RECENT LITERATURE

Edited by Edward H. Burtt, Jr.

BANDING AND LONGEVITY

(see also 2, 27, 30)

1. **Nautical owls surface inland.** C. Trichka. 1981. N. Am. Bird Bander 6:110.—A Barn Owl *Tyto alba* of undetermined sex was banded as a nestling on 29 June 1980. This was reported in N. Am. Bird Bander 6:18. This article reports a visual sighting of the above mentioned bird at a nest site "shortly after that issue reached its subscribers in 1981." It was "one of the parent birds" and was "raising a family." No mention is made of what the family was, nor the date(s) of the sighting(s). Fred Sibley of the Peabody Museum in New Haven, CT reported the sighting to the author. If Fred's call was a toll call perhaps he could check his telephone bill and let us know when the "parent bird" was identified. Schneider (*Schleiereulen,* 1977, Neue Brehm-Bücherei No. 340) informs us that ringed females that were 235 and 292 days old were reported as having laid eggs. This article was in the news, notes, and comments section. Which is it? A news item, a scientific note, or a comment?—Richard J. Clark.

MIGRATION, ORIENTATION, AND HOMING

2. **The average rate of travel by migrating White-crowned Sparrows, *Zonotrichia leucophrys gambelii,* in spring.** J. R. King and L. R. Mewaldt. 1981. N. Am. Bird Bander 6:98–100.—The cumulative sum of birds captured daily was converted to a percentage of the seasonal total and then plotted against the calendar date. When plotted on a probability scale, a normal-frequency distribution yields a straight line. Data from birds captured at Hart Mountain Antelope Refuge, Oregon (42°21'N, 119°40'W) and Pullman, Washington (46°N, 117°12'W) were treated in the above manner and found to be distributed normally. The two locations are 484 km apart and as the passage time was either 7.5 or 8 days, an average travel velocity of 60–65 km/day was calculated. The components of average travel velocity (AVT), namely, mean distance traveled per unit of time and the mean duration of stop-over periods (SOP) are discussed. There is an increase in AVT in spring migration resulting from a decrease in SOP and an increase in distance traveled. It is not known if the latter is accomplished by the birds putting in more flying time or flying faster. The authors suggest that "many such data (as analyzed in this study) are already moldering in neglected record books" which could be similarly treated to learn whether the analysis that the authors have sketched from fragmentary data "can be generalized."—Richard J. Clark.

POPULATION DYNAMICS

(see also 6, 20, 21, 48)

3. **Habitat occupancy and regulation of clutch size in the European Kestrel *Falco tinnunculus.*** R. J. O'Connor. 1982. Bird Study 29:17–26.—Population size, habitat use, clutch size, and the onset of egg-laying were analyzed using the BTO's Common Birds Census and Nest Record Card data for the years 1962–1978. Between 1964 and 1968, the kestrel population more than quintupled and thereafter the population size remained stable. The number of nesting habitats used by kestrels increased as the population increased, and continued to increase after the kestrel population attained its equilibrium level. No indication of changes in habitat availability are presented. Increases in population size were accompanied by delayed breeding and smaller clutch sizes. Clutch size also decreased with increase in the number of habitats used by kestrels. O'Connor suggests delayed breeding was a consequence of greater territorial defense by territory holders towards a large spring population of young birds following a productive year. Additionally, he concludes that the shift to more territories in one year is correlated with a reduction in clutch size, thereby serving to regulate the population level.—Stephen R. Patton.

4. The influence of female age on breeding in the eider *Somateria mollissima*. S. R. Baillie and H. Milne. 1982. Bird Study 29:55–66.—In a population of eiders banded regularly since 1961, field work conducted from 1977 to 1979 determined age of first breeding, clutch size, date of egg laying, and female weight at the onset of incubation. The oldest individuals studied were 17 years old, but the average adult life expectancy of eiders is 26 years. The onset of incubation was determined by direct observations and by the relationship between egg density and length of incubation (error of less than 4 days for 89% of nests). Fresh egg weight was determined from the relationship with egg volume. Variation in clutch weight was explained primarily by clutch size (97% of variation) and clutch size was used in subsequent analyses of female energetic investment. Rate of female weight loss was determined by the relationship between $\log_{10}$ female weight and the number of days into incubation. The age structure of the population was determined from survival rates of banded individuals.

About 25% of the birds breed when 2 years old and nearly half breed when age 3. Two-year-olds lay later than birds 7–13 years old, but were not significantly later than other age groups. Similarly, 2- and 3-year-old eiders lay smaller clutches than all other age groups, but egg weight did not differ with age. Weights of 2-year-old females were significantly less than all other age classes. Hatching success did not vary with female age, but nests destroyed by predators before females were identified were not included in this analysis. Such nests may have included a disproportionately large number of young birds. The results of this study are compared with similar studies of other long-lived bird species. A reduction in breeding performance of old birds was not observed in this study, but birds of older age classes were unmarked.—Stephen R. Patton.

NESTING AND REPRODUCTION

(see also 1, 3, 4, 9, 11, 47, 48)

5. Nest parasitism and hatching success in a population of goldeneyes *Bucephala clangula*. M. O. G. Eriksson and M. Andersson. 1982. Bird Study 29:49–54.—The influence of intraspecific nest parasitism on hatching success of a nest box breeding population of Common goldeneyes was investigated during 1972–1980. Three criteria were used to determine that parasitism had occurred: (1) more than 1 egg laid per day, (2) a 3-day lapse in egg laying, and (3) eggs laid following the onset of incubation. Criterion 2 overestimates the number of parasitized nests because females may sometimes pause several days between laying successive eggs. Criterion 3 may include some parasitized nests in the control group because nests were not checked daily after the start of incubation. Approximately one-third (23 of 68) of the examined nests were parasitized as indicated by one or more of the above criteria. Desertion rates of control and parasitized nests (criteria 1 & 2) did not differ, but parasitized nests (criterion 3) were deserted more frequently than controls. Similarly, hatching rates of parasitized nests (criterion 3) were lower than control nests. Predation rates were low in this study compared to previous studies conducted at the site, but nests plundered between successive nest checks were not included in the analysis because it was impossible to determine if parasitism had occurred in these cases.

Desertion of females from nests parasitized during incubation may be a result of aggressive interactions between parasite and host or may have been the result of poor female health prior to parasitism. It is suggested that young females may be more successful as parasites because they are less skilled in rearing broods. Additionally, young females may be unsuccessful at obtaining suitable nesting sites.—Stephen R. Patton.

6. Genetic and environmental variation in clutch size of the Great Tit (*Parus major*). A. J. van Noordwijk, J. H. van Balen, and W. Scharloo. 1981. Neth. J. Zool. 31:342–372.—To determine the genetic component of variation in clutch size, data were analyzed from a 25-year study of Great Tits in the Netherlands. This was done by computing the relationship (regression) between number of eggs laid by parents and then by their offspring in the subsequent generation. Thus this kind of analysis can only be done for studies of sufficient size and duration that there are multiple generations of comparable data and substantial numbers of birds with known pedigrees.

The authors have been careful to use several refinements on the basic regression approach to reduce the statistical "noise" in the data due to year-to-year fluctuations in clutch size, the age of the birds, and microhabitat quality. The results, from several populations and using slightly different assumptions, are sufficiently consistent that the authors can fairly claim to have demonstrated that approximately 40% of the observed variance in clutch size, within populations, has a genetic origin. The adaptive significance of this result is not clear. While the authors emphasize that such a relatively high heritability indicates that selection could make rapid progress to increase clutch size, that heritability exists indicates that selection is not operating directionally on it. Rather, some data on year-to-year variation in recruitment as a function of clutch size suggest that direction of selection may vary from year-to-year and, on the basis of an overall average across years, be stabilizing. In any case, this is a significant contribution, and reaffirms the value of long-term field studies.—George F. Barrowclough.

