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RECENT LITERATURE

Edited by John A. Smallwood

NOTICE

In order to make the information in the literature reviews more accessible, several changes have been made to the topical organization of contributed reviews. "Banding and Longevity" no longer is a titled section; banding methodology papers will be included with other techniques papers in the new section "Research Techniques," and longevity papers will be included under "Population Dynamics." Another new section, "Habitat Use and Territoriality," has been added, "Physiology" has broadened to "Physiology and Development," and the two sections, "Wildlife Management and Economic Ornithology" and "Conservation and Environmental Quality" have been combined. In addition, the sequence of sections has been rearranged to bring topically similar papers together. In this issue, all current subject headings appear, except "Photography and Recordings."

NEW JOURNAL

1. Bird populations. The Institute for Bird Populations will be publishing this new scientific journal, whose primary objective "is to foster a global approach to research and the dissemination of information on changes in the numbers, distributions and ecological relationships of birds." The institute points to current large-scale environmental changes, such as tropical deforestation, ozone depletion, global warming, and toxic pollution, and voices the expectation that bird populations will likely undergo dramatic changes during the next few decades. The goal of the new journal is to provide a global forum dedicated to dynamic avian biogeography.

The first issue of *Bird populations* is expected in late 1991. The journal plans to publish four kinds of materials: "(1) refereed papers of original research, either empirical or theoretical, dealing with changes in the abundance, distribution or ecology of birds, (2) refereed papers of a review, synthesis or commentary nature . . . (3) annual reports from all the major avian biomonitoring projects around the world, and (4) annual summaries of significant changes in bird populations from each continent or major sub-continent division." As the institute continues to develop a network of biomonitoring programs worldwide, it welcomes any information on such current programs.

Membership in the Institute for Bird Populations includes a subscription to *Bird populations*. Annual dues are $35. Direct inquiries to the Institute of Bird Populations, P.O. Box 554, Inverness, CA 94937, USA.—J. A. Smallwood.

RESEARCH TECHNIQUES

(see also 34, 50)

2. Effects of nest inspections and radio-tagging on Barn Owl breeding success. I. R. Taylor. 1991. J. Wildl. Manage. 55:312–315.—The effects of frequent nest inspections and radio-tagging on reproductive success in Common Barn-Owls (*Tyto alba*) were studied in Dumfriesshire, Scotland, from 1979 to 1988. Fifty-one nests were visited continually throughout the entire nesting season (the intensive group) while 32 nests were visited only when the young were near fledging (the nonintensive group). There was no difference in the mean number of young fledged per nest or in the mean mass of near-fledged young between intensive and nonintensive study groups. Additionally, the mean number of young fledged per pair did not differ between radio-tagged and untagged groups. There was no nest desertion among the frequently visited birds and there was a high rate of nest site fidelity, with only 0.9% of males and 4.0% of females changing nest sites in consecutive seasons. Thus, the author suggests that reproductive success in Common Barn-Owls is not likely to suffer reduction due to researcher activities. [Dept. of Forestry and Natural Resources, Univ. of Edinburgh, Mayfield Rd., Edinburgh EH9 3JU, Scotland.]—Robin J. Densmore.

BEHAVIOR

(see also 20)

3. Trade-off between mate guarding and mate attraction in the polygynous Great Reed Warbler. D. Hasselquist and S. Bensch. 1991. Behav. Ecol. Sociobiol. 28:187–193.—The authors observed Great Reed Warblers (*Acrocephalus arundinaceus*) during four breeding seasons in southcentral Sweden to investigate the potential ramifications of male mate guarding and mate attraction behaviors. About 40% of the males became polygynous (mated 2–4 females) in each season. Male Great Reed Warblers possess two distinct song types: (1) a long song that is sung during a large proportion of the day, and (2) a short song that is sung much more sporadically. After a male had attracted a female to his territory using the long song, he immediately switched to the short song and spent about 80% of his time within 10 m of his newly acquired mate. However, early in the breeding season, males resumed long song as early as 7 d before the end of the primary female's fertile period, attempting to attract additional females. Conversely, later in the breeding season, mate guarding lasted throughout most of the female's fertile period. This supports the authors' prediction that when the probability of attracting a second female declines as the season progresses, mate guarding should intensify.

Male intrusions on other male's territories varied over the breeding cycle, with the greatest frequencies occurring from the day pairs were formed until the start of egg laying. Ninety-two percent of intruding males that were identified already held territories in the study area, and 50% were already paired with at least one female. Males often made several territorial intrusions per day, and in between attempted to attract new females to their own territories by singing long song. Thus, all male intrusions into territories with fertile females probably were attempts at gaining extra-pair copulations with unguarded females. Such intrusions increased as the season progressed and unpaired females became less common. [Dept. of Ecology, Animal Ecology, Univ. of Lund, Ecology Building, S-223 62 Lund, Sweden.]—Danny J. Ingold.

4. The role of helpers in feeding chicks in cooperatively breeding Green (Red-billed) Woodhoopoes. M. A. du Plessis. 1991. Behav. Ecol. Sociobiol. 28:291–295.—Ten flocks of Green Woodhoopoes (*Phoeniculus purpureus*), varying in size from two to eight, were observed during the 1986–1987 breeding season in the eastern Cape Province, South Africa. In doing so, the author's goal was to examine the relationship between flock size and the amount of food delivered to nestlings, and the potential effects of this relationship on flock fecundity and breeder survivorship. Although the total number of feeding visits did not vary significantly with flock size, feeding frequency and the amount of food delivered by both male and female breeders decreased with increasing flock size. Consequently, some of the pressure on breeding birds to provision young with food was alleviated, reducing their energy expenditure. However, data from an eight-year study of 144 flocks at the same location revealed that larger flocks did not enhance flock fitness or breeder survivorship. Thus, there is no evidence that the feeding contributions of helper woodhoopoes to young augment their own indirect fitness. [FitzPatrick Inst., Univ. of Cape Town, Rondebosch 7700, South Africa.]—Danny J. Ingold.

5. Nocturnal abandonment response to Black-crowned Night-Heron disturbance in a Common Tern colony. D. A. Shealer and S. W. Kress. 1991. Colon. Waterbirds 14: 51–56.—Although many colonially nesting bird species have adequate responses to diurnal predators, many lack nocturnal defense mechanisms. The authors report on the effects of Black-crowned Night-Herons (*Nycticorax nycticorax*) on nest attendance and reproductive success for a Common Tern (*Sterna hirundo*) colony on Stratton Island, Maine. One hundred and fifty-three tern nests were marked and followed until chicks fledged. Nocturnal observations were made on eight nights. Sixty-two nests failed due to abandonment and 51 due to predation. Of the predations observed, three were by Black-crowned Night-Heron(s), and two each by gulls, ants, and Ruddy Turnstones (*Arenaria interpres*). The predations of all but the Black-crowned Night-Herons were of abandoned or unattended eggs. Nocturnal observation revealed many instances of tern "selective abandonment" (terns leave nest and most do not return until dawn), some caused by Black-crowned Night-Herons. During

daylight terns successfully drove off night-herons and other predators. The authors agree with published suggestions that Black-crowned Night-Herons can cause tern chick and egg loss both by direct predation and indirectly through nocturnal abandonment, which provides access to gulls and other predators. Fledging success (0.24 chicks/pair) was well below the 1.1 needed to sustain the population. The authors suggest that nocturnal abandonment may have evolved as a response to owl predators, which often kill adult terns, but suggest that terns cannot distinguish between owl and night-heron silhouetes at night, and hence abandon nests when night-herons enter a colony. Night-heron predation ceased in late July and the authors suggest that perhaps the predation was by a single night-heron. Thus a single predator may be responsible for reducing productivity in an entire colony. [Dept. of Biological Sciences, Rutgers Univ., Piscataway, NJ 08855, USA.]—William E. Davis, Jr.

6. Long-term changes in nest defense intensity of the Spanish Imperial Eagle *Aquila [heliaca] adalberti*. M. Ferrer, L. Garcia, and R. Cadenas. 1990. Ardea 78:395–398.—This paper describes the variations and changes in eagle nest defense after the declaration of Doñana as a national park in southwestern Spain in 1974. There was a marked increase in the intensity of nest defense behavior through time during 403 nest visits to 12 nests over a 12-year period. The authors suggest that since eagles are long-lived birds and are protected in the Doñana, they learned by positive reinforcement through time that young were unharmed after an aggressive attack. Thus, the increased intensity of nest defense behavior over the years is a function of adult learned behavior rather than because of greater parental investment.—Clayton M. White.

FOOD AND FEEDING

(see also 4, 21, 25, 50)

7. Food habits of nesting Prairie Falcons in Campbell County, Wyoming. J. R. Squires, S. H. Anderson, and R. Oakleaf. 1989. J. Raptor Res. 23:157–161.—Prairie Falcon (*Falco mexicanus*) food habits were examined in Campbell County, Wyoming, from 1982 to 1985 in order to identify important prey species used by this particular population. Pellets and prey remains were collected at eyries, and observations were conducted on the foraging behavior of adults. Additionally, transect sampling was used as an index of the relative prey abundance between years.

