alpes-Maritimes. His conclusions are based on 3091 prey items in regurgitated pellets.

Mammals (more than 25 species, listed by the author) constituted 78% of the prey and 85% of the biomass consumed by the owls. Most important were doormice (*Glis glis*); Muridae, mostly rats (*Rattus rattus* and *R. norvegicus*); a rabbit (*Oryctolagus cuniculus*); a shrew (*Erinaceus europaeus*); and a microtine (*Microtus nivalis*). Rodents were the major prey captured by Eagle Owls throughout Provence and in the southern French Alps, but numbers varied considerably from one sampling station to another.

Pellets also contained the remains of at least 44 species of birds (listed by the author) from sedentary forms (e.g., Phasianidae, Corvidae, Picidae, Strigidae) to migrants and overwintering birds (Apodidae, Columbidae, Turdidae, Rallidae). Birds constituted 18.5% of the prey items and 14% of the biomass in the owl's diet. Pheasants, partridge, and Rock Doves (*Columba livia*) were particularly well represented in the pellets. The only important raptors in the diet were Common Kestrels (*Falco tinnunculus*), Tawny Owls (*Strix aluco*), and Little Owls (*Athene noctua*). The avian families upon which owls relied most heavily were Turdidae and Corvidae. The pellets also contained the remains of a few amphibians, reptiles, fish, and/or arthropods.

Regional variations (substantial!) in the diet were related to the distribution and abundance of various prey within Provence and to the specialized hunting practices of certain pairs of Eagle Owls. Using dietary affinities, it is possible to separate Eagle Owls from 9 sites in Basse Provence and one in the southern French Alps into two major groups. Birds from the southern French Alps (Queyras and Ubaye), like middle European specimens (from Bavaria and the Central Massif of France) had a diet in which birds weighing more than 300 g and mammals weighing less than 50 g (essentially microtines) were the most abundant items. In contrast, Eagle Owls in Basse Provence had a diet more than half of which consisted of medium-to-large mammals.

The stations in Basse Provence can be further subdivided into (1) a group of 5 (Roquebrussane, Nice, Sollies, Luberon, Toulon) in which medium-sized rodents, doormice, and rats were the major foods, (2) a group of 3 (Sainte Victoire, Brignoles, Alpilles) in which the diet, like that of Eagle Owls from Herault (France), consisted of roughly equal

numbers of rabbits and large rodents, and (3) a single station (Ventabren) in which, as in Spain, the owls' diet consisted essentially of rabbits.

Owls in group (2) from Basse Provence have substituted large rodents for rabbits in their diet, and this appears to have reduced their reproductive success and the density of breeding pairs. For example, in the Department of Var, where an outbreak of myxomatosis decimated local populations of rabbits, the density of territorial pairs of owls is currently 2–3 times lower than it is in Alpilles where rabbits are still abundant. Reproductive success in Var is less than half what it is in western Provence where rabbits are also abundant.

The author notes, however, that the reproductive success of Bonelli's Eagles (*Hieraaetus fasciatus*) in Provence is more seriously affected by such changes in the abundance of rabbits (and partridge) than that of Eagle Owls because of differences in the dietary diversity index of the two species: 2.05 for Eagle Owls, but only 1.85 for Bonelli's Eagles.—Michael D. Kern.

SONGS AND VOCALIZATIONS

(see also 20, 28)

27. The organization and structure of Sage Sparrow song: locatability, distance transmission, and contrast. T. Rich. 1985. Murrelet 66:1–10.—Sage Sparrows (*Amphispiza belli*) nest in sagebrush steppe where steep temperature and density gradients and strong winds are common. Their territories are large (4.4 ± 1.9 ha) compared with those of other North American sparrows such that adjacent males are often more than 100 m apart. These factors should place strong selective pressure for song structure that enhances distance transmission and locatability. In theory, sound transmission in steppe habitat is best in low frequency, broad-band vocalizations with rapid frequency modulations. Locatability is enhanced when song syllables begin and end abruptly and are of short duration and low pitch. Sage Sparrow song might also be structured to avoid signal repetition as predicted by Hartshorne's monotony-threshold hypothesis (Auk 83:176–192, 1956).

Rich recorded Sage Sparrow songs in southeastern Idaho from 1976–1979. Sage Sparrows were dialectal and individual males sang one song type with little variation. Most of the 40 syllables identified were short duration, low frequency (mean dominant frequency = 3.1 kHz), and had abrupt beginnings and endings. The syllables were also broad-band with rapid frequency modulations. Low frequency syllables were of longer duration than high frequency ones. There was little repetition of syllable types within songs, and sparrows tended to alternate high and low frequency syllable types and long and short types within songs. In short, Sage Sparrow song indeed has elements that theoretically enhance distance transmission and locatability and provide contrast within each song type.—Jeffrey S. Marks.