7. Size discrepancy between eggs of wild and captive Brown Kiwi (*Apteryx australis mantelli*). B. Reid. 1981. Notornis 28:281–287. **A North Island Brown Kiwi and her eggs.** B. Reid. 1981. Notornis 28:287.—Kiwi eggs are of special interest because of their extreme size. Those of captive hens are much lighter than those of wild birds (360 vs 431 g), probably because of diet, so that the source of data on which calculations are based is important. The second article, consisting largely of an x-ray of a gravid female, is absolutely impressive and is text-book material.—J. R. Jehl, Jr.

BEHAVIOR

(see also 40, 41, 48, 50, 52, 54)

8. Hunting success rates, foraging habits, and prey selection of Peregrine Falcons migrating through central Alberta. D. Dekker. 1980. Can. Field-Nat. 94:371–382.—Here is an exceptionally detailed ethological account of hunting by Peregrine Falcons (*Falco peregrinus*). Interactions between Peregrines and potential prey were divided into 3 categories: interactions in which the prey was seen to be captured or escape, interactions in which the outcome was not seen, but could be deduced from the Peregrine's subsequent behavior, and interactions where outcome was unknown. Of 958 observed hunts, the outcome was known in 674, of which 52 were successful. Such a low success rate agrees well with success rates found by other authors (e.g., Treleaven, Br. Birds 54:136–142, 1961).

Dekker's observation that aerial flocks scatter when attacked by a Peregrine disagrees with the conventional wisdom that such prey flock more tightly when attacked. All prey (26) that failed to dodge were captured, whereas only 6 of 394 prey that dodged were captured, an observation that confirms the selective advantage of evasive behavior.—Edward H. Burtt, Jr.

9. The adaptive value of polygyny in marsh-nesting Red-winged Blackbirds; renesting, territory tenacity, and mate fidelity of females. J. Picman. 1981. Can. J. Zool. 59:2284–2296.—Picman here continues his analysis of Red-winged Blackbirds (*Agelaius phoeniceus*) at a British Columbia salt marsh. In this paper he examines patterns of renesting over a 4-yr period for individually marked females. Known number of nests per marked female per breeding season was 1.638. This number is also undoubtably an underestimate of nests attempted since numerous abandoned nests were never associated with an individual female. Of the females that renested within a season, most (83%) renested within the territory of the same male as that in which they nested originally. Females did not move far between nests. Modal movements were only 0–20 m within a season with a mean of 47 m. Most females (62%) returned to the same nest areas in successive years although the percentage here is lower than within a season (62% vs 83%). The difference is a reflection of the significantly higher distances between nest sites between years (mode = 21–60 m, mean = 77 m) than within years. What adult male was present had no influence ($P > .995$) on the probability of a female's returning to the same territory or moving one or more territories away. The degree of nesting site tenacity that was seen seems to be due to either a familiarity with the habitat itself or some aspect of the nesting territory such as proximity to food or knowledge of other harem members. In any case, new male territory holders "inherit" so many of the same females as nested there previously, that a correlation exists between mating success of earlier and current holders of the same territory. Picman has lucidly detailed alternative explanations and probable causes for all behavioral patterns described. While further work is required to know precisely how females benefit by returning to the same nesting area regardless of what male is present, Picman's analyses clearly indicate what conclusions can be properly drawn at this point.—A. John Gatz, Jr.

ECOLOGY

(see also 19, 25, 33, 38, 40, 50, 52, 54)

10. Temperature in the nocturnal shelters of the redpoll (*Acanthis flammea* L.) and the Siberian Tit (*Parus cinctus* Budd) in winter. K. Korhonen. 1981. Ann. Zool. Fenn. 18:165–167.—At air temperatures below 0°C, snow burrows provided a warmer microclimate than simulated tree hollows, even when hollows were occupied by 2 birds. The volume of the burrows is not specified, but is clearly much less than the volume of the cylindrical nest box. The author ignores the volumetric disparity when considering the biological significance of different shelters. Perhaps the surprising result is that the microclimate within tree cavities is not more favorable. Thus while the cavity provides shelter from the wind, huddling by the occupants may be vital to heat conservation. The unexplained deaths of individuals confined to closed snow burrows may explain why redpolls and Siberian Tits more commonly roost in tree cavities. The study leaves many questions unresolved.—Edward H. Burtt, Jr.

11. Influence of habitat structure on the nesting height of birds in urban areas. J-P. L. Savard and J. B. Falls. 1981. Can. J. Zool. 59:924–932.—Nest site locations of birds in residential Toronto were identified by spending hundreds of hours observing birds either building their nests or feeding their offspring. Species yielding analyzable data included: one ledge nester, the Rock Dove (*Columba livia*); 2 secondary hole nesters, the Starling (*Sturnus vulgaris*) and the House Sparrow (*Passer domesticus*); and 2 foliage nesters, the American Robin (*Turdus migratorius*) and the Common Grackle (*Quiscalus quiscula*). The Rock Dove alone showed a strong nest height dependency; it nested only in residential areas where 2-story houses were present and always nested at the second floor level. Starlings nested in cavities about the eaves or in various attic vent holes in either 1- or 2-story houses. Absolute nest height thus varied according to the location of suitable sites. House Sparrows showed even greater variations in nest height than did Starlings. On man-made structures they tended to nest lower than Starlings, but House Sparrows also nested high in the dense foliage of conifers. The 2 foliage nesters nested higher in Toronto than they have been reported to nest in non-urban areas. Savard and Falls attribute this to the limited availability of low, dense vegetation in the urban environment. Robins tended to put their early nests in conifers and later nests relatively higher in deciduous trees. In both cases, nests were located just below the layer of foliage with the greatest volume. Common Grackles have only one brood a year in Toronto and this is early. Hence, as one might expect, conifers are used nearly exclusively. The overall conclusion that nest height for all 5 species is always a function of habitat structure—either of the vegetation or of the buildings—is not too surprising, but the particular findings for particular species are most interesting.—A. John Gatz, Jr.

12. Tropic ecology of *Athene* owls in mediterranean-type ecosystems: a comparative analysis. F. M. Jaksić and C. D. Marti. 1981. Can. J. Zool. 59:2331–2340.—How much of what a species eats is determined by the habitat vegetation? Jaksić and Marti attempt to answer this question by comparing the diets of Burrowing Owls (*Athene cunicularia*) from one grassland and 2 chaparral regions with each other and with the diet of a congener, the Little Owl (*A. noctua*), from the chaparral in Spain. Published data are used to calculate prey diversity and evenness both in terms of classes of prey eaten (vertebrate and invertebrate) and in terms of species of mammals. Additionally, mean weight of the mammals eaten was estimated. Results indicate the greatest similarity in diet exists between chaparral dwelling *A. c. cunicularia* from Chile and *A. c. hypugea* from California. Grassland dwelling *A. c. hypugea* from Colorado eats both smaller mammals and a less diverse diet than its conspecifics. The Little Owl from Spain shows similarities in diet with the other chaparral dwelling populations only in terms of the mean weight of mammals eaten. Like Colorado grassland *Athene,* it shows exceptionally high insectivory. Further, the Little Owl differs from any population of Burrowing Owls studied due to the high abundance of amphibians and reptiles in its diet.

The bottom line in this study is far from clear. Jaksić and Marti interpret the similarities and dissimilarities in mammalian prey sizes in terms of the sizes of other species of owls in the habitats. For example, of the sites studied, only in Colorado is there no smaller species of owl present to compete with the *Athene* for the smallest of mammals and hence the smallest mean mammalian prey size in Colorado. So much for habitat vegetation determining this aspect of diet. Further, due to the limitations of basing a study on published information on diets, Jaksić and Marti have no way of assessing relative abundances of different prey items in the habitats. They are left having to speculate whether differences in relative abundances of particular categories of prey are due to active selection on the part of the owls or mere random sampling of what is available. Clearly a comparative field study designed to measure electivities in the several habitats would give more interpretable results and needs to be done to answer the original question.—A. John Gartz, Jr.