Fifteen prey species were identified, with the most common prey species being Thirteen-lined Ground Squirrels (*Spermophilus tridecemlineatus*), found in 91% of the pellets. Western Meadowlarks (*Sturnella neglecta*), Horned Larks (*Eremophila alpestris*), and Lark Buntings (*Calamospiza melanocorys*) were the next most prevalent species, found in 56%, 23%, and 12% of the pellets, respectively. Eighty-nine percent of the pellets contained both avian and mammalian remains, 4% contained only avian remains, and 7% contained only mammalian remains. Thirteen-lined Ground Squirrels were the most common species found in mammal transects (85%) while Lark Buntings, Brewer's Sparrows (*Spizella breweri*), Vesper Sparrows (*Pooecetes gramineus*), and Horned Larks were the most common species in bird transects, found in 88, 83, 75 and 71% of the transects, respectively. [Wyoming Cooperative Fish and Wildlife Research Unit, P.O. Box 3166 Univ. Station, Laramie, WY 82071, USA.]—Robin J. Densmore.

8. Prey remains from Bald Eagle nests in Sonora, Mexico. B. T. Brown, W. C. Leibfried, T. R. Huels, and J. A. Olivera. 1991. Southwest. Nat. 36:259–262.—Prey remains were collected from three of five known Bald Eagle (*Haliaeetus leucocephalus*) nests along the Rio Yaqui River in central Sonora, Mexico, from 1987 to 1989. Of the 118 individual prey items that were identified (representing 20 different taxa), 77.1% were fish, 20.3% birds, and 2.5% mammals. Catfish (*Ictalurus* sp.), common carp (*Cyprinus carpio*), and river carpsuckers (*Carpoides carpio*) were the most abundant fish, and American Coots (*Fulica americana*) were preyed upon most frequently among the birds. These results parallel those of a similar study of inland Bald Eagles conducted in Arizona in which individuals preyed most frequently upon benthic-feeding fish. [P.O. Box 3741, Tucson, AZ 85722, USA.]—Danny J. Ingold.

SONGS AND VOCALIZATIONS

(see 3, 28, 35, 37, 50)

NESTING AND REPRODUCTION

(see also 2, 3, 4, 5, 6, 18, 23, 25, 26, 28, 50)

9. Eastern Bluebirds nest over water. R. M. Tuttle. 1991. Sialia 13:83–87.—Between 1982 and 1990 the author monitored from two to five nest boxes placed in each of two ponds in Delaware County, Ohio, for Tree Swallow (*Tachycineta bicolor*) and Eastern Bluebird (*Sialia sialis*) nesting activity. The boxes were situated between 2 and 9 m from the shore with entrances ranging from 1 to 1.2 m above the pond surface. Tree Swallows attempted nesting efforts in the pond boxes 55 times and fledged young in 43 instances (78.2% success), while bluebirds attempted 12 nesting efforts and fledged young in 5 instances (41.7% success). Although both species lost a few boxes to House Wrens (*Troglodytes aedon*) and House Sparrows (*Passer domesticus*), which also nest over water, the success rates of both species nesting over water were not significantly different from those nesting over land. Although Tree Swallows have been previously documented to nest over water, the phenomenon is apparently not well documented among bluebirds. These data provide bluebird conservationists with a new and viable option regarding nest box placement which could help to circumvent some of the problems associated with land-placed boxes. [311 West Central Ave., Delaware, OH 43015, USA.]—Danny J. Ingold.

10. Differential reproductive success of Ospreys in New Jersey. R. J. Steidl, C. R. Griffin, and L. J. Niles. 1991. J. Wildl. Manage. 55:266–272.—A comparison of reproductive success of Ospreys (*Pandion haliaetus*) nesting in Delaware Bay and Atlantic Coast colonies was conducted in New Jersey in 1987 and 1988. The success of the Delaware Bay colony had been lower than the Atlantic Coast colony for years. Thus, the purpose of this study was to identify the limiting factors on Osprey productivity in the Delaware Bay colony. Data were collected on nesting success, timing of reproductive failure, feeding and nest attendance rates, food accessibility, and eggshell thickness of both colonies.

Hatchability, proportion of young fledged per egg laid and per occupied nest, and the number of nests fledging more than one young were all lower in the bay colony than in the coast colony. Water transparency was lower in the Delaware Bay foraging areas than in those of the Atlantic Coast, and Delaware Bay adults spent more time away from the nest than did Atlantic Coast adults. However, time spent feeding young did not differ between colonies. Eggshells from Delaware Bay averaged almost 5% thinner than those from the Atlantic Coast colonies when compared to pre-DDT standards, although this difference was not statistically significant.

The authors suggest a combination of poor hatching success and probable Great Horned Owl (*Bubo virginianus*) predation as limiting factors for Delaware Bay Osprey productivity. Additionally, they suggest the possibility of exposure to industrial contaminants from the northern portion of Delaware Bay as a cause of egg failure. [Dept. of Forestry and Wildlife Management, Univ. of Massachusetts, Amherst, MA 01003, USA.]—Robin J. Densmore.

11. Conspecific nest parasitism in the European Starling. R. Pinxten, M. Eens, and R. F. Verhayen. 1991. Ardea 79:15–30.—Parasitism of conspecifics has been reported in less than 150 species of birds and is apparently more common in birds breeding in colonies. From 1983 to 1988 the authors monitored 260 European Starling (*Sturnus vulgaris*) nests in three nest box colonies. Conspecific parasitism occurred in 15% of 174 first clutches and 2% of 86 intermediate clutches. The yearly proportion of first clutches parasitized was as high as 37%. Parasitism occurred even when there were available unoccupied nest boxes for pairs to use. In 27% of the parasitized first clutches one of the host's eggs disappeared the same day as the parasitic egg was added. The authors do not suggest any advantage gained by parasitic starlings but do suggest that first clutches in starlings have fewer eggs than could be productively reared. They suggest that this is "insurance" against the "crowding" effect that could result because of the added parasitic egg.—Clayton M. White.

MIGRATION, ORIENTATION, AND HOMING

(see also 50, 52)

12. Long-tailed Skuas in Britain and Ireland in autumn 1988. P. J. Dunn and E. Hirschfeld. 1991. Br. Birds 84:121–136.—During the fall migration of 1988, exceptionally large numbers of Long-tailed Skuas (*Stercorarius longicaudus*) appeared in the North Sea and to a lesser extent along the other British coasts. The first birds appeared in the Shetland and Orkney islands during the third week of September, the same time numbers were increasing off the coast of Denmark. Peak numbers of adults occurred between 24 September and 2 October while a second wave on 6 October was primarily immatures. Their numbers rapidly declined after 11 October, although scattered individuals remained through 2 November. At least 1224 long-tails were recorded in British waters with 1042 along the coasts of other European countries.

Several factors contributed to this unprecedented movement. On their arctic breeding range, abundant lemmings (Cricetidae) and other prey probably resulted in the production of many young skuas. Weather conditions during late September and early October forced the migrating skuas to congregate in the North Sea. Two frontal systems converged over the northern Scottish isles, producing rain and strong northwesterly winds which may have blown the skuas away from their normal migration routes in the Atlantic Ocean. Once they entered the North Sea, a shortage of food may have lengthened their stay in the North Sea. When weather conditions improved during mid-October, the absence of sightings from the English Channel indicated most skuas flew north from the North Sea as they returned to the Atlantic Ocean. [16 Southwold Rise, Scarborough, North Yorkshire YO11 3RB, Great Britain.]—Bruce G. Peterjohn.

13. Hawk Cliff raptor banding station eighteenth annual report—1988. B. W. Duncan, D. Fowler, and S. Fowler. 1990. Ont. Bird Banding 22:19–24.—During the fall migration of 1988, a total of 34,595 hawks were counted as they passed over Hawk Cliff, Ontario. This total compares favorably with the 1973–1987 average of 31,066 hawks. Species noted in above average numbers included Turkey Vulture (*Cathartes aura*), Red-shouldered Hawk (*Buteo lineatus*), Golden Eagle (*Aquila chrysaetos*), Bald Eagle (*Haliaeetus leucocephalus*), and Merlin (*Falco columbarius*). Declining numbers of Sharp-shinned Hawks (*Accipiter striatus*), Red-tailed Hawks (*Buteo jamaicensis*), and American Kestrels (*Falco sparverius*) were noted. A total of 1964 hawks were banded, representing a 23% decline from the 1973–1987 average of 2548. Sharp-shins, red-tails, and kestrels were the most frequently captured hawks. [1049 Kirkwall Rd., R.R. 1, Dundas, ON L9H 5E1, Canada.]—Bruce G. Peterjohn.

14. Northern Saw-whet Owl studies at Prince Edward Point in 1989. R. D. Wier. 1990. Ont. Bird Banding 22:38–41.—In 1989, Northern Saw-whet Owls (*Aegolius acadicus*) were banded for the fifteenth consecutive autumn on Prince Edward Point along the north shore of Lake Ontario. The seasonal total of 114 owls was the third poorest capture rate during this study, with hatching year birds constituting 48.25% of this total. The majority of saw-whets were captured during the evening of 22–23 October.

Data from the entire study indicate that the passage of saw-whets at Prince Edward Point was strongly correlated with cold fronts and accompanying NW or W winds. Fluctuations in the numbers of hatching year owls captured each year were largely responsible for the considerable annual variations in capture rates. The small number of direct recoveries indicated that some owls migrated southwesterly along the north shore of Lake Ontario while others appeared to head directly south across the lake. [294 Elmwood St., Kingston, ON K7M 2Y8, Canada.]—Bruce G. Peterjohn.

15. Sexual differences in timing of American Kestrel migration at Hawk Mountain Sanctuary, PA. N. G. Stotz and L. Goodrich. 1989. J. Raptor Res. 23:167–171.—Migration data for American Kestrels (*Falco sparverius*) passing through Hawk Mountain Sanctuary from 1963 to 1988 were examined in order to determine if a bimodal pattern existed along this Appalachian migration route. Additionally, the authors sought to determine if sexual differences occurred in the timing of kestrel migration.