PHOTOGRAPHY AND RECORDINGS

28. Sound supplement. Recordings illustrating the bioacoustic problems posed by birds of the Ethiopian region. (Supplement sonore. Illustration sonore de problemes bioacoustiques poses par les oiseaux de la zone Ethiopienne.) C. Chappuis. 1985. Alauda 53:115–136. (French.)—This article was written to accompany a phonographic record (no. 13; available for 90F from the publisher of *Alauda*) featuring the vocalizations of 68 African species belonging to the families Upupidae, Phoeniculidae, Apodidae, Picidae, Pittidae, Eurylaemidae, Alaudidae, and Motocillidae. Although the vocalizations supposedly represent the avifauna of the "Ethiopian region," they were actually recorded throughout northern and central Africa. For every species, Chappuis gives the source of each vocalization (where and when it was recorded, often by whom) and the nature of the vocalization (e.g., produced in flight, part of a nuptial display, an alarm call). For many species, he also discusses (1) structurally important features of the vocalizations, (2) similarities and differences between the vocalizations of these African species and their European relatives, (3) taxonomic implications of vocalizations, (4) their functions, and/or (5) selection pressures responsible for their structure.

The following are examples of Chappuis' comments about the taxonomic value of vocalizations. Temporal differences between the songs of Wrynecks (*Jynx torquilla*) and

Red-breasted Wrynecks (*J. ruficollis*) in areas where the species are sympatric, indicate that they do not hybridize. Vocalizations of Sun Larks (*Heliocorys modesta*) and larks of the genus *Galerida* are so different that these larks should not be lumped into a single genus (*Galerida*) as is sometimes done. On the other hand, the song of Dunn's Lark (*Eremalauda dunni*) so closely resembles that of larks in the genus *Mirafra* that one wonders if Dunn's Lark really belongs in a separate genus. Acoustic data do, however, support the division of the African pittas into the two species, *Pitta reichenowi* and *P. angolensis*, and inclusion of Greenbacked Woodpeckers (*Campethera permista*) as a race of *C. cailliautii*. Unfortunately, the vocalizations of Grey-headed (*Smithornis sharpei*) and African (*S. capensis*) broadbills are identical and the only way to distinguish the species in the field is on the basis of the habitat in which songs are heard, since *S. sharpei* lives in primary forests, whereas *S. capensis* inhabits secondary forests. Chappuis also presents a brief, but comprehensive explanation of taxonomic problems associated with the African Picinae. He then offers a revised taxonomy (replete with a key) of the group based largely on the vocalizations and drumming activity of its members.

His comments about the functions and factors responsible for the structure of vocalizations are illustrated by the following few examples. Structural similarities between the vocalizations of several African pipits may permit them to form and maintain mixed flocks during the winter. European wagtails use staccatic, rapidly modulated vocalizations to penetrate the white noise in their habitat. Mountain Wagtails (*Motacilla clara*), in contrast, do the same in Africa using long, pure notes that are scarcely modulated at all. The long, pure notes in the songs of Brown-eared Woodpeckers (*C. caroli*) are unusual sounds for woodpeckers and probably developed because of their communicative value in the dense primary forests where this woodpecker lives.

Chappuis also describes noises that function as songs, but are actually produced by vibrations of specialized wing feathers in broadbills; and the territorial "song" of Flappet Larks (*Mirafra rufocinnamomea*), for which regional dialects may exist, which is also wing noise, but in this case produced when the feathers are clicked against one another. Finally, there is the vocalization of Dunn's Lark (alluded to above), a very rare species in the Ethiopian region, whose song has not been recorded previously.—Michael D. Kern.