13. Relationships between temperate forest bird communities and vegetation structure. F. C. James and N. O. Wamer. 1982. Ecology 63:159–171.—James and Wamer have used censuses published in *American Birds* as a data base for analysis of patterns of abundance of bird species in North American temperate forests. Adjustments by rarefaction techniques to give an estimated number of species per 40 bird territories showed that species numbers peak in young forests in secondary successional stages. On the other hand, estimated number of territories per 10 ha was highest in mature deciduous forests and lowest in various coniferous plots. Principle component analysis identified 3 major independent factors as being the most important vegetation characterstics in determining patterns of distribution of bird species: (1) number of tree species and absolute canopy height, (2) differences between maximum and minimum canopy height within a forest, and (3) density of trees ≥7.5 cm dbh. Highest densities of birds occur where components 1 and 2 have high values and 3 has intermediate values. Highest numbers of species of birds occur where all 3 components have intermediate values. Lowest densities and species numbers occur where components 1 and 2 have low values and 3 has a high value. James and Wamer stress that the techniques they use are only good for examining effects, not causes or mechanisms. But they also quite convincingly point out that if one wants to study effects, the techniques they use are superior to linear correlations between more directly measured variables such as bird species diversity and foliage height diversity.—A. John Gatz, Jr.

14. Bird community composition in relation to habitat and season in Betatakin Canyon, Navajo National Monument, Arizona. J. D. Brotherson, L. A. Szyska, and W. E. Evenson. 1981. Great Basin Nat. 41:298–309.—The authors calculate diversity, evenness, niche width, and niche overlap for birds observed from transects in 3 habitats over 4 seasons. There were clear differences in the relationships between niche overlap and niche breadth for each habitat and season. Wintering birds showed the narrowest niches and least niche overlap when compared to breeding and migrating species. Riparian habitat consistently supported more bird species, higher densities, greater niche breadth, and greater niche overlap than pinyon-juniper habitat. Pinyon pine (*Pinus edulis*) and Gambel oak (*Quercus gambelii*) were perched upon more often than other species (or the ground) irrespective of their relative abundances. Greater bird species diversity was associated with greater plant species diversity. Similarity of bird species composition among habitats with respect to season and similarity of perching locations with respect to tree and shrub species (or ground) are summarized in several useful diagrams. Tables display statistical groupings of bird species with respect to niche overlaps using season, habitat, and perching location data sets. Overall, the composition of bird communities varied more among seasons than among habitats. A bird species checklist for the area with seasonal, habitat, and relative abundance information is provided.—Richard M. Zammuto.

15. Interactions of migrant and resident land birds in Florida and Bahama pinelands. J. T. Emlen. 1980. Pp. 133–143, *in* **Migrant birds in the neotropics: ecology, behavior, distribution, and conservation.** A. Keast and E. S. Morton (eds.). Smith. Inst. Press, Wash., D.C.—Densities of land birds at 13 pine forest sites in winter more than doubled in Florida and nearly doubled in the Bahamas because of invasion by northern migrants. Palm Warblers (*Dendroica palmarum*) were by far the most numerous migrant, and avian species diversity (H′) was very similar between winter and breeding communities because of the proportionally low representation of other winter species. Migrants and residents occupied somewhat different habitats, vegetation compartments, and guilds, but none of the differences were significant. Migrants were most abundant in open habitats, tree crowns, and ground vegetation, and aerial and ground insectivorous guilds.

Emlen believes his results support the view that mixed winter assemblages of migrant and resident species represent full integrated communities. A weakness of this study is the failure to measure food availability and its effects on bird density and distribution over all habitats. As Emlen states, "within habitat shifts among resident densities cannot be evaluated without data on changes in food abundance." The scarcity of more complete data on resident and summer migrants (=breeders) during the breeding season weakens Emlen's assertion that available niche space is unoccupied after the migrants leave, though winter resident populations of birds may be regulated during winter when migrants are present. Emlen's own data indicate resident density greatly decreased during April and May, suggesting that residents did indeed fill up some niche space. Support of competition theory by summation of community patterns and use of information theory has proven useful, but measures of diversity and evenness may fail to clarify important community characteristics. Emlen's paper is a fine one and his wealth of data invites questions and promises further important work.—D. B. McNair.

16. The Black-throated Green Warbler in Panama: geographic and seasonal comparison of foraging. K. N. Rabenold. 1980. Pp. 297–307, *in* **Migrant birds in the neotropics: ecology, behavior, distribution, and conservation.** A. Keast and E. S. Morton (eds.). Smithson. Inst. Press, Wash., D.C.—Black-throated Green Warblers (*Dendroica virens*) had broader foraging niches in a montane oak forest in Panama than in spruce-fir forests in North Carolina and Maine. Black-throated Greens foraged higher and more distally in the foliage in Panama than in North Carolina and Maine. A greater diversity of foraging techniques was used—ducking under, vertical cling, and hang, as well as the more frequent hawking, sallying, and hovering which were the dominant techniques in North Carolina and Maine. Individual Black-throated Greens also had broader foraging niches and searched individual trees more in Panama. Males foraged, on average, higher than females in all habitats; documentation of intersexual differences on foraging behavior is still scarce for most warblers, especially on winter habitats. Rabenold suggests his foraging data in Panama support the food optimization hypothesis, and that for Black-throated Green Warblers, broader foraging niches resulted from scarcity of suitable foods. Rabenold (Ecol. Monogr. 48:397–424, 1978) supported this argument in North Carolina and Maine because he controlled foliage type and habitat and sampled the invertebrate fauna. These controls are lacking in the present study. Nevertheless, his foraging data for Black-throated Green Warblers in Panama suggest that expansion of the foraging niche is not the result of competitive release or competitive pressures.—D. B. McNair.

17. What is the true breeding bird population of a census area? P. Palmgren. 1981. Ornis Fenn. 58:141–150.—The author, who first published on the bird fauna breeding in southern Finland in 1928, censused the birds of a small farm over 10 weeks in one breeding season to determine their numbers. Birds were noted during walking and waiting on a transect, and their locations were plotted on a map. The number of inhabited territories in the 16-ha farm varied between 48 and 57, but during the breeding season 66 territories were occupied. At least 30 pairs nested in previous years in territories unoccupied in the year of the study. The results suggest to the author that about 100 pairs of birds could breed in the area, and that the actual bird populations are well below the carrying capacity of the habitat. He suggests that predators control bird numbers, and he gives a few anecdotes on nest predation (but none of predation on adults). The birds were not individually marked. The paper is of some interest in pointing out that census results vary with time, but because the birds were not marked, nests were not followed, and alternative census techniques were not used, it tells us nothing of causality.—Robert B. Payne.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(see also 22, 52)

18. Economic impact of pest birds on ripening cereals in Senegal. R. Bruggers and P. Ruelle. 1981. Prot. Ecol. 3:7–16.—Grain-eating birds, particularly Red-billed Queleas (*Quelea quelea*), were found destroying almost 5% of the total cereal crop in Senegal, with an estimated annual loss of $4–5 million. Control practices have been directed toward reduction of this loss for nearly 20 years, with millions of birds killed. Maybe the persons responsible for administration of this control program could save themselves or their constituents from some expenses if they would consider the relevance to their problem of the principle sometimes over-used in game management, that the birds being killed would die from natural causes if not killed in the control program.—Paul A. Stewart.

19. Field guidelines for using transects to sample nongame bird populations. S. A. Mikol. 1980. U.S. Fish Wildl. Serv. Biol. Serv. Program FWS-0BS 80/58:1–26. For sale by Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402, no price given.—Mikol provides an introduction to the methodology, assumptions, and procedures involved in conducting line transect censuses to estimate bird densities. The report is intended to be a part of a training program for field workers, and not a thorough review. It achieves its goals, but not without certain flaws in coverage, editing, and presentation. The European literature, particularly that of the Finnish workers, is very inadequately treated; this is inexcusable because the Finnish workers have considerable experience in the very contexts to which this work is directed. The author urges adoption of unique abbreviations for bird names for field use, but fails to point out the unique abbreviations provided by Klimkiewicz and Robbins (N. Am. Bird Bander 3:16–25, 1978). The work is very poorly edited for sentence structure and includes some well-intentioned but poorly executed drawings. In spite of these faults, I recommend Mikol's guide as a common sense *addition* to any training program for field workers in the methodology of variable width transects for bird censusing.—Paul B. Hamel.