The mean weekly number of migrating kestrels during the 26-year period peaked on 11 September and 2 October. Female kestrels outnumbered males 201 to 161 on or before

18 September. The proportion of males increased as fall progressed, and males outnumbered females 309 to 166 after 18 September. The median date for sighting females was 14 September, which differed significantly from that of males, 25 September.

Thus, the authors found that kestrels exhibited a bimodal migration pattern at Hawk Mountain as well as differential timing between males and females. Possible causes of these patterns are discussed. [Northern Arizona Univ., Dept. of Biological Sciences, NAU Box 5640, Flagstaff, AZ 86011, USA.]—Robin J. Densmore.

16. Bird migration studies in the Soviet Union. I. N. Dobrynina. 1990. Sitta 4:1–26.—This is a review paper on the state of knowledge and sequence of studies on bird migration in the U.S.S.R. Observation of migration within the U.S.S.R. started as early as 1877, though most studies began in the 1900's when ringing started to be practiced widely. Ringing studies started first in European Russia and the Baltic area, and in the 1890's neck rings were used on cranes in the Ukraine. By 1927 ringing had occurred at 51 locations in the U.S.S.R., from islands in the Arctic Ocean, throughout European U.S.S.R. and West Siberia, to Central Asia. By 1954 as many as 100,000 birds were ringed annually. In the 1970's two All-Union bird ringing conferences were held, one in Moscow and the other in Alma Ata.

The author reviews some of the findings of Soviet researchers dealing with numerous topics such as irregular or invasion migration, summer moult migration, nocturnal migration, radar observations, orientation, lipid deposition, migration routes, and neurophysiological studies, to name a few. One of the major contributions of the paper is the extensive literature citations and contributions of Soviet authors. A total of 381 citations are listed.—Clayton M. White.

HABITAT USE AND TERRITORIALITY

(see also 29)

17. Overwintering waterfowl on Swiss lakes: Which lake characteristics determine species and individual numbers? [Überwinternde Wasservögel auf Schweizer Seen: Welche Gewässereigenschaften bestimmen Arten- und Individuenzahl?] W. Suter. 1991. Ornithol. Beob. 88:111–140. (German, English summary.)—The waterfowl populations on 20 large Swiss lowland lakes were analyzed to determine which parameters affected the density of overwintering waterfowl. Almost all species showed a linear correlation between population size and the size of the lake or the length of the shoreline. Diving duck and fish-eating duck populations were most accurately predicted by the surface area of the lake, and dabbling duck numbers by the length of the shoreline. Piscivorous species also were correlated with the commercial harvest of their prey species. Dabbling species also were positively correlated with the extent of shallow areas. Species richness showed a positive, but nonlinear, correlation with surface area of the lakes. Not surprisingly, food abundance and availability appeared to have the greatest influence on the number of individuals and species overwintering on a lake. [Schweizerische Vogelwarte, CH-6204 Sempach, Switzerland.]—Robert C. Beason.

18. Nesting by Wood Storks in natural, altered, and artificial wetlands in central and northern Florida. J. C. Ogden. 1991. Colon. Waterbirds 14:39–45.—Foraging habitat loss and resulting nesting failure was a major factor in the decline of Wood Storks (*Mycteria americana*) in southern Florida. Recently, however, numbers of nesting pairs and colonies have increased in cental and northern Florida, with a majority of nesting colonies in altered or artificial wetlands. Censuses in this area from 1958–1960 and 1975–1986 show an increase from 11 colonies in the early period to 40 in the later, with a total of 45 separate colonies for the two census periods. Of the 45, 23 were classified as natural (native woody vegetation surrounded by water unregulated by manmade structures), and 11 each of altered (native vegetation but water levels regulated by structures such as leeves) and artificial (nonwetland or exotic vegetation with standing water due to structures). The number of stork nests recorded annually increased from a maximum of 1500 in 1959–1960 to 4355 in 1975–1986. The number of nests in altered and artificial sites rose from 10.5% in the early censuses to 60–80% during the later period, with the sharpest increase in the altered sites. During

1975–1985 the number of nests in altered sites was greater each year than for artificial and natural sites combined. Ogden suggests that the increased use of altered sites results from the natural habitat becoming less suitable due to drying during the spring. Further, the altered sites have more nests and are used longer, on the average, because they have more stable water and vegetation conditions. Stork population growth has resulted mostly from an increase in the number of colonies, and the creation of altered sites with stable, regulated water levels, has produced new sites for colonies. [South Florida Research Ctr., Everglades National Park, P.O. Box 279, Homestead, FL 33030, USA.]—William E. Davis, Jr.

19. Owner and floater Red-winged Blackbirds: determinants of status. D. Shutler and P. J. Weatherhead. 1991. Behav. Ecol. Sociobiol. 28:235–241.—Two hypotheses have been posed to explain the success of individuals (owners) in defending their breeding territories against non-territorial floaters. The resource-holding potential (RHP) hypothesis proposes that owners have an advantage over floaters in size, weaponry, display, and other morphological attributes that ensure their success. However, it has been recognized that intrinsic RHP does not always explain why some individuals win contests. An alternative explanation, the value asymmetry hypothesis (VAH), suggests that territories have greater future value to owners than to intruders. As a result of this value asymmetry, owners are more willing to invest in territorial contests and thus more likely to win such contests regardless of RHP.

The authors used sequential removal experiments on a population of Red-winged Blackbirds (*Agelaius phoeniceus*) in southeastern Ontario, Canada, to test the hypothesis that owners have superior competitive RHP to both "shallow" and "deep" floaters (the first individuals to replace territorial owners were considered shallow while their subsequent replacements were referred to as deep). A total of 127 territorial males was captured during two breeding seasons and a series of morphological features was measured. Of 13 second-year males, only one was an owner, suggesting that the morphology of this age group was related to lower RHP. Among adults, no morphological differences were detected among owners, shallow floaters, and deep floaters, suggesting that morphology per se did not predict owner-floater status.

Sixty-four birds were used in a subsequent series of aviary experiments to determine male RHP in contests for limited food. The data offer only weak support for the hypothesis that second-year males have low compeitive RHP. Moreover, among adults, owners did not outcompete floaters of either category. Thus, these data present no evidence for differences in competitive RHP between adults. Conversely, the results offer support for the VAH only as an explanation for the differences between adult owners and floaters, although the precise nature of the payoff has yet to be determined. [Dept. of Biology, Carleton Univ., Ottawa, ON K1S 5B6, Canada.]—Danny J. Ingold.

20. Nonbreeding Bald Eagle communal and solitary roosting behavior and roost habitat on the northern Chesapeake Bay. D. A. Buehler, T. J. Mersmann, J. D. Fraser, and J. K. D. Seegar. 1991. J. Wildl. Manage. 55:273–281.—Bald Eagle (*Haliaeetus leucocephalus*) roosting behavior and roost site selection was studied in the Chesapeake Bay area during the period of 1986–1989. The purpose of this study was to determine seasonal roost site characteristics of nonbreeding Bald Eagles and the frequency of communal versus solitary roosting. Previous to this study, little attention has been focused on solitary roosting and communal summer roosting.

Data were collected on a year-round basis and roosts were classified as communal-winter, communal-summer, solitary-winter, and solitary-summer. Thirteen communal-winter, 11 communal-summer, 12 solitary-summer, and four solitary-winter roosts were located. Solitary roosts were more widely dispersed than communal roosts. All roost tree classes were larger in dbh than that of random trees and roost trees from all classes except solitary-winter were taller than random trees. All classes of roost trees had more canopy cover than random trees, and snags occurred more often at roost sites than random sites. Oaks (*Quercus* spp.) and Yellow Poplars (*Liriodendron tulipifera*) were used most frequently. All roost sites were forested, all roost classes were farther from paved roads and buildings than random sites, and 95% were within 720 m of water. Solitary and communal roost sites occurred in woodlots greater than 43 and 110 ha, respectively. The majority of the winter roosts, 92.9%,

were protected from prevailing north winds, while only 57.1% of the summer roosts were protected. Another significant difference between summer and winter roosts was that summer roost trees had greater access and protruded above the canopy more than winter roost trees.

Nonbreeding eagles were found in solitary roosts on more than 40% of the tracking nights. Communal roosting sites were found year-round but only 41% of the sites were used in both summer and winter. Thus, the authors suggest protection of Bald Eagle roost sites needs to be extended beyond communal winter sites to a year-round basis including areas suitable for solitary roost sites. More specifically, the authors suggest protecting undeveloped shoreline forest stands which extend 1400 m inland and include at least 1360 m of shoreline edge. Moreover, growth of tall, large diameter trees within stands should be promoted and protected. Additionally, the authors found that fewer than 2% of the random trees sampled met the minimum habitat values of roost trees, suggesting a scarcity of suitable roost trees. Thus, lack of protection to roosting habitats could become a limiting factor for Bald Eagle populations.

This study significantly contributes to the understanding of Bald Eagle roosting behavior and offers sound management suggestions. [Dept. of Fish and Wildlife Sciences, Virginia Polytechnic Inst. and State Univ., Blacksburg, VA 24061, USA.]—Robin J. Densmore.