BOOKS AND MONOGRAPHS

29. Wildfowl 35. G. V. T. Matthews and M. A. Ogilvie (editors). 1984. The Wildfowl Trust, Slimbridge, England. 184 p. $15.00 (paper). (May be ordered from the Administrative Officer, The Wildfowl Trust, Slimbridge, Gloucestershire, England GL2 7BT.)—This is a collection of research papers published annually by The Wildfowl Trust as a service "to the conservation of and research on the birds of the world's wetlands." It contains 18 papers on waterbirds. Four additional abstracts present census, banding, and avicultural data from The Wildfowl Trust's activities in Britain and Ireland. The research papers describe work done in England, North America, Scotland, Iceland, Africa, Sweden, the Netherlands, Algeria, Spain, and France. Papers concerned with individual species include those on Tule Geese (*Anser albifrons gambelli*), Whooper Swan (*Cygnus cygnus cygnus*), Barnacle Geese (*Branta leucopsis*), Brent Geese (*B. bernicla bernicla*), Crane (*Grus grus*), Mallard (*Anas platyrhynchos*), Black Duck (*A. rubripes*), and Tufted Duck (*Aythya fuligula*). There are also several papers on waterfowl community ecology. Subject matter is quite diverse. The highlight for me was a posthumously-published, humorous piece by John Lynch that presented an underlying serious, and sensible, approach to the formulation of North American waterfowl hunting regulations. Other topics include waterfowl distribution and abundance, nesting biology, technique (Paassen et al., A simple device for determination of incubation stages in eggs), ecology of wintering populations, wetland habitat characteristics (Heitmeyer and Vohs, Characteristics of wetlands used by migrant dabbling ducks in Oklahoma, USA), foraging ecology, behavior, and orientation (Matthews, "Nonsense" orientation in Mallard: a resume, and an investigation of the mechanism of a sun-compass [a good review of nonsense orientation]). This book is attractively printed on good paper with few typographical errors. One error I did run across was the cover painting of "Goldeneyes" (they are actually Bufflehead). This book will be of interest to waterfowl

biologists, aviculturists, and anyone with more than a passing interest in wetland birdlife.—Richard A. Lent.

30. The Audubon Society guide to attracting birds. S. W. Kress. 1985. Charles Scribner's Sons, New York. 377 p. $24.95.—Here is a well-illustrated guide for the individual with a more-than-casual interest in attracting birds to the backyard—or to the back forty. Kress has compiled a great deal of information—mostly from government publications, but also from individuals who responded to a news release in which a request was made for innovative ideas for feeders, houses, and nuisance animal control. In general, the result is a volume that looks and sounds like the source publications—and as a result, also like many of the other "attracting birds" books that have appeared. However, Kress has provided many new ideas—most the result of gleaning the technical literature and making use of ideas from respondents to his questionnaire. This guide differs from other available books in that it has a wider scope, including information for all of North America, information on such things as building farm ponds and green tree reservoirs, and plans for nest boxes and artificial nesting platforms for such birds as Ospreys (*Pandion haliaetus*), Common Barn-Owls (*Tyto alba*), Barred Owls (*Strix varia*), Common Loons (*Gavia immer*), and Canada Geese (*Branta canadensis*). This is the most complete such book that I have yet seen.

The numerous black-and-white drawings by Anne Senechal Faust add immeasurably to the usefulness of the book. The birds are accurate, the instructions clear, and the arrangements are very pleasing.

Nearly the first half of the book deals with landscaping and plants for attracting birds. As such, "Attracting Birds" sometimes takes on the appearance of a botany text rather than a book about attracting birds. Of what relevance is it to learn what achenes, capsules, compound capsules, drupes, drupelets, pomes, and syncarps are (pp. 59–64)? As a purist, I prefer using native plants and I was dismayed to find a large number of exotic species being recommended. At least tables are provided which identify which plants are native and which are exotic.

Chapter 6 provides numerous references for publications that deal with attracting birds. Among these is a listing of publications available from agencies within each state. I was disappointed in Appendix A, which lists "Agencies and organizations that can help": no mention is made of any state or national ornithological society—not even the American Birding Association. Although the publications of national organizations rarely have articles specifically dealing with attracting birds, anyone with a serious interest in birds might be interested in learning more. Certainly many of the state journals have information about attracting birds.

Appendix B ("Ordering trees and shrubs through the mail") and D ("Sources for bird-attracting supplies") should be very useful for anyone with such interests. These sections, however, may have a short-lived usefulness. Addresses, phone numbers, and catalog prices do change.

Absent from the book are discussions of binoculars and field guides—but this is a book about bird-attracting, not bird-watching.

In summary, The Audubon Society Guide to Attracting Birds would be a fine and useful addition to the library of anyone interested in attracting birds to their property. I recommend it without reservation.—Jerome A. Jackson.

31. Vertebrate flight: A bibliography to 1985. J. M. V. Rayner. 1985. University of Bristol Press, Bristol, England. 182 p. $9.75 (paper).—This extensive bibliography (approximately 2500 references) is a must for anyone interested in vertebrate flight. Rayner's introduction defines the limits of the bibliography to include "as many aspects of vertebrate flight as practicable," but he admits to some patchiness. In preparing the bibliography, the author relied heavily on previously compiled bibliographies as well as on Zoological Record, Biological Abstracts, and various editions of the Bibliotheca Zoologica. He acknowledges that among the most important sources have been bibliographic citations from other papers.