CONSERVATION AND ENVIRONMENTAL QUALITY

(see also 11, 48)

20. Status and foraging distribution of White Pelicans, Prince Albert National Park, Saskatchewan. 1980. G. C. Trottier, R. J. Breneman, and N. A. Young. Can. Field-Nat. 94:383–390.—The population of White Pelicans (*Pelecanus erythrorhynchos*) nesting on Pelican Island, Lavallee Lake, Prince Albert National Park, was censused from aerial photographs. Despite a tendency for aerial photographs to underestimate, the population of pelicans has increased substantially since 1938. However, immigrants from nearby abandoned colonies may have contributed to the local increase in population. Such shifts in population have been reported previously, but their cause is unknown and we are not enlightened by data from the present study.—Edward H. Burtt, Jr.

21. Third tour of inspection of Quebec heronries, 1979. J. L. DesGranges and P. Laporte. 1981. Can. Wildl. Serv. Prog. Notes No. 123, 10 p.—This paper reports the third year's data of a 10-year plan to monitor nesting, population numbers, and eggshell thickness in Quebec heronries (Great Blue Heron, *Ardea herodias*). Sixty-four of the 133 known heronries in Quebec were studied by 76 personnel. Per successful nest, clutch size at hatching was 4.5 ± 0.1 SE, an increase ($P < .05$) of 0.5 from 1978 data, hatching success was 90%, and the average number of young produced was 2.3 ± 0.2 SE. The average number of young produced per occupied nest was 1.9 ± 0.1 SE. The number of occupied nests increased in 50% of the colonies, but the overall increase in numbers of occupied nests over 1978 data (+28%) was insignificant ($P > .05$). Three colonies had an average increase of 168% over 1978 data. Photographers were believed to have caused a 26% reduction in the number of occupied nests at one colony and a progressive decline in numbers at another over the last 4 years. Winds caused high mortality of nestlings at several colonies. A map delineates the locations of 64 heronries; tables provide records for the number of occupied nests, reproductive success, eggshell thickness, and organochlorine residues found in eggs for many colonies. Effects of toxic substances were considered minor since eggshell thickness and organochlorine residues in eggs remained normal for most colonies.—Richard M. Zammuto.

22. **Migratory birds killed in Canada during the 1980 season.** S. Wendt and C. Hyslop. 1981. Can. Wildl. Serv. Prog. Notes No. 126, 42 p.—This note has 18 tables showing the number of hunters and harvest rates for each province for 1978–80 for a total of 40 species of waterfowl, upland game, and shorebirds. In some cases, yearly data for these parameters are given for the years 1966–80. I gleaned the following information from the tables. Hunters numbered about ½ million across Canada each year during 1974–80. Of these, 30% hunted in Ontario. About 70% of the hunters were successful for each of 6 years (1975–80). On average, each hunter harvested 11 ducks and 5 geese each year during 1978–80 and spent an average of 8 days afield to hunt ducks and geese during 1980. Just over 4 million waterfowl were harvested each year during 1977–80 throughout Canada. More waterfowl were harvested in Ontario ($\bar{x} = 1,000,000$) and Alberta ($\bar{x} = 800,000$) each year during 1977–80 than in other provinces. Waterfowl harvest per province per species is shown in 25 pages of tables.

An average of 230,000 upland game and shorebirds were harvested each year during 1975–80. Of these, 125,000 were American Woodcock (*Scolopax minor*) and 82,000 were Common Snipe (*Gallinago gallinago*), each hunter harvesting 6 and 5 birds of each species respectively per year.—Richard M. Zammuto.

23. **Three decades of Swiss attempts to recolonize the White Stork (*Ciconia ciconia*) in Altreu, 1948–1979.** (Drei Jahrzehute Schweizerischer Storchansiedlungsuresuch (*Ciconia ciconia*) in Altreu, 1948–1979). M. Bloesch. 1980. Ornithol. Beob. 77:167–179. (German)—The paper reviews the efforts to reintroduce the White Stork in Switzerland. The wild breeding population disappeared in 1950. By 1979, 59 nests were occupied in the wild. The most successful technique appears to be to maintain the young storks in captivity until their fourth year, when they become sexually mature and paired. Releases are made near stations where captive flocks are maintained to serve as attractants to the released birds to keep them in the area. Details of release stations and nest platforms are given.—Robert C. Beason.

24. **Reischek's 1890 paper on 'The Kakapo (*Strigops habroptilus*) in the wild and in captivity.'** K. E. Westerskov. 1981. Notornis 28:263–280.—The Kakapo, or Owl-Parrot, endemic to New Zealand, is surely one of the rarest and most curious of extant birds. Semi-terrestrial, virtually flightless, and "the most unsocial of all birds," it was nearly exterminated by introduced predators and now ekes out a precarious existence in a semi-captive and highly managed state. The parrot was declining in the 1880's, when Andreas Reischek, an Austrian naturalist, spent over a decade in New Zealand. Reischek not only collected large numbers, but also attempted to maintain the species in captivity; he was involved with the proposal to introduce them to predator-free islands, such as Little Barrier, a program which is the basis for the species' continued survival. Reischek's observations, first published in an obscure German journal, include valuable first-hand information on behavior and ecology. Westerskov's translation is an important contribution, and it is enhanced by his comments, which provide a critical perspective.—J. R. Jehl, Jr.

25. **Songbird populations and clearcut harvesting of aspen in northern Utah.** N. V. DeByle. 1981. U.S. Dep. Agric. For. Serv. Res. Note INT-302, 7 p. Intermountain

Forest and Range Experiment Station, Logan, Utah 84321.—DeByle analyzes 4 years (1973–1977) of spot mapping census data gathered by J. Young on a 4 ha plot of 35-year-old aspen (*Populus tremuloides*) forest. In 1975, 2.5 ha were clearcut, providing an opportunity to examine the effects of the cutting on the avifauna. DeByle associates declines in 5 species and increases in 3 others with the cutting; several species were associated with the edge created by the cut. He points out correctly that the results from such a small plot are indicative, not definitive.—Paul B. Hamel.

PARASITES AND DISEASES

(see 5)

PHYSIOLOGY

(see also 10)

26. The energy costs of temperature regulation in birds: the influence of quick sinusoidal temperature fluctuations on the gaseous metabolism of the Japanese Quail (*Coturnix coturnix japonica*). R. Prinzinger. 1982. *Comp. Biochem. Physiol.* 71A:469–472.—Quick sinusoidal temperature fluctuations cause an increase in metabolism in comparison to a constant ambient temperature even though both regimes have the same average temperature. Response during rest periods was greater than during the active period. Increase in metabolism is probably caused by "overshoot" of compensatory controls in the course of adjusting metabolism to new ambient temperature levels.—C. R. Blem.

MORPHOLOGY AND ANATOMY

(see also 7)

27. Further observations on skull pneumatization. R. P. Yunick. 1981. N. Am. Bird Bander 6:40–43. Why should one passerine species demonstrate peripheral skull pneumatization while a closely related species shows median line pneumatization? The author attacked this question and by regressing skull width against skull length found "the peripheral group occurs at a skull length of up to about 17 mm, and the median line group at lengths above some value in the 17–18 mm range." Pneumatization patterns are reported for the first time for the following species: peripheral, in ascending order of skull length, American Redstart (*Setophaga ruticilla*), Blackpoll Warbler (*Dendroica striata*), Pine Siskin (*Carduelis pinus*), Black-throated Green Warbler (*Dendroica virens*), Common Yellowthroat (*Geothlypis trichas*), and Chipping Sparrow (*Spizella passerina*); median line, in ascending order of skull length, Northern Waterthrush (*Seiurus noveboracensis*), Ovenbird *Seiurus aurocapillus*), Gray-cheeked Thrush (*Catharus minimus*), Song Sparrow (*Zonotrichia melodia*), Swainson's Thrush (*Catharus ustulatus*), Veery (*Catharus fuscescens*), Hermit Thrush (*Catharus guttatus*), Tufted Titmouse (*Parus bicolor*), Gray Catbird (*Dumetella carolinensis*), White-crowned Sparrow (*Zonotrichia leucophrys*), Rufous-sided Towhee (*Pipilo erythrophthalmus*), Wood Thrush (*Hylocichla mustelina*), Rose-breasted Grosbeak (*Pheucticus ludovicianus*), and American Robin (*Turdus migratorius*). Thus, skull size and structural requirements of the bone tissue undergoing pneumatization appear to be responsible for the observed patterns.—Richard J. Clark.