21. Effect of territory quality on intrusion rate of nonbreeding hummingbirds. L. Marchesseault and P. W. Ewald. 1991. Behav. Ecol. Sociobiol. 28:305–308.—Data that demonstrate a direct positive correlation between increased productivity on territories and increased intrusion rates among birds are weak. In this experiment the authors reduced food productivity on artificially created territories to test the effects on intrusion rates among territorial Anna's and Black-chinned hummingbirds (*Calypte anna* and *Archilochus alexandri,* respectively) in the Santa Lucia Mountains in central California. With one exception, all owners were *C. anna,* and the proportional reduction in productivity was significantly correlated with a proportional reduction in intrusion rate. Sample size, owner density, and temporal influences (e.g. increased familarity with patch location) were not implicated as important influences on intrusion rate. Rather, the data suggest that the correlation resulted from the natural distribution of artificial flowers in this study. [Dept. of Biology, Amherst College, Amherst, MA 01002, USA.]—Danny J. Ingold.

22. Palm Warblers use upland cutovers as nesting habitat in northwestern Ontario. A. Harris. 1990. Ont. Birds 8:84–87.—The typical nesting habitat of Palm Warblers (*Dendroica palmarum*) consists of open sphagnum bogs with scattered spruce (*Picea* sp.) and tamarack (*Larix laricina*) trees. At five different locations in northwestern Ontario, breeding pairs were located in cutover, upland habitats. These habitats were characterized by widely spaced 2- to 5-m high jack pines (*Pinus banksiana*) while the ground cover was composed of various mosses, herbs, and low ericaceous shrubs interspersed with patches of bare sandy soil. Logging slash was present in most areas.

These upland cutovers are structurally similar to sphagnum bogs since both habitats offer interspersed small conifers, ericaceous shrub cover, and open areas. Hence, vegetation structure rather than species composition may be the important factor determining the nesting habitats of Palm Warblers. Breeding pairs have been found in similar upland habitats elsewhere in the upper Great Lakes region, and traditionally they may have nested in young jack pines regenerating following fires. Current logging practices should benefit Palm Warblers nesting in these upland habitats. [113 1/2 S. Harold St., Thunder Bay, ON P7E 1K5, Canada.]—Bruce G. Peterjohn.

ECOLOGY

(see also 5, 11, 12, 19, 21, 50, 51, 52)

23. Skewed brood sex ratio and sex-biased hatching sequence in Harris' Hawks. J. C. Bednarz and T. J. Hayden. 1991. Am. Nat. 137:116–132.—Ninety-nine broods of Harris' Hawks (*Parabuteo unicinctus*) were monitored in New Mexico over a five-year period. Fledging success was higher in broods where the first hatchling was male than in female-initiated broods. Adaptiveness towards this trend is supported by data that show a significantly higher ratio of males in first-hatched young and the expected near-equal sex

ratio in second- and third-hatched young. The authors suggest that the unproportional sex ratio seen in first-hatched young may be due to more rapid development of embryonic males, but no data are presented concerning laying order. The authors found no evidence that parental care or use of food resources influenced development and therefore survival of one sex over the other. However, they suggest that due to the relatively high reversed size dimorphism in this species (females averaged 46.7% heavier than males), late-hatched females competing with earlier-hatched males promote much higher fledging success than the reverse scenario. [Dept. of Biology, Univ. of New Mexico, Albuquerque, NM 87131, USA.]—James P. Key.

24. On some aspects of the ecology and zoogeography of Macaronesian birds. A. Rolando, E. Balletto, and C. Palestrini. 1989. Sitta 3:1–20.—The Macaronesina islands as described in this paper constitute the five Mid-Atlantic archipelagoes of the Azores, Madeira, the Canaries, the Salvagens, and the Cape Verdes. They are scattered over some 2700 km of latitude from 39° to 14°N. Most of the specific taxonomic analysis by geography deals with the Azores, Madeira, and the Canaries. Generally, the data conform to the principles predicted by island biogeographic theory. Ecological amplitude or habitat release is suggested especially for *Parus* and *Fringilla*. Some data from *Regulus* may be interpreted to suggest that interspecific competition still occurs. Factor analysis showed that 57% of the variables seen was correlated with position of the island relative to the nearest mainland, 22% by elevation on the island, and 19% by area of the island.

The authors suggest that the main problem with their analysis of distributional patterns occurred with the allocation of taxon rank (species or subspecies level). Another problem involved the complication of deliberate introductions by man not fully documented. Lastly, the loss of species through historical or geological time is not fully understood.—Clayton M. White.

25. Food dispersion, predation, and the relative advantage of colonial nesting. J. G. Kopachena. 1991. Colon. Waterbirds 14:7–12.—Debate on the causative factors in the evolution of colonial nesting has focused on two hypotheses: (1) colonial nesting enhances efficient exploitation of food, and (2) it evolved as an antipredator strategy. The author suggests that strong evidence exists for both hypotheses and that in some bird species the first factor has been dominant and in other species the second. In some cases there is no clear evidence for the relative importance of the two factors, and it is suggested that both factors have contributed to the evolution of colonial nesting. The author presents a graphic "threshold" (of food dispersion) model which assumes that predation and food dispersion together determine the most beneficial nesting dispersion, i.e., solitary or colonial. The benefits of colonial nesting depend on prey distribution and are maximized when prey are highly clumped and unpredictable. Solitary nesting is favored when prey is evenly distributed and predictable. The factors which determine whether colonial nesting will be an effective antipredator strategy are more complex. The author presents a graphical model which combines the effects of food dispersion on colonial and solitary nesting, and individual cases with low and high benefits for predator avoidance. The case of high predator avoidance benefits in effect, lowers the level of prey clumping which will favor colonial nesting. Kopachena then makes several predictions about how food dispersion and predation interact to produce selection for colonial nesting. He further suggests that the predictions of the model could be tested with bird species which nest both colonially and solitarily in the same geographic area, such as Great Blue Heron (*Ardea herodias*), or in closely related sympatric species of which one nests colonially (e.g., Horned (*Podiceps auritus*) and Eared (*P. nigricollis*) grebes). The predictions of the threshold model are largely untested.

This is an interesting synthesis of two competing hypotheses on the evolution of colonial nesting. [Dept. of Zoology, Univ. of Toronto, ON M5S 1A1, Canada.]—William E. Davis, Jr.

26. Insurance offspring and the evolution of avian clutch size. L. S. Forbes. 1990. J. Theor. Biol. 147:345–359.—In this theoretical paper, Forbes examines how various factors influence the value of superfluous young as a hedge against nestling loss. Such an investment is not cost free and its optimum value is influenced by several factors. Insurance offspring would be more valuable when the rate of offspring mortality is high and the

parents have little investment in each offspring. Parental costs are increased if there is no mechanism for elimination of excessive young (infanticide or siblicide). [Dept. of Biological Sciences, Simon Fraser Univ., Burnaby, BC V5A 1S6, Canada.]—Robert C. Beason.

POPULATION DYNAMICS

(see 5, 10, 18, 29, 43, 45, 46, 47, 53)

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 24, 46, 50, 51, 53)

27. World status of the Red Kite. I. M. Evans and W. M. Pienkowski. 1991. Br. Birds 84:171–187.—The authors present a progress report on a joint relocation effort directed toward the Red Kite (*Milvus milvus*) by the Nature Conservancy Council and the Royal Society for the Protection of Birds. The population of this species now stands at 11,000–13,000 pairs. Worldwide declines in range and numbers during the nineteenth century as well as recent reports of major declines in the USSR, Middle East, and countries bordering the Mediterranean suggest that the relatively stable breeding populations in Spain, France, and Germany may be the last strongholds for the Red Kite. The authors objectively approach the pros and cons of removing this species from stable areas and reintroducing them into areas of historic habitat depletion and human conflict.

Information on present status, residency periods, and estimated population trends of this species has been gathered from ornithologists throughout the Red Kite's range and is presented for 37 countries in brief individual summaries as well as one table for convenient comparison. [Joint Nature Conservation Committee, Monkstone House, City Rd., Peterborough PE1 1JY, Great Britain.]—James P. Key.

28. Status of Barau's Petrel (*Pterodroma barau*i): colony sites, breeding population and taxonomic affinities. V. Bretagnolle and C. Attié. 1991. Colon. Waterbirds 14: 25–33.—Barau's Petrel is endemic to Réunion Island in the Indian Ocean, and was not described until 1964. Its biology is largely unknown. The authors describe the nesting colonies, aspects of the breeding biology and vocalizations, provide estimates of population size, and suggest phylogenetic affinities. From October 1987 to January 1989 counts were made from shore of Barau's Petrels at sea, at the colonies (2700–3000 m) or crossing the coast in transit. At the two colonies found, birds nested on cliff ledges, probably in burrows. The petrels were highly vocal in flight with two principal calls. Barau's Petrel is unique among the high nesting Procellariiformes in that birds arrive at nests in the daytime, perhaps using the afternoon thermals. Egg laying probably begins about mid-November. The authors used three indirect methods for estimating a breeding population of at least 3000 pairs. On the basis of vocalizations the authors link *P. barau*i first with Mottled Petrel (*P. inexpectata*) and secondly with Hawaiian Petrel (*P. phaeopygia*). This paper adds substantially to our knowledge of this little-known species. [Ctr. d'Etudes Biologiques des Animaux Sauvages, Ctr. National de la Recherche Scientifique, Villiers en Bois, 79360, Beauvoir sur Niort, France.]—William E. Davis, Jr.

29. History of the Pochard breeding in Britain. A. D. Fox. 1991. Br. Birds 84: 83–98.—Breeding European Pochards (*Aythya ferina*) colonized Great Britain during the early nineteenth century and spread to Ireland by the early twentieth century, part of a notable range expansion throughout much of Europe. This paper provides detailed information on the current distribution and population trends of breeding pochards in Britain. In 1986, the minimum nesting population was estimated at 370–395 pairs with the largest concentrations in the eastern counties from Norfolk south through Kent. Away from their favored habitats in eastern Britain, their appearance frequently is sporadic and breeding productivity is low in relation to the numbers of summering adults. While numbers in Scotland may have declined during the last 50 years, their populations elsewhere are stable or still increasing.

Their initial colonization and expansion in Britain was greatly assisted by feral and escaped pochards. Feral pairs may still be contributing to their expanding numbers in some counties. In Britain, breeding pairs have exhibited a preference for lowland lakes and marshes

with abundant and submergent vegetation. They rarely are found nesting above 300 m and generally avoid reservoirs and other large bodies of open water. Given these habitat preferences, pochards probably will never become widespread breeders in Britain. [The Wildfowl and Wetlands Trust, Slimbridge, Gloucester GL2 7BT, Great Britain.]—Bruce G. Peterjohn.

30. First nesting record for Williamson's Sapsucker (*Sphyrapicus thyroideus*) in Baja California, Mexico, and comments on the biogeography of the fauna of the Sierra San Pedro Martir. A. W. Kratter. 1991. Southwest. Nat. 36:247–250.—On 21 June 1986, the author discovered an active Williamson's Sapsucker nest with nestlings in a living quaking aspen (*Populus tremuloides*) in the Sierra San Pedro Martir of Baja California. The location of this breeding pair represents a 325-km southward extension of its previously documented southernmost breeding range in the southern Sierra Nevadas. The author discusses the implications of this antecedently known disjunct breeding range. [Dept. of Geography, Univ. of California, Los Angeles, CA 90024, USA.]—Danny J. Ingold.

SYSTEMATICS AND PALEONTOLOGY

(see also 28)

31. Taxonomy and evolution in Redpolls *Carduelis flammea-hornemannii*: a multi-variate study of their biometry. M. Herremans. 1990. Ardea 78:441–458.—Redpolls, as a complex of "species," has undergone a variety of taxonomic allocations, starting in particular with the late Finn Salomonsen in 1950, who proposed to unite the two conventially recognized "species" into one. Systematic arrangements since then have varied between the recognition of one to as many as four species. My own studies in Alaska in the early 1960's indicated an entire range of color variation from extremely pale to dark, and with such variation that one would be led to certain taxonomic judgments. In the present study Herremans, with over 1000 sexed specimens, used principal components analysis (PCA) and canonical variate analysis to examine four separate morphometric measurements: wing length, tail length, bill length, and bill depth. Based on PCA, birds fell more or less into two groups, relatively short billed long tailed birds, and long billed short tailed birds. Herremans found that apparently two distinctly colored populations occur in Iceland, one dark and one light. Based on the statistical analysis, color assessment, and zoogeographical arguments of the variation, Herremans suggests that redpolls should be arranged into four species, *C. hornemanni, C. exilipes, C. rostrata,* and *C. flammea,* with two distinct races. Additionally, the pale Icelandic bird may represent a distinct taxon.—Clayton M. White.

EVOLUTION AND GENETICS

(see also 4, 26, 31, 50)

32. Do large males have small testes? A note on allometric variation and sexual size dimorphism in raptors. P. D. Olsen. 1991. Oikos 60: 134–136.—The author presents all allometric evidence that reversed size dimorphism (RSD) in Australian Falconiformes and Strigiformes is due to an increase in female size as opposed to hypotheses that it is due to a decrease in male size. This is based on the idea that organ size remains closer to ancestral form while overall body mass changes. Sample sizes are small ($n < 13$ for all but one species and only four "normally" dimorphic species are represented), but testis length/body mass appears to be higher in species showing RSD. Assuming that various ancestral raptors were as small as or smaller than those present today, this suggests that females of species exhibiting RSD have increased in mass at a greater rate than males. Conversely, a lower testis length/body mass shows an increased rate of growth in males of species which do not exhibit RSD. The author argues that if selection for smaller males is the cause for RSD, then there would be an increase in testis length/body mass as RSD increases. This trend has not been shown. [Dept. of Zoology, Australian National Univ., GPO Box 4, Canberra City, ACT 2601, Australia.]—James P. Key.

33. Low genetic differentiation between two disjunct White Ibis colonies. P. W. Stangle, J. A. Rodgers, Jr., and A. L. Bryan. 1991. Colon. Waterbirds 14:13–16.—The

authors sampled feather pulp from 24 nestlings from a White Ibis (*Eudocimus albus*) colony near Georgetown, South Carolina, and 30 from a colony on Cedar Key, Florida, for an electrophoresis study to test for genetic differences between the widely spaced colonies. Various measures of genetic variability were in the expected range for birds and there were no significant differences between colonies. Wright's F-statistics and other measures of genetic differentiation showed only minor differences between the colonies. This low level of differentiation was similar to that recorded among Wood Stork (*Mycteria americana*) colonies in Florida. Similar gene frequencies in the two colonies of ibis could result from similar selective pressures, high gene flow between the colonies, lack of sufficient time for differences to accrue, or some combination of the three. In White Ibises, where breeding locations are related to water conditions and foraging habitat, there are frequent changes in colony location and a probable high interchange of individuals among colonies. Hence, high gene flow probably occurs. The degree to which gene flow occurs and affects genetic differentiation awaits studies with marked birds. The authors suggest that the low genetic differentiation patterns of White Ibises and Wood Storks have similar causes and predict low genetic differentiation among populations of other waterbird species which are similarly affected by dynamic hydrologic regimes. [National Fish and Wildlife Foundation, 18th St. and C St. N.W., Rm. 2556, Washington, DC 20240, USA.]—William E. Davis, Jr.

PHYSIOLOGY AND DEVELOPMENT

(see also 23)

34. Growth rates of Great Egret, Snowy Egret and Black-crowned Night-Heron chicks. T. W. Custer and D. W. Peterson, Jr. 1991. Colon. Waterbirds 14:46–50.—This study evaluated body mass and various body part measurements as a means of aging chicks of three species of Ardeidae. Black-crowned Nigh-Herons (*Nycticorax nycticorax*) were studied at Rhode Island and Texas colonies, and Snowy Egrets (*Egretta thula*) and Great Egrets (*Casmerodius albus*) in Texas. Repeated measurements of body mass, and length of exposed culmen, tarsus, and forearm, were made on chicks of known age from broods of three. There were no significant differences for Black-crowned Night-Herons' growth rates between colonies, and C-chicks were slower growing than the A- or B-chicks. The comparisons of C- with A- and B-chicks were more complex in the other species. For A-chicks the three linear growth measurements were not significantly different among the three species. The authors present linear regression equations for the three species derived from A-chick culmen measurements, which were used to predict ages of known-age collected chick specimens. The predicted ages were within 1.5 days of known age collected chicks. The authors suggest that culmen and tarsus measurements are the best for aging chicks because they showed linear growth from hatching to 18 days for all the species. The tarsus measurements predicted age of chicks to within 1.8 days. The authors suggest that there may be an upper limit to growth rates independent of heron species. [U.S. Fish and Wildlife Service, Patuxent Wildlife Research Ctr., Gulf Coast Research Station, P.O. Box 2506, Victoria, TX 77902, USA.]—William E. Davis, Jr.

35. Reassessing the mechanisms and origins of vocal learning in birds. F. Nottebohm. 1991. Trends Neurosci. 14:206–211.—This paper provides a good review of recent findings on the neural pathways involved in the learning and control of song. The results are based primarily on findings from Zebra Finches (*Poephila guttata*) and Common Canaries (*Serinus canaria*), but the mechanisms probably are similar in other songbirds. Neural pathways for song learning and production involve well defined brain nuclei and connections that develop at different times during ontogeny, some rather late. Some neurons in the song control nuclei such as HVc also respond to sound, and are biased toward the birds own song as an adult. Song learning and control in songbirds are rather involved processes. The author presents a great deal of information in a manner that can be followed by most ornithologists. [Field Research Ctr., Rockefeller Univ., Millbrook, NY 12545, USA.]—Robert C. Beason.

36. Physiological responses of four passerine species to simulated altitudes. F. F. Novoa, M. Rosenmann, and F. Bozinovic. 1991. Comp. Biochem. Physiol. 99A:179–

183.—The authors examined metabolic rates of four species from two families (Fringillidae: *Carduelis barbata, Phrygilus gayi*; Emberizidae: *Sicalis auriventris, Zonotrichia capensis*) of Chilian songbirds in response to decreased partial pressure of oxygen simulating altitudes up to 10,000 m. All species showed high tolerance to hypoxia as evidenced by the lack of change in metabolic rates to decreased oxygen levels. There did not appear to be any interspecific differences correlated with the species' altitudinal ranges, indicating an efficient respiratory system in all of the species tested. [Dept. Ciencias Ecologicas, Univ. Chile, Casilla 653, Santiago, Chile.]—Robert C. Beason.

37. Neuron loss and addition in developing Zebra Finch song nuclei are independent of auditory experience during song learning. M. J. Burek, K. W. Nordeen, and E. J. Nordeen. 1991. J. Neurobiol. 22:215–233.—The increases in volume of the song control nuclei hyperstriatum ventralis pars caudalis (HVc), the robust nucleus of the archistriatum (RA), and Area X are the result of maturation in the Zebra Finch (*Poephila guttata*), and not affected by deafening the birds prior to the learning of their song. Deafened birds had smaller volumes at 25 days of age in the lateral magnocellular nucleus of the anterior neostriatum (IMAN) than did controls. The authors conclude that neuron loss and gain in song control areas of the Zebra Finch are unaffected by song learning, but are controlled by changes in hormonal levels and maturation. Song learning may be controlled by the elimination and addition of synaptic connections associated with neuron loss and growth. Similarly, extensions or synaptic rearrangement of new and existing neurons may account for the learning that occurs during sensitive periods. Investigations of such changes in connectivity would be the next logical step in understanding the neural basis of song learning in this and other species. [Neuroscience Program, Univ. of Rochester, Rochester, NY 14627, USA.]—Robert C. Beason.

MORPHOLOGY AND ANATOMY

(see also 31, 32, 35, 52)

38. Encephalization in hummingbirds (Trochilidae). G. Rehkämper, K.-L. Schuchmann, A. Schleicher, and C. Zilles. 1991. Brain Behav. Evol. 37:85–91.—When compared to brain mass in Galliformes, the brain mass of hummingbirds was 2.5 times larger per g body mass. This increase is due to an enlarged telencephalon and an enlargement of the cerebellum and/or brain stem. The latter enlargments are probably associated with the ecological niche of the hummingbird that requires specialized sensorimotor adaptations for hovering flight. More detailed analyses are needed to confirm these conclusions, and to make comparisons across other taxa. [Anatomisches Inst., Univ. Köln, Germany.]—Robert C. Beason.

39. A circuit for detection of interaural time differences in the brain stem of the Barn Owl. C. E. Carr and M. Konishi. 1990. J. Neurosci. 10:3227–3246.—The ability of Common Barn-Owls (*Tyto alba*), and probably other birds, to establish the direction of sound depends on determining the interaural time differences of the sound. The ability to determine the differences in arrival times depends on neurons projecting from the cochlear nucleus magnocellularis to the nucleus laminaris in such a way that the ipsilateral axons (those coming from the same side) enter from the dorsal surface and interdigitate with the contralateral axons (from the opposite side) that enter from the ventral surface of the nucleus. These interdigitated projections are sharply tuned to individual frequencies and tonotopic (frequency responses are serially mapped on the brain). The individual neurons in the nucleus laminaris respond maximally to specific time differences. These neurons are arranged in an orderly fashion which suggests that interaural time differences are mapped for each frequency through the dorsoventral axis of the nucleus laminaris. [Dept. of Zoology, 1200 Zoology-Psychology Bldg., Univ. of Maryland, College Park, MD 20742, USA.]—Robert C. Beason.

PLUMAGES AND MOLTS

(see also 31)

40. Molt pattern and duration in a female Northern Goshawk (*Accipiter gentilis*). C. J. Reading. 1990. J. Raptor Res. 24:91–97.—The author observed the first seven annual

flight feather molts of a wild-bred captive goshawk, from 1983 to 1989. With the exception of the first molt, for which the data are incomplete, the author recorded the date of feather loss, rachis width, and flattened rachis length for each molted alular quill, primary, secondary, and rectrix. All six alular feathers were molted each year, and in the same sequence (#3 to #1, innermost to outermost). The alular molt was initiated later and was of greater duration for the second and third annual molts, compared to molts in subsequent years. All 20 primaries were replaced each year, except during the second annual molt, when one pair (#10, the outermost) was retained. Primary pairs were molted sequentially, #1 to #10, in each year but one, in which pair #10 was dropped between #7 and #8. Although starting date did not change from year to year, there was a significant reduction in the interval between the shedding of successive feathers (mean of 13.7 days for 1984–1985 and 8.6 days for 1986–1989. Primary rachis length and thickness increased between the juvenal feathers and subsequent plumages. Secondary molt was quite variable in regard to molt initiation, duration, and retention of feathers. The tail molt also was variable with respect to retained feathers, but there was a trend toward earlier molts of longer durations.

The bird under observation had been taken from the wild to be flown in falconry. Considering the many thousands of raptors (and other birds) that are kept in captivity, this study provides a good example of the wealth of data that could be made available to researchers at little or no expense. In addition to the contribution made by longitudinal studies, such as this one, much could be learned about inter-individual variation in molt characteristics. [Inst. of Terrestrial Ecology, Furzebrook Research Station, Wareham, Dorset BH20 5AS, United Kingdom.]—J. A. Smallwood.

PARASITES AND DISEASES

41. Blood parasites of Blue Grouse (*Dendragapus obscurus*) in western North America. J. L. Mahrt, F. C. Zwickel, and T. G. Tessier. 1991. J. Wildl. Dis. 27:482–485.—Between 1983 and 1986, a total of 333 Blue Grouse from 11 study sites were examined for the presence of blood parasites. Geographic location extended over 21° of latitude, from southern Yukon Territory, Canada, to central Nevada in the United States. Grouse were captured live, bled, and released, or were collected by shooting. Blood smears were stained with Giemsa's solution (pH 6.8) for 60 minutes. Parasites were detected by a 5-minute total search at 100× and 400× magnifications. The 92 specimens from Montana and Colorado, where *Plasmodium* sp. was known to occur, also were examined at 1000× magnification for a 10-minute total search.

Ninety-five percent of the specimens were found to be infected with one or more of four species of hematozoa, three protozoans and a splendidofilariid nematode. Protozoans detected included *Leucocytozoon lovati* (92% of the specimens were infected), *Haemoproteus mansoni* (29%), and *Trypanosoma avium* (46%). The nematode *Microfilaria* sp. B was detected in 29% of the specimens. These results extend (both north and south) the known range of these blood parasites in Blue Grouse. Further, the same species of parasites were found throughout the observed range. The authors suggest two possible explanations for the widespread host-parasite association: (1) the intermediate hosts (simuliid and ceratopogonid flies) may be broadly sympatric with the definitive hosts (Blue Grouse), or (2) the parasites may show little host specificity in regard to the hematophagous insect vector. [Dept. of Zool., Univ. of Alberta, Edmonton, AB T6G 2E9, Canada.]—John A. Smallwood.

WILDLIFE MANAGEMENT AND ENVIRONMENTAL QUALITY

(see also 9, 10, 18, 20, 22, 48, 50, 53)

42. Heart rot and cavity tree selection by Red-cockaded Woodpeckers. R. G. Hooper, M. R. Lennartz, and H. D. Muse. 1991. J. Wildl. Manage. 55:323–327.—Cavity tree selection by Red-cockaded Woodpeckers (*Picoides borealis*) and occurrence of heart rot were studied in the Francis Marion National Forest in South Carolina from 1979 to 1982. The purpose of this study was to determine if the frequency of decayed heartwood differed between control trees and those selected for excavation. Additionally, the authors sought to determine if cavity placement was random or associated with decayed areas. Eighty-four

trees in early excavation were randomly selected and 84 adjacent, unexcavated control trees were selected. All trees examined were either Loblolly Pine (*Pinus taeda*) or Longleaf Pine (*P. palustris*). This was the first study to examine tree selection and heart rot using controlled comparisons.

The authors conclude that Red-cockaded Woodpeckers selected trees for excavation which contained decayed heartwood, and that the presence of heart rot may facilitate excavation. Because heart rot frequency increases with stand age, the authors agree with past recommendations that habitat management for Red-cockaded Woodpeckers include Longleaf Pines at least 95 years of age and Loblolly Pines at least 75 years of age. Moreover, due to the importance of trees with heart rot to Red-cockaded Woodpeckers, the authors suggest that in regard to habitat management, more emphasis be directed toward enhancing heart rot silviculturally, rather than relying on stand age alone. [U.S. Forest Service, Southeastern Forest Experiment Station, 2730 Savannah Hwy., Charleston, SC 29414, USA.]—Robin J. Densmore.

43. Ontario Eastern Bluebird nestbox survey—1989. W. F. Read. 1990. Ont. Bird Banding 22:33–36.—Within Ontario, the number of monitored nestboxes for Eastern Bluebirds (*Sialia sialis*) increased from 8809 in 1988 to 11426 in 1989. A total of 1732 pairs occupied these boxes in 1989, producing 8260 fledged young (an average of 4.83 fledged young per pair). The number of fledged young increased by 30% from 1988.

Bluebird populations have increased substantially in Ontario during the 1980s, and are at their highest levels at any time since the early 1950s. Factors contributing to this increase include an expanding network of well managed nestbox trails, absence of adverse weather during the breeding season in Canada and during the winter in the U.S., and declining numbers of House Sparrows (*Passer domesticus*). [165 Green Valley Dr., Unit 2, Kitchener, ON N2P 1K3, Canada.]—Bruce G. Peterjohn.

44. Foiling House Sparrows. W. H. Davis. 1991. Sialia 13:51–53.—In order to determine the extent to which Eastern Bluebirds (*Sialia sialis*) and House Sparrows (*Passer domesticus*) will use shallow nest boxes (8 cm deep from lower entrance) with slotted entrances, the author erected 64 boxes (half shallow and half 13 cm-deep controls) 1.2 m above the ground on an agricultural farm near Lexington, Kentucky. House Sparrows built nests in 8 of the control boxes and in none of the shallow ones. Bluebirds built nests in 28 of the controls vs. 17 of the shallow boxes (although the author fails to state whether this difference is significant). [Sparrows and bluebirds each showed significant preferences for deep boxes (Fisher exact tests, $P = 0.002$ and $P = 0.003$, respectively), and the bluebird preference was significantly less pronounced than that of sparrows (Mantel-Haenzel test, $Z = 4.178$, $P < 0.001$).—Ed.]

At a second study site near Richmond, Kentucky, where sparrows are absent, the author erected 50 slotted nest boxes (half shallow and half deep) 1.2 m above the ground on utility poles. Bluebirds used all the available boxes, showing no preference for either type. Although more young fledged from the deeper boxes, the difference was not significant. These data suggest that House Sparrows may avoid shallow nest boxes and that bluebirds will use such boxes even though they may prefer deeper ones. Thus, shallow nest boxes could help to reduce sparrow-bluebird competition in areas where they overlap. [School of Biological Sciences, Univ. of Kentucky, Lexington, KY 40506, USA.]—Danny J. Ingold.

45. The killing of passerine migrant birds in Italy. R. Massa and L. Bottoni. 1989. Sitta 3:27–36.—In the six northern regions of Italy 53 species of birds are huntable, including 25 species of passerines, although 13 of these have been listed as protected since 1982. Nets and shooting (some decoy hunting) are used in taking these species.

In the region of Lombardy, for example, 201 catching sites are listed and between 586,000 (in 1978) and 108,695 (in 1986) birds have been caught annually. The greatest number of individuals taken in 1986, for example, were Song Thrushes (*Turdus philomelos*) at 52,035, Redwings (*T. iliacus*) at 22,400 and Fieldfares (*T. pilaris*) at 11,750. That same year in the region of Friuli Venezia-Giulia 130,226, 139,323 and 149,574 of these species were taken, respectively. While the Chaffinch (*Fringilla coelebs*) is protected in Lombardy, 121,660 were taken in the latter region that year.

It was concluded that the practice of hunting passerines, some still used as food sources, is not acceptable in our current world but no serious or permanent effect on the European population of the most heavily hunted species has been shown. I would add the rejoinder, however, that on a recent trip to Soviet Middle Asia it was mentioned that *Coturnix coturnix* (a species hunted in Italy) has been in a steady and serious decline over the past few years and hunting (in various forms) is thought to be a major contributor.—Clayton M. White.

46. Birds of prey in the Netherlands in the mid-19th century. [Roofvogels in the Nederland in het midden van de 19de eeuev.] J. H. de Rijk. 1990. Limosa 63:135–140. (Dutch, English summary.)—A bounty or premium system was offered by the Dutch government in their game laws in 1814 and 1852. There was a rather good record of bounties paid during that period, which forms the basis of this paper. The bounty record provided data on abundance and distribution, although identification of the species was not always reliable. Some representative mean numbers of birds killed, by month, for 1853–1859 are: two eagles (*Aquila* spp. and *Haliaeetus albicilla*) in January, eight Northern Goshawks (*Accipiter gentiles*) in November, 210 Eurasian Sparrowhawks (*Accipiter nisus*) in October, and 35 falcons (*Falco* spp.) from September to November. The author's analysis of the numbers killed by region led to the following conclusions: (1) Eagles were more common in the 19th century than today. (2) Goshawks were uncommon in the 19th century and many of the specimens turned in for bounties probably were sparrowhawks, not goshawks. (3) The geographic distribution of bountied sparrowhawks reflects more the distribution of finch catchers who caught them in nets rather than the true distribution of sparrowhawks. (4) Common Buzzards (*Buteo buteo*), killed mainly in winter, were probably less common then than in the 20th century.—Clayton M. White.

47. The effects of hunting on overwintering waterfowl in the Ermatinger Basin. [Die Bedeutung der "Gemeinschaftlichen Wasserjagd" für überwinternde Wasservögel am Ermatinger Becken.] P. Meile. 1991. Ornithol. Beob. 88:27–55. (German, English summary.)—Waterfowl hunting on the Ermatingen Basin of Lake Constance was regulated by international agreements prior to 1984 when it was stopped. During the last 25 years of hunting, 150 hunters annually harvested 2000–9000 waterfowl from the basin. The total harvest varied from 30% to 150% of the overwintering populations, depending on species. Harvest levels greater than 100% were the result of immigration during the hunting season. Additional mortality resulted from injured birds and lead poisoning from birds eating lead shot. Population sizes and locations responded to hunting pressures by avoiding parts of the basin that were open to hunting. If it was completely open, fewer waterfowl used the basin and primarily those areas farthest from shore. Some species also appeared to suffer from food shortage toward the end of winter.—Robert C. Beason.

MISCELLANEOUS

48. Seabirds, tropical biology and global warming: are we missing the ark? J. Burger. 1990. Colon. Waterbirds 13:81–84.—In this guest editorial Burger explores some of the problems with modern biology, including the fragmentation of efforts along molecular versus whole animal biology and biome lines. "Biome chauvinism" focuses on differences among major systems rather than similarities and has led to the separation of biologists through separate journals and meetings. Burger focuses on tropical biology with its problems and implications of global scope in relation to colonial waterbirds which she thinks do not get appropriate attention or funding. Studying seabird colonies is expensive because researchers usually require a boat and the training of students in tropical biology often has ignored marine and estuarine systems. The biologists who do study tropical marine systems often study them as isolated entities, rather than as parts of tropical systems, and have not adequately compared tropical and temperate seabird faunas, nor tested major concepts of diversity and stabiltity with tropical marine bird colonies. Burger suggests that more attention should be paid by waterbird biologists to species interactions, complexity, and global patterns, and to practical conservation problems of sustainable yield. Global warming is an example of concern, with its effects of rising water levels, climatic and resource changes.

Burger points out a number of deficiencies in current approaches to the study of colonial

waterbirds, particularly in the tropics, and whether or not readers agree with Burger's analysis, anyone interested in colonial waterbirds or the tropics should read this editorial. [Dept. of Biological Sciences, Rutgers Univ., Piscataway, NJ 08855, USA.]—William E. Davis, Jr.

BOOKS AND MONOGRAPHS

49. Birds of Jamaica: a photographic field guide. A. Downer and R. L. Sutton. 1990. Cambridge University Press, Cambridge, England. 152 pp. hardcover.—*Hey mon,* more endemic birds occur in Jamaica than on any other Caribbean Island. Twenty-five endemic species (including five endemic genera) and 21 endemic subspecies are part of Jamaica's rich avifauna, which comprises 200 species and an additional 50+ vagrants and rare winter visitors. These endemics are the focus of the *Birds of Jamaica,* written by two life-long Jamaican birders and illustrated with detailed photographs of the birds in their natural habitats by Yves-Jacques Rey-Millet. The authors vividly describe the physiognomy, voice, status, habitat, habits, nesting, and range for Jamaica's unique species and subspecies. For birds already covered in North American bird guides, Downer and Sutton provide descriptions only of their status, voice, differences from similar species, and a summary of range and migration patterns.

The authors also offer a useful introduction to birding in Jamaica, an island of 10,892 km^2 with the highest peak at 2,290 m, located 150 km south of Cuba. Their brief political and ecological description of Jamaica employs maps of Jamaica's topography and rainfall. Photographs of major habitat types—coasts and cays, wetlands, dry limestone forests, wet limestone forests, montane forests, and cultivated areas—serve as a guide for foreign birders, along with a tantalizing list of endemics to be found in each habitat. Also provided is a comprehensive and accurate list of 47 "hot" birding spots. For example, one area, the Rockland Feeding Station, recommended for viewing Red-billed Streamertails (*Trochilus polytmus polytmus*), Jamaican Mangoes (*Anthracothorax mango*), and Black-faced Grassquits (*Tiaris bicolor*), provided just that. Other helpful hints, such as "the road is rough and most suited to four-wheel drive vehicles," or "bird watchers are admitted by prior arrangement," also make the book well worth the $29.95 price tag. [Softcover is available for $13.95.—Ed.]

The text is based on the authors' experience with birding, banding, and field observations, with help from members of Jamaica's Gosse Bird Club. The senior author, Downer, has been president of the Club for over 20 years. This experience provides a wealth of information, such as the local names for the birds; Jamaica's three species of hummingbirds are called Doctorbirds while Turkey Vultures (*Cathartes aura*) are referred to as John Crows. The descriptions of the birds' habitats are interesting and well written: the Red-billed Streamertail "feeds on nectar and small insects, fruit-flies, and swarming ants. Nests year-round but chiefly Jan–Jun. Nest is a tiny cup of plant fibers bound together with cobweb and decorated with lichen."

The photographs of Jamaica's endemic species and many subspecies are sharply rendered with accurate colors, and provide an easy reference for amateur birders. Complications, of course, ensue when one sees a bird also found in the Greater Antilles, such as the Antillean Nighthawk (*Chordeiles gundlachii*). Downer and Sutton do not provide a photograph, making James Bond's *Birds of the West Indies* the preferable reference in these cases. Most of the time, however, *Birds of Jamaica* excels. For example, male and female Jamaican Woodpeckers (*Melanerpes radiolatus*), the only woodpecker on the island besides the over-wintering Yellow-bellied Sapsucker (*Sphyrapicus varius*), are beautifully photographed at their nest cavity. In Bond's book, one must differentiate from among eight illustrated species.

The only other contender for bird identification in Jamaica is Frank Bernal's book by the same name, *Birds of Jamaica* (Heinemann Publishers Ltd. 1989). Bernal's paintings of 48 Jamaican birds are lovely, but his text provides neither the detail nor accuracy of Sutton and Downer.

A few minor problems plague Sutton and Downer's book, i.e., typographical errors (Jamaica is listed as 10,982 m^2 instead of km^2) and a few unclear photographs (both photographs of feeding male and female Vervain Hummingbirds (*Mellisuga minima*) obscure

their bills). Yet this is nit-picking, and the faults detract little from the book's overall high quality, or from the authors' lofty goals: ". . . that through this book people will become more aware and appreciate Jamaica's birds, that they will carry out the research that is needed, take action to protect species that are being affected by hunting and habitat destruction, help others to know and understand them, and simply enjoy a hobby that can last a lifetime, and add a new dimension to travel to foreign countries."

I think they are succeeding. My nonbirding companion to the island of sun and fun not only borrowed my book and was able to easily identify a number of birds, but he is planning to purchase his own volume for a return trip. Although the book may never be a best seller at Reggae Sunsplash, it is a delightful and practical addition to the libraries of professional and amateur birders alike.—Susan K. Jacobson.

50. Ecology and behavior of birds. [Экология и поведение птиц.] V. D. Ilyichev, ed. 1988. Academy of Sciences of the USSR, Moscow. 249 pp. (Russian.)—This book is a collection of scientific papers that discuss the results of recent ornithological research in the Soviet Union and elsewhere, including new data on the biology and behavior of colonial species such as the Common Gull (*Larus canus*) and the Arctic Tern (*Sterna paradisaea*). Several papers are dedicated to the nesting ecology of raptors. Activities of several Gallinaceous species, both in the wild and in captivity, are discussed, as well as the behavior and structure of acoustic signaling of the birds. Additional papers investigate methods of mathematical treatment of qualitative bird censuses, and methods of registering certain incubation parameters in birds. A total of 31 papers are organized into six topical sections, described below.

General questions.—This introductory section includes papers on the ecology and evolution of birds, by L. P. Poznanin; palearctic migrants in Vietnam, by L. S. Stepanyan; and historical aspects of the formation of biotropical and regional differentiation of the avifauna of Wrangel Island, by M. S. Steeshov.

Nesting ecology.—Titles include "The characteristics of nest-building and of the nest composition of grebes (Podicipedidae) in northern Kazakhstan," by N. S. Gordiyenko; "Distribution, abundance, and several features of the ecology of Galliformes in southern Zabaikal," by V. E. Litun and V. N. Smetanin; "The accompaniment of geographical variations of feeding with subspecies structure of predatory birds," by V. E. Pererva; "*Falco peregrinus* in Kuznetskii Alatau," by S. P. Guryeev and U. G. Golubyatnikov; "Nesting of *Falco peregrinus* in the Big Rogovaya River basin (south of Bol'shezemelskaya tundra)," by R. N. Voronin; "On the biology of *Falco subbuteo* in the mountain forests of southern Altai," by N. N. Berezovikov and E. S. Zinchenko; "Trophic relationships of Black-headed Gulls during the nesting period inside the Black Sea refuge," by T. B. Ardamadtskaya et al.; "On the biology of *Larus canus*," by L. P. Bekova; "Nesting biology of the Common Cuckoo (*Cuculus canorus*)," by E. N. Derim-Oglu; "Nesting biology of *Sterna paradisaea*," by N. P. Kaverkina; "On the nesting biology of *Parus major* in Jungarskii Alatau," by S. L. Sklarenko; and "Nesting ecology of *Phoenicurus ochruros* in the urban landscape," by G. P. Vorobyov and U. P. Lexatskii.

Behavior.—Contributed papers include "Acoustic signals in disturbed situations: structure and functional use of signals in *Fringilla coelebs*," by V. V. Korbut; "*Podoces panderi* behavior during food caching," by A. B. Bardin; "Mating behavior of *Sterna camtschatica*," by E. G. Lobkov; and "On sound communication of *Ciconia nigra* nestlings," by E. B. Ilyinskii et al.

Applied ornithology.—The four papers of this section include "Captive breeding of *Lyrurus tetrix*," by V. S. Ivanova et al.; "Artificial nests for birds of prey," by E. Drobyalis; "Ornithological status of Buxarskii airport," by A. Jabbapov; and "Adaptation of certain birds of prey and owls to anthropogenic influences," by A. I. Shepel'.

Field research methods.—Titles include "On using an automated recording unit in the research of nesting activities," by V. V. Borisov et al.; "Sex determination in *Corvus cornix* using chemicals," by A. V. Leontiev; and "Bird density estimates using radial distances and angles of detection in flight," by N. G. Chelintsev.

Seasonal rhythms in birds' lives.—The final section consists of five papers loosely related to annual rhythms of behavior and physiology. Contributed papers include "Scale and duration of stopovers of *Calidris minuta* during fall migration on reservoirs of the republic

of Kazakhstan," by E. E. Gavrilov et al.; "On the regional character of migration rhythms of birds," by E. V. Lugovoii; "Time and energy budgets of Mallards wintering in Byelorussia," by A. V. Kozulin; "Post-juvenal molt in captive *Calidris melanotos* broods," by V. V. Gavrilov; and "The effectiveness of capturing *Ficedula hypoleuca* using fixed traps in Kurshskoii Spit on the Baltic Sea," by L. V. Sokolov and V. G. Visotskii.—Oksana Piterman.

51. Ecology of passerines of the northwestern USSR. [Экология воробьиных птиц северо-запада СССР.] 1988. V. B. Zeemin. Nauka, Leningrad. 184 pp. (Russian.)—This book presents an analysis of the characteristics of distribution and annual cycles in passerines of northwestern USSR. The data described here were collected using various methods, including continuous trapping, descriptions of live birds, and management of marked populations over many years. Main features of reproductive cycles and factors determining their inter- and intrapopulation variations are discussed in association with geographical regions. Hypotheses suggest mechanisms for the formation of modern distribution boundaries, clutch size variability, ways of synchronizing reproduction with seasonal environmental cues (i.e., photoperiod, temperature, humidity), and the origin of polygyny and multiple broods. The author describes how birds utilize positive and avoid negative influences of environmental factors to solve problems of seasonal reduction of photoperiod in the northern parts of their range.—Oksana Piterman.

52. Mauritania issue. B. Ens, T. Piersma, W. Wolff, and L. Zwarts (eds.) 1990. Ardea 78:1–364—This volume of Ardea is a double-sized (no's 1–2) issue devoted to research on waders and migration along the east Atlantic flyway. Much of the research occurred at the Banc d'Arguin in Mauritania. The entire volume was published as a book entitled "Homeward bound," edited by the above four authors. It may be purchased from Stichting WIWO, U.R. Steivenbergweg 4, 6644 AB Ewijk, The Netherlands.

The introduction to the volume, by Ens, Piersma, Wolff, and Zwarts, titled "Homeward bound: problems waders face when migrating from the Banc d'Arguin, Mauritania, to their northern breeding grounds in spring," sets the stage for the 22 papers that follow. The unifying themes revolve around the mechanics of survival at Banc d'Arguin and subsequent preparation for northward migration by exploring five main aspects. First, the environment, standing stocks of food and possible occurrence of salt stress are couched in terms of what makes Banc d'Arguin so attractive to waders. Second, the migration patterns are described in space and time and some of the studies attempt to determine the breeding origin of waders based on morphometric studies. Third, the migratory behavior documented suggests there are possible energetic advantages of leaving in a particular flock size in a particular direction and at a particular time of day. The problems of flock size are discussed at length. Fourth, the acquisition of sufficient food, or extra component of lipid, to make the necessary flight is explored. Much of the data was gathered from Whimbrels (*Numenius phaeopus*). Lastly, energy budgets were constructed for the trip from the Banc d'Arguin to the Wadden Sea based on departure body mass, tail winds, and flight costs.

The editors conclude that for many of the studies, projections will be verified only with radio-tagged birds monitored by satellite or by the use of a huge network of observers monitoring movements. Regardless of whether the biological questions are answered, the Banc d'Arguin is of major importance for the conservation of waders on the European and African Atlantic coasts and global regulations may be necessary to preserve the area intact.—Clayton M. White.

53. Western palearctic geese. T. Fox, J. Madsen, and J. Van Rhijn (eds.). 1991. Ardea 79:113–371.—Rather than being a monograph this issue of Ardea presents the proceeding of the International Waterfowl and Wetlands Research Bureau (IWRB) held in Kleve, Germany, 1989. Represented are 44 papers on the following topics: distribution, numbers, and status (13 papers); conflicts with agriculture (three papers); population dynamics (one paper); hunting (five papers); disturbance (two papers); Graylag Goose (*Anser anser*) (two papers); Lesser White-fronted Goose (*A. erythropus*) (one paper); Bean Goose (*A. fabalis*) (one paper); Barnacle Goose (*Branta leucopsis*) (four papers); Canada Goose (*B. canadensis*) (one paper); and the recommendations.

The tone of the symposium is set by the first paper on the status and trends of geese in general in the Western Palearctic during the 1980s by J. Madsen. In general, the numbers

of geese in the Western Palearctic has nearly doubled since the 1970s, with over 2 million being accounted for. Despite this increase, the Lesser White-fronted and Brent Goose (*B. bernicla*) on Svalbard are in critical conditions because of declines. Many of the papers are species specific studies, often in a specific geographic area. The papers are too extensive to review here but anyone interested in waterfowl should have this volume.

Of the recommendations adopted at the conference, several have general and widespread application, namely that the Goose Research Group of IWRB develop a database on the Palearctic species, in particular the critical and declining Red-breasted (*B. ruficollis*), Lesser White-fronted, and Brent Goose on Svalbard; that hunting and research groups improve documentation of side-effects of hunting and levels of goose kills; and that governments in the Western Palearctic promote farming practices compatible with goose conservation.—Clayton M. White.