The bibliography begins with a listing of entries compiled alphabetically by author. These are followed by subject and taxonomic indices which greatly add to the value of the

effort. Although most entries deal with bird "flight," the swimming behavior of penguins is also included, since it is essentially flight underwater. Subject categories include such diverse topics as "fringe" sources (e.g., philosophy, fiction, poetry), flapping wing aerodynamics, model animals, photography and cinematography, radar tracking, echolocation, flocks and flocking, flightlessness, various types of soaring, migration and homing, hovering, flight speed, environmental influences, flight energy measurement, anatomy, physiology, and evolution.

Although the majority of references included are in English, there are also many references from non-English sources—especially German, Russian, and French. A quick check of major American ornithological journals suggests that most recent major articles are included and that most citations are correct (I did note that one of the author's names is misspelled in the Odum et al. 1961 reference).

This was obviously a work done out of love of the subject matter. It is very well done and in a form that should be useful to biologists from many disciplines.—Jerome A. Jackson.

32. A bibliography on the technical literature of the bluebird genus *Sialia*. T. W. Gutzke (compiler). 1985. The North American Bluebird Society, Research Ser. No. 1. (Box 6295 Silver Springs, Maryland 20906-0295). 29 p. $2.50 (paper).—This bibliography includes approximately 362 entries (up to 1983) alphabetically listed by author. No attempt has been made to provide subject indexing as has been done with so many recent bibliographies. The compiler's objective was to include "the majority of the technical literature of the bluebird genus *Sialia*." Publications cited were published in major ornithological journals, some state journals, some government publications, several non-ornithological journals, a few theses and dissertations, and several books. Considering the stated goal of compiling references from the "technical literature," I was surprised to find entries from Science News, 4-H bulletins, Reader's Digest, and Purple Martin News. Thus, the scope of coverage is greater than stated. The nature of publications cited varies from popular to highly theoretical articles and from articles in which bluebirds are only incidentally mentioned to monographs dealing only with bluebirds. Unfortunately, the coverage is far from complete—a quick check of volumes of the Auk and Wilson Bulletin from the 1970s revealed several references that were not included. Furthermore, a spot check of some of the references that are included revealed errors in titles (e.g., the references to Drinkwater 1953, Flanigan 1971, Preston 1938). Gutzke is also consistent in not including "Jr.," "III," etc. as part of authors' names—although they were included in the original articles. From a stylistic point of view, authors' names are typically all run together, with no spaces between last names and initials, and the compiler has not followed the convention of capitalizing common names of birds.

Finally, Gutzke has fairly stated that the bibliography was not complete. Future editions are planned and he solicits entries. I found no serious errors, but as with any secondary source, users should check the original articles for correct citations. In sum, this bibliography should be a useful starting point for anyone interested in the bluebird literature. I hope that future editions can be based on thorough systematic searches and can include subject indices.—Jerome A. Jackson.

33. Catesby's birds of colonial America. A. Feduccia, ed. 1985. University of North Carolina Press, Chapel Hill. 176 p, 20 color plates, numerous black-and-white plates. $29.00.—This volume includes all of Catesby's bird illustrations, although much reduced from the originals. Twelve of the color reproductions are about 16 × 22 cm; 8 are only about 10 × 13 cm. All are reproduced well on semigloss paper. Subjects chosen for color reproduction include several "popular" species (e.g., Purple Martin, *Progne subis*), 4 extinct forms (e.g., Ivory-billed Woodpecker [?], *Campephilus principalis*), and an assortment of others (e.g., Little Blue Heron, *Egretta caerulea*). In addition to the selected color plates, all of the original plates are reproduced in the text. Some of the same plates selected for color reproduction were also singled out for enlarged black-and-white reproduction. The plates reproduced in this volume are those from a copy of the first edition of Catesby's Natural History which is in Duke University's Perkins Library. Some of these (e.g., Kill-

deer, *Charadrius vociferus*) vary slightly in background details from the 1974 reproduction of the third edition of Catesby's plates by the Beehive Press (Savannah, Georgia).

The text of this volume begins with an introduction by Feduccia that summarizes Catesby's life and critiques his art and writing. Particular effort is made to reveal Catesby's literary debt to John Lawson, whom he seems to have freely paraphrased, and his artistic debt to John White, from whom he clearly copied at least 7 illustrations. Also included is brief mention of other colonial naturalists and lists of birds compiled by Lawson, Catesby, and Thomas Jefferson.