28. Notes on the body weight and molt of the Elf Owl (*Micrathene whitneyi*) in southeastern Arizona. P. M. Walters. 1981. N. Am. Bird Bander 6:104–105.—The average weight for 20 mist-netted owls was 41.0 g (sex undetermined) with a range of 35.9 to 44.1 g. Mean wing chord was 104.5 mm (range 99 to 110 mm) and tail length was 46.3 mm (range 39 to 51 mm). Molting birds were captured on 31 July, 2, 7, and 16 August. The first 3 were known juveniles and age of the last bird was unknown.—Richard J. Clark.

29. A comparative morphological study of the digestive tract of some Corvids (Corvidae). (Vergleichend morphologische Untersuchungen am Verdauungstrakt einheimischer Rabenvögel (Corvidae)). M. G. Oelhafen. 1981. Ornithol. Beob. 78:17–40. (German)—This study used histological structures of the digestive system to examine the systematic relationships among 8 species of European corvids. The author concludes that the 2 divisions used by some authors are unnecessary and should be dropped. *Corvus monedula* is very different from other members of the genus and should be returned to the revived genus *Coloeus.* A total of 84 morphological and developmental characters were examined using light microscopy and scanning electron microscopy. The character that was most important in distinguishing among species was the relief of the intestinal lining. Other characters that were also significant included the structure of the glands, *Lamina propria,* and *Muscularis mucosae* of the esophagus; and the structure of the glands and epithelial surface of the glandular stomach. The corvids all show similar general morphology of the digestive system, but there is a great deal of interspecific radiation of the microscopic structures. Additional information of this type is needed for many of the passerines in order to understand their evolution and systematics better.—Robert C. Beason.

PLUMAGES AND MOLT

(see also 28, 49, 52)

30. Age determination of winter and spring Dark-eyed Juncos. R. P. Yunick. 1981. N. Am. Bird Bander 6:97.—Hatching year (HY) and second-year (SY) Dark-eyed Juncos (*Junco hyemalis*) can be told from adults which have undergone at least their second prebasic (first post-nuptial) molt by the presence of brownish-edged tertials. These feathers contrast with the gray-edged secondary coverts. Only one bird of 128 HY's demonstrated total replacement of tertials, as in adults, when trapped in mid-August to mid-October. From a spring sample of 191 SY birds, one had renewed "top and bottom" (=all??) tertials.—Richard J. Clark.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 15, 35, 42, 44, 47, 48, 50, 54)

31. Marine bird observations at Cape St. Mary's and Placentia and St. Mary's bays, Newfoundland, winter 1978–79. R. I. Goudie. 1981. Can. Wildl. Serv. Prog. Notes No. 124, 10 p.—This paper reports the numbers and locations of marine birds overwintering within 1 km off the shores of Newfoundland. The Common Eider (*Somateria mollissima*), Black-legged Kittiwake (*Rissa tridactyla*), and Thick-billed Murre (*Uria lomvia*) were each observed more than a ¼ million times while no other species was observed more than 10,000 times. Estimates of densities are provided.—Richard M. Zammuto.

32. The expansion of the Great Reed Warbler *Acrocephalus arundinaceus* into Finland. P. Koskimies. Ornis Fenn. 58:151–158.—Great Reed Warblers were first recorded in Finland in 1930. Numbers of birds reported have increased gradually with means of 3.6 in the 1950's, 7.5 in the 1960's, and 30.2 in the 1970's. Until the 1970's the birds were found only along the south coast, but as shown on the maps of singing males, the range has spread to southeast and southwest coasts as well as locally inland. Only about 15 nestings have been confirmed. Reasons for expansion appear related to recent amelioration of climate, associated increase in populations in eastern Europe, and development of suitable habitats. The author collected many of the records using a published request in the field ornithologists' journal for the area and for more recent years from atlas maps of local bird distributions. The study suggests means to document changing bird populations and indicates a widespread interest in local birds in southern Finland.—Robert B. Payne.

33. The Great Grey Owl *Strix nebulosa*—a bird of the northern taiga. O. Hilden and P. Helo. 1981. Ornis Fenn. 58:159–166—Great Gray Owls in northern Europe have become more numerous in recent years and now nest well south of their range in the early 1960's. The owls are nomadic and seem to settle and breed in areas with high vole populations, sometimes in local concentrations with nests as close as 100 m apart. Most settle in old raptor nests or artificial substitutes. They usually remain within their northern breeding range, but at intervals of several years they invade as far as the south coast of Finland. Fine photographs are included with some showing the owls plunge-diving into the snow after voles they hear. The biology appears similar to that of Great Gray Owls in

North America, where the species has nested in northern Minnesota, Wisconsin, and Michigan in recent years. Unfortunately the authors do not compare their observations with those in North America and do not mention R. W. Nero's recent book, **The Great Gray Owl—Phantom of the Northern Forest** (Smithsonian, Washington, 1980).—Robert B. Payne.

SYSTEMATICS AND PALEONTOLOGY

(see also 29, 35, 46, 47, 53)

34. The external morphology and taxonomic status of the Orange-fronted Parakeet. A. J. Nixon. 1981. Notornis 28:292–300.—Discriminant function analysis of Orange-fronted Parakeet (*Cyanoramphus malherbi*) and Yellow-crowned Parakeet (*C. auriceps*) indicate that the 2 are conspecific and that *malherbi,* recently rediscovered in the wild, is a color variant.—J. R. Jehl, Jr.

EVOLUTION AND GENETICS

(see also 6, 53)

35. Speciation and the adaptive radiation of Darwin's finches. P. R. Grant. 1981. Am. Sci. 69:653–663.—The classic example of adaptive radiation in birds is that of Darwin's finches (subfamily Geospizinae) on the Galapagos Islands. Although several investigators have examined radiation among the Geospizinae, none has made field investigations as thorough as those of Peter Grant and his associates. In this paper, Grant traces the historical development of current ideas regarding the evolution of these finches and then discusses the current controversies by drawing heavily upon his own work. The author suggests that detailed studies of the remarkable diversity of the Geospizinae may help us to understand how intraspecific variation is transformed into interspecific variation.

The major explanation for the evolution of the Geospizinae is an allopatric model provided in part by Darwin, Stresemann, and Lack. Lack (**Darwin's Finches,** Cambridge Univ. Press, 1947) provided the most detailed exposition, postulating 4 major steps. The first step involves a single over-water colonization of the Galapagos by an ancestral finch (unknown). In step 2 the populations of the initial colonists increase with some individuals dispersing to nearby islands. Small amounts of genetic change occur in such allopatric populations in new environments. In step 3 secondary contact occurs between the original and derived populations. If these 2 populations are different enough, individuals of the 2 groups may show only a slight tendency to interbreed while those that hybridize will have offspring with lower fitness than those individuals which breed "true." Thus the reproductive isolation initiated in allopatry (on different islands) is perfected in sympatry (on the same island). Step 4 is a repeat of the cycle resulting in the evolution of the 13 species.

A controversial portion of the allopatric model was Lack's assertion that differentiation in allopatry resulted from small mutations in allopatric populations and the subsequent divergent selection acting against members of the 2 populations in secondary contact. Lack believed that interspecific competition caused divergent selection to reduce competition. Bowman (Univ. Calif. Publ. Zool. 58:1–302, 1961) disagreed, suggesting that population differentiation in allopatry could be a result of adaptation to a new flora and not a result of interspecific competition in sympatry. Grant and his associates designed field studies to discriminate between these hypotheses. The results suggested that adaptation to a new food supply on different islands could account for population differentiation in allopatry. However, their findings of small numbers of species per genus on islands, the larger than expected correlation between the bill ratios of sympatric pairs of species, and the under-representation of certain combinations of species on islands are consistent with a competition hypothesis. Grant concludes that variation in the flora (food supply) of different islands may have brought about local adaptation in different island populations in the early stages of radiation. Once more species were generated in step 4, interspecific competition became important at the secondary contact stage.

As an alternative to the allopatric model, Grant discusses a sympatric model to explain the evolution of the finches. He cites some intriguing evidence which is consistent with both the ecological and genetic subdivision necessary for sympatric speciation (but is not inconsistent with an allopatric model). He has initiated long-term studies to examine some of the remaining problems associated with this possible case of sympatric speciation.

Grant's past, present, and future studies have been designed to understand the where, how, and why of evolutionary change in Darwin's finches. He hopes that these studies will provide a better understanding of evolutionary diversification and adaptive radiation in less accessible species. His review may provide such a first step.—J. M. Wunderle, Jr.

36. Genetic variation in serum enzymes of Belding's Savannah sparrows. L. Liu, J. Brookey, S. Dimse, J. B. Williams, and G. Tallman. 1981. J. Hered. 72:438–440.—Electrophoresis was used to examine genetic structure of a small, relatively sedentary population of Savannah Sparrows (*Ammodramus sandwichensis*) from southern coastal California. Blood samples were taken from 51 individuals of 250 pairs; approximately 10 genetic loci were scored. Observed genetic variability (heterozygosity), averaged over individuals, was 0.037; expected heterozygosity, assuming Hardy-Weinberg proportions, was 0.085. The authors interpret this discrepancy to be the result of inbreeding due to reduced immigration and emigration among populations and restricted dispersal within the isolated colony.

There are a number of problems with this reasoning. First, however, 10 loci are just not adequate to estimate heterozygosity. The among loci component of genetic variance is very large in all electrophoretic studies; estimates based on fewer than 25–30 loci are probably not useful. Standard errors can be calculated, but were not reported here. Departures from Hardy-Weinberg frequencies are also disturbing for single breeding populations. Contra the authors, reduced immigration among populations will not result in a departure from such expectations within a colony. Rather, reduced intrapopulational exchange results in an excess of homozygotes among populations, the so-called Wahlund effect. This can only be detected when several populations are sampled simultaneously. Thus, more loci, and especially loci less troublesome than esterases, ought to be examined in studies such as this. Extreme care has to be taken with loci showing departures from Hardy-Weinberg predictions; the sample sizes required to detect the levels of selection or inbreeding due to limited dispersal that might be reasonably expected in avian populations are enormous. Recent data from *Microtus* populations suggest that some proteins may be subject to post-translational modification altering electrophoretic mobility. This should be considered a possibility for loci not in local Hardy-Weinberg equilibrium.—George F. Barrowclough.

37. Genetic variation in a winter population of Mallard ducks. L. E. Parker, E. G. Bolen, and R. J. Baker. 1981. Southwest. Nat. 26:425–428.—The authors used starch-gel electrophoresis and specific isozyme staining to examine 55 wintering Mallards for 20 genetic loci. Four of these loci were variable and the overall level of individual heterozygosity was 0.027. The authors use these results to make a strong claim. They note that the neutral theory of population genetics predicts a relationship between effective population size and heterozygosity. They claim that because the North American population of Mallards (*Anas platyrhynchos*) is large, heterozygosity in this species ought to be greater than in other species of birds examined to date. However, the observed 0.027 is at the middle to low end of reported values. Hence the neutral theory must be incorrect.

There are 3 key problems in this logic: first, the estimate of heterozygosity in this study is based on a marginal number of loci and its standard error is unreported. To compare such figures among species, there ought to be some sort of control on the choice of loci sampled; it is known that there is considerable variance among loci in heterozygosity. Second, there are currently no estimates of overall effective population sizes for any North American birds. The Mallard population may well be large, but whether it is substantially larger than that of such species as Yellow-rumped Warblers (*Dendroica coronata*), White-crowned Sparrows (*Zonotrichia leucophrys*), and Northern Orioles (*Icterus galbula*) is not obvious. Finally, although they cite the major paper, the authors have not taken into account the results of Nei et al. (Evolution 29:1–10, 1975). These indicate that a reduction in population numbers (a bottleneck) will result in a severe loss of heterozygosity that will take on the order of 100,000 to 1,000,000 yr for recovery. Thus, the important parameter is not the present population size, but the time course of size over the Pleistocene.

The influence of effective population size on heterozygosity is an important question, and may yield information based on careful thought and experimentation, but the assumptions of this study are just too simplistic.—George F. Barrowclough.

FOOD AND FEEDING

(see also 8, 12, 16, 33, 35, 48)

38. Predation by the Barn Owl (*Tyto alba*) in Mediterranean habitats of Chile, Spain, and California: a comparative approach. F. M. Jaksić, R. L. Seib, and C. M. Herrera. 1982. Am. Midl. Nat. 107:151–162.—The Mediterranean habitats of Chile, Spain, and California have similar distributions of small animals available to Barn Owls. In addition, these prey resources are used by taxonomically related assemblages of owl species having similar size distributions. The Barn Owls in the 3 localities were similar in that they fed on almost every small mammal species present. However, Spanish Barn Owls differed from the Barn Owls of the other localities by taking significantly smaller-sized mammal prey and included more reptiles, amphibians, and insects in their diets. The small mean prey size taken by Spanish Barn Owls reflects the reduced abundance of large mammal prey which forces the owls to feed on smaller mammals and less efficient nonmammalian prey. Data from a Colorado grassland were used as a control and fell within the range of diet variation exhibited by Mediterranean Barn Owls. The mean size of mammalian prey was not correlated with the size of Barn Owls, which differed in the 3 Mediterranean habitats. The authors conclude that the statistical distribution of mammalian prey sizes available, their relative abundance, and the make-up of the assemblage of syntopic owls are the important parameters determining the pattern of Barn Owl predation in different areas of their range. Future studies in areas with different prey-size distributions and/or different size distributions of the syntopic owls are encouraged.—J. M. Wunderle, Jr.

39. Winter nutrition of the Willow Grouse (*Lagopus lagopus* L.) in the extreme north of Finland. E. Pullianinen and J. Iivanainen. 1981. Ann. Zool. Fenn. 18:263–269.—The winter food of the Willow Grouse was 77.3–97.8% birch (*Betula* spp.) and 0.9–22.5% willow (*Salix* spp.), with minor quantities of low-lying plants from snowless patches. Consumption of willow was lowest when consumption of protein-rich birch catkins was highest. Despite important data on the diet of Willow Grouse, there are no data on the relative availability of foods. Thus we do not know whether grouse feed nonselectively on whatever is most available or seek certain foods despite their relative rarity.—Edward H. Burtt, Jr.

40. Diets and feeding ecology of Great Skuas *Catharacta skua* during the breeding season in Shetland. R. W. Furness and J. R. G. Hislop. 1981. J. Zool. (Lond.) 195:1–23.—The population of Great Skuas has been increasing in northern Britain at a rate of 7% per annum since the end of the last century. Continuation of population growth in recent years appears to depend on an increased population of sandeels (*Ammodytes marinus*) resulting from overfishing of the sandeel's competitors and the availability of undersized whitefish discarded from fishing boats. Sandeels are the preferred food of breeding birds and chicks, but the importance of discarded whitefish is emphasized by decreases in the population of Great Skuas in the Faroes where fishing nets with larger mesh trap fewer undersized fish.

The article provides an admirably complete analysis of diet based on analysis of regurgitated pellets, meals regurgitated by chicks during banding, and scats. Dietary analysis is complemented by behavioral descriptions of fish and breeding skuas as well as analysis of fishing records. Calculation of monthly energetic requirements for the skua population at Foula includes some rather rough assumptions, but the model's precision and predictions match consumption estimates quite closely. The data suggest that young breeders are hard pressed to provide sufficient food for their young. Artificially increased broods were probably less successful than normal broods, but the sample (2 broods) cannot adequately support a conclusion. The authors' conclusion that time at sea is devoted exclusively to foraging is one interpretation of the behavioral data, but others are possible. For example, time at sea might be devoted to constant proportions of foraging and maintenance. Thus a decline in availability of food would result in more time at sea because foraging time is increased without changing the ratio of foraging time to maintenance behavior. A change in interpretation of time at sea has no effect on the important ecological conclusions, but is an example, along with discussion of optimal clutch size, of overinterpretation of the data.—Edward H. Burtt, Jr.

SONGS AND VOCALIZATIONS

41. A comparison of neighbor-stranger discrimination in Eastern and Western meadowlarks. J. B. Falls and L. G. d'Agincourt. 1981. Can. J. Zool. 59:2380–2385.—Eastern Meadowlarks (*Sturnella magna*) have a larger song repertoire size (≥54 songs) than do Western Meadowlarks (*S. neglecta*) (5 to 11 songs). Eastern Meadowlarks also show marginal neighbor-stranger (N-S) discrimination of song playbacks whereas Western Meadowlarks show good N-S discrimination. Falls and d'Agincourt consider these facts to be causally related. They suggest that poor N-S discrimination is a cost associated with large repertoire size, a cost that can be borne because of other benefits of a large repertoire. Although their data and other data cited from the literature fit this suggestion, more work is necessary to identify and quantify both the costs and the benefits for particular species and prove the connection.—A. John Gatz, Jr.

MISCELLANEOUS

42. An assessment of Walter Raine and his Saskatchewan records. C. S. Houston. 1981. Blue Jay 39:168–181.—For decades, Walter Raine generally was the archetypal unscrupulous oologist. In fact, this reviewer once was told that Raine was the only collector who kept his wife on bad eggs! He had some 50,000 eggs at one time—then the largest collection in Canada. But he lacked the knowledge to correctly label many clutches that he collected himself, or to evaluate critically the identifications of other unqualified collectors whose eggs he received by exchange or purchase. For such reasons he lost the trust of professional ornithologists and they came to dismiss him out of hand rather than recognize that many of his records, assessed individually, are valid and useful. He did some important work, such as obtaining and reporting the earliest known clutches of the Solitary Sandpiper (*Tringa solitaria*; pp. 170–171). Houston has done a service in discussing and documenting Raine's career and putting him, posthumously, into proper perspective.—Ralph S. Palmer.

BOOKS AND MONOGRAPHS

43. An annotated bibliography of the Red-cockaded Woodpecker. J. A. Jackson. 1981. Savannah River Ecology Laboratory, Aiken, South Carolina. 290 pp. (Available free from: Librarian, SREL, P.O. Drawer E, Aiken, SC 29801)—What strikes the user of this work is the ease with which one can look up any particular aspect of Red-cockaded Woodpecker (*Picoides borealis*) biology among 1790 references. This is because of subject categories presented at the front of the book. All are well written and carefully chosen. They include primary sources of original information and secondary sources that provide new interpretations. Categories include: habitat requirements, breeding biology, foraging, census reporting, population sizes, and local information by individual states. With his subject found, the reader can turn to the back for lists, by number, of all references dealing with it. It would be nit-picking to hunt for some obscure reference that Jackson has left out. Dr. Jackson is aware of the possibility and plans to continue collecting references, that could be added later in the form of addenda. His approach is comprehensive. The references brought together range from ones of high quality to ones of a "no sophistication" level. Everything is there. This bibliography should be of value to anyone interested in woodpeckers in general or Red-cockadeds in particular. It will also serve, no doubt, as a model of how clear and efficient a work of this kind can be.—Lawrence Kilham.

44. An annotated checklist of Peruvian birds. T. A. Parker, III, S. A. Parker, and M. A. Plenge. 1982. Buteo Books, Vermillion, South Dakota. 108 p. $15.00.—There is no comprehensive text on the birds of Peru, despite its having (or perhaps because of) the richest avifauna (1678 species) of any country in the world. This checklist of Peruvian birds should serve as a reliable, though cursory, guide to the birds of Peru until a more detailed book is forthcoming.

This book is intended for birders and field ornithologists. Over half the book is devoted to a checklist which summarizes species occurrence in different life zones; symbolic notation is used for indices of relative abundance. Numerical notations indicate species preference for one or more of 23 habitat types. Most habitat types are illustrated with one or two adequate black-and-white photographs; a few appear underexposed. There is a brief section on bird finding in Peru. The literature cited section is thorough and current, and includes references to more synthetic works for those who may want more information. There are no comments on species distribution in different habitats, microhabitat preferences, and habits, though this might be an unreasonable expectation. Nonetheless, this is apt to be a disappointment for keen field workers.

The attractive cover painting of a Long-whiskered Owlet (*Xenoglaux loweryi*) by John P. O'Neill may partially explain the high price. However, other cost factors include pages of high quality paper, stitched signatures, and a durable binding. Royalty income will help support the Louisiana State University's Peruvian Expedition Fund so that field work in Peru may continue, though the discovery rate of about 1 new species per year surely cannot continue!—D. B. McNair.

45. A bibliography of the Lesser Prairie Chicken, 1873–1980. J. A. Crawford and F. A. Stormer. 1980. U.S. Dep. Agric. For. Serv. General Technical Report RM-80, 8 pp. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado.—Although Lesser Prairie Chickens (*Tympanuchus cupido*) are not presently endangered, current populations occupy less than 10% of the range inhabitated by the birds before 1900. Land use practices associated with the decline of the species continue; this suggests that management efforts expended now may effectively prevent populations from reaching endangered status. Crawford and Stormer list 207 books, papers, and reports dealing with the species; they cross-reference these works into 19 subject categories. Citation frequencies range from 2 papers each dealing with parasites and propagation, to 36 on populations, and 49 bearing general information. The authors provide no clue to the strategy employed nor to the extent of their search for the listed papers. The work should prove useful, particularly because it includes numerous government reports from Federal Aid in Wildlife Restoration projects that might otherwise go unnoticed.—Paul B. Hamel.

46. The Birds of Prey of Southern Africa. C. G. Finch-Davies and A. C. Kemp. 1980. Winchester Press, Ltd., Johannesburg, South Africa. 339 pp.—This is an exceptional book that unfortunately is limited to 1726 copies. Therefore, if you don't have a copy by now you may not get one. The book merits review because of its significant contribution to the history of ornithological art and biology of African raptors. Basically the book contains the art work of the late Lt. C. G. Finch-Davies (1875–1920) with commentary on each species by Alan Kemp, curator of birds at the Transvaal Museum. Finch-Davies grew up in British colonialist tradition and like so many 19th century British ornithologists lived in both India and Africa. He had a varied and controversial career and if he takes a place in history it will be because of his art work and not his career and achievements as a military man. While the late and legendary Leslie Brown has often been said to be the authority on African raptors, his only edge on Alan Kemp has been his age. Alan's intimate knowledge of raptors, his keen ability as an observer, and his intuitive common sense about raptor biology are manifest throughout his narrative species accounts.

The book contains 124 color plates of diurnal raptors and 17 of owls. Of the 59 species of diurnal raptors shown, all but 15 depict adult and juvenal plumage, and in all but a few cases there is more than one plate per species. The 12 species of owls shown are all adult but one. While most of the art work is of a similar quality, it spans a 10 yr period from 1910 to 1919. Some plates show excellent fidelity, e.g. the cream-backed form of the Bateleur (*Terathopius ecaudatus*) while others have some minor problems with body proportions, such as the juvenile Black Sparrowhawk (*Accipiter melanoleucus*). Plates that I particularly like are the male Jackal Buzzard (*Buteo rufofuscus*), the immature Tawny Eagle (*Aquila rapax*), and the adult female White-faced Owl (*Otus leucotis*). Several species, e.g., Smaller Banded Snake-eagle (*Circaetus cinerascens*) and Long-legged Buzzard (*Buteo rufinus*) have occurred in southern Africa since Finch-Davies' time and although not illustrated they are nonetheless mentioned by Kemp.

While not a trained ornithologist, Finch-Davies became an excellent observer and clarified the fact that the immature of the Red-headed Falcon (now named *Falco chicquera*) was just that and not a different species that had been named (*Falco horsbrughi*). He also clarified a similar adult-immature confusion with a hawk-eagle (*Hieraaetus*).

Dr. Kemp's background is thoroughly zoological and African: born in Zimbabwe of British ancestry. While he has a keen interest in raptors, his Ph.D. work was on hornbills (*Tockus* spp.). Much of the earlier nomenclature of raptors is preserved by Kemp and differs from that preferred in the most recent Peters' *Check-list of Birds of the World.* Many of the forms Kemp calls full species are referred to as "megasubspecies" in Peters; forms approaching full species status. For example, Kemp places the Tawny Eagle (*Aquila rapax*) as a species apart from the Steppe Eagle (*Aquila nipalensis*) and 2 distinctive African buteos (*Buteo rufofuscus* and *B. augur*) are treated as different species rather than both subspecies of the former as preferred by Peters. I do not know what bird is called the Mountain Buzzard (*Buteo tachardus*) by Kemp but I presume it to be the African Mountain Buzzard (*B. oreophilus*) of other check-lists. However, Dr. Kemp's intuitive knowledge of raptors is superb. He has included new data in the book from his own observations, for example, data on the behavior of Dickinson's Kestrel (*Falco dickinsoni*). When my family and I visited the Kemps in Pretoria in 1981, I watched the Dickinson's Kestrels in a large cage in his back yard and one need only watch them and their fast parrot-like movements for a short period to realize how different they are from other "kestrels." Through such studies Dr. Kemp should help clarify the more accurate affinities and relationships of many of the aberrant African raptors such as this kestrel.

I heartily recommend that one familiarize himself with this book and glean the new knowledge of the remarkably diverse and abundant African raptor fauna that is scattered throughout the text. This book will stand for some time to come as the most complete of its kind on birds of prey of southern, if not all, Africa.—Clayton M. White.

47. Hawks in Focus. J. Cupper and L. Cupper. 1981. Jacklin Enterprises, Mildura, Australia. 208 pp., 315 photos, 26 maps. $29.50—This is a delightfully written book, especially for one familiar with Australia. As I read about the dust storm with fierce hot winds approaching the authors as they photographed from a tower, I recalled all too vividly my experience in the mallee of Victoria with airborne dust so thick it could be cut, high winds, and temperatures exceeding 100°F. My experience was exciting and I was gripped with nostalgia as I read about theirs. By the same token, the one minor fault with the book is the sometimes lengthy discussions of the authors' trials, tribulations, and experiences, which had nothing to do with raptors. However, the authors describe their feelings about their work and their adventures so that the reader may vicariously visit all 24 species of diurnal Australian raptors. For each species, photographs show a normal clutch, adults at the nest with young, the adult perched, a bird in flight, and a general view of the habitat. In a random sample of 5 species there were on average 13 photographs per species (range 6–20).

The photos were taken from a blind located on top of a metal tower erected by the nest tree. The only nests not shown in trees were one of an Osprey (*Pandion haliaetus*) and one White-bellied Sea-Eagle (*Haliaeetus leucogaster*) on rocky pinnacles, and those of the Marsh Harrier (*Circus aeruginosus*) on the ground. Australia has some incredibly interesting raptors; notable are the Letter-winged Kite (*Elanus scriptus*) which, along with the Bat Hawk (*Machaerhamphus alcinus*) of Africa and Southeast Asia, is a nocturnally hunting "diurnal" raptor, and the Spotted Harrier (*Circus assimilis*), the only tree nesting member of the genus.

The authors made some exciting observations from the blind. They saw an adult breeding Australian Kestrel (*Falco cenchroides*) fly to and feed young Black Falcons (*Falco sub-*

niger) that were giving food begging calls in their nest. This smacks of the observations of Ratcliffe (Br. Birds 56:457, 1962) where kestrels were raised by Peregrines (*Falco peregrinus*). They watched a female Brown Falcon (*Falco berigora*) remove one of her dead chicks from a nest just as she did the remains of uneaten food. Removal of food scraps is an interesting behavior in itself, especially if one is familiar with the lack of nest cleaning so common in other large falcons, such as the Peregrine, where even dead young remain in the nest if not cannibalized by siblings. Some of the Cuppers' observations attest to the value of blinds. As further testimony to the value of studies from blinds, I am reminded of a recent conversation with my colleague William Mader where, in checking food remains in nests of a South American hawk, no remains of eels were found (N = 160 remains) but based on observations from a blind at one of the same nests previously checked, 45% of the food brought in (42% by biomass) was freshwater eels; items totally missed by other means of food studies.

Three of the photographic studies were of particular interest to me. First, photographs of the Grey Falcon (*Falco hypoleucos*), an uncommon falcon of the drier parts of Australia, may be the first to show adults at the nest. Second is the remarkable documentation of the Black-breasted Buzzard (*Hamirostra melanosternon*), a type of kite, raising a brood of kestrels. Apparently the buzzards fed on young kestrels and some brought to the nest as food were not killed; as the kestrels gave food begging calls, the buzzard responded with stereotypic appropriateness and did so until the young kestrels fledged. Last, is the record of the natural hybrid between the white phase of the Grey Goshawk (*Accipiter novaehollandiae*) and the Brown Goshawk (*Accipiter fasciatus*). Pictures I saw elsewhere of the first adult plumage of the hybrid offspring were not unlike the grey phase of the Grey Goshawk, and it is indeed unfortunate the Cuppers did not include a picture of the molted bird in their book. The hybrid pair was not at the periphery of the range of either species where one might expect hybridization to occur, and the pair bond lasted more than one year.

The Cuppers state that the Brown Falcon was recorded building its own nest. I have heard the same from Australian falconophiles, but I saw no evidence that convinced me that the species does build a nest. If they do, they are the only one of 36 species of *Falco* to do so. Unfortunately the Cuppers were unable to document this on film. Had they, it would have been a significant contribution to our knowledge of this somewhat different *Falco* species and indeed *Falco* in general.

The casualness of, not only the humor, but also the descriptive statements in the book, reflects the direct subtle style of Australians. For example, describing the Black Kite (*Milvus migrans*): "unlike most other young birds they did not back to the edge of the nest to defecate. Instead they lowered their head, raised their rear-ends and ejected howitzer-like from the cup of the nest." They vividly described the incredible rapidity that soils in the interior gum up and become slick with the slightest moisture. As they returned from photographing Black Falcons, they drove down one wet track where "it looked like a squadron of tanks had been holding maneuvers on it. With more than a modicum of luck, coupled with the expertise acquired through a lifetime of driving on out back tracks we managed to keep mobile most of the time, although we weren't always facing in a homeward direction."

I thoroughly enjoyed the book not only for its readability, but for the biological observations. Most of all, I enjoyed the magnificent photographs. Once having read the book, it is impossible not to grasp the breadth of opportunity for study represented by the remarkable array of Australian raptors.—C. M. White.

48. Invited Papers at the Second Annual Meeting (Oct. 20–23, 1978) of the Colonial Waterbird Group. Transactions of the Linnaean Society of New York 1980, 9, 158 pp.—On the occasion of its centennial anniversary, the Linnaean Society of New York hosted the Colonial Waterbird Group's Second Annual Meeting and published in Volume 9 of its Transactions a collection of the invited contributions. Though irregular in occurrence, the Society's Transactions have been a medium for outstanding ornithological publications. The preceding volume, published in 1962, was Margaret Morse Nice's **Development of Behavior