Following a reproduction of a sample page from the first edition of Catesby, each of the plates is presented along with the "lightly edited" original description from Catesby, and notes about the species by the editor. The latter notes include current AOU nomenclature, current tidbits of natural history, and comments excerpted from the writings of other early naturalists such as Lawson, Wilson, and Audubon. These allow one to form a nice mental image of colonial knowledge of the birds.

On the negative side, there are no captions for the black-and-white plates, they are often on pages where the text describes other species, and many of the birds in them (e.g., on p. 122) are simply unrecognizable in the reduced, black-and-white format. The most negative aspects of the book are the notes about the species by the editor. Although the problems are often small from both biological and grammatical standpoints, they are abundant enough to be annoying.

Feduccia notes (p. 23) that the Great Blue Heron (*Ardea herodias*) is also "commonly known as the 'blue crane.'" The same sort of statement is also made for colloquial names of a number of other species. There is nothing wrong with mentioning colloquial names, but they should be labelled in such a manner as to tell the reader that they are improper common names and, as in the case of the "blue crane," may imply false relationships. Feduccia also suggests (p. 25) that the Green-backed Heron (*Butorides striatus*) is "no doubt the best-known heron in the United States," although it is absent from most of the west. In comparing the Osprey (*Pandion haliaetus*) to the Bald Eagle (*Halieetus leucocephalus*) (p. 33), Feduccia notes that the underparts of the Osprey are white, "as opposed to black in the eagle"! Entomologists might be puzzled to learn (p. 87) that Pileated Woodpeckers "feed on all types of insects and ants."

Although Feduccia claims (p. 15) that "both common and scientific names of the birds conform strictly to the latest usage in the AOU checklist . . . ," as far as common names go nothing could be further from the truth. One of the more frustrating aspects of the book is the abundance of different names used for the same species. For completeness and clarity, Catesby's name and the correct common name in use today should have been presented. In spite of properly referring to the American Kestrel (*Falco sparverius*) and Wood Stork (*Mycteria americana*) in titles to his comments, Feduccia then states (p. 36) "The handsome little sparrow hawk is the smallest and perhaps best known of the North American hawks," and that "Catesby's wood pelican, today known as the wood ibis . . ."! Nowhere in the text does he refer to the "sparrow hawk" as American Kestrel or as a falcon, though he does explain that the "wood ibis" is a stork. Under Merlin (*Falco columbarius,* p. 37), we learn from Feduccia that "The pigeon hawk is a small falcon, more or less the size of a *bluejay* [sic]. . . ." Under the Yellow-crowned Night-Heron (*Nycticorax violaceus,* p. 27), night-heron is hyphenated in the title, but nowhere in the text.

From a grammatical and literary point of view, the text also suffers in places. Commas that are needed are often missing—e.g. (p. 25), the Green-backed Heron "is also known as the 'fly-up-the-creek,' 'shitepoke,' or 'Indian Hen.'" And the text is particularly well flavored with superlatives and redundancies: Carolina Parakeets (*Conuropsis carolinensis*) are (p. 65) "completely extinct." Catesby's "American swallow" is noted (p. 78) as "the common chimney swift, which is common. . . ." There are other problems strictly from the point of view of one interested in further reading. Some of the authors quoted in the text are not included in the bibliography, nor are references given in the text (e.g., Dr. Samuel L. Mitchill, p. 38).

In spite of these shortcomings, Feduccia and the University of North Carolina Press have done the ornithological community a service in once again making the works of Catesby

available—and at a reasonable price. The special contribution of Feduccia in providing excerpts from the writings of other colonial writers helps to put Catesby's work in proper perspective. This volume will be of interest to any student of the history or art of American ornithology and would be a worthwhile addition to college and university libraries.—Jerome A. Jackson.

NOTES AND NEWS

The **NORTHEASTERN BIRD-BANDING ASSOCIATION** will meet 2–4 May 1986 at the Broadmoor Sanctuary in eastern Massachusetts. For information contact Dr. John C. Kricher, Biology Department, Wheaton College, Norton, Massachusetts 02766.

WESTERN BIRD BANDING ASSOCIATION'S 1986 meeting will be held 10–12 October at the Santa Barbara Natural History Museum, Santa Barbara, California. The program will highlight banding demonstrations and workshops and will include field trips. Title and abstract of papers should be submitted to David F. DeSante, Point Reyes Bird Observatory, 4990 Shoreline Highway, Stinson Beach, California 94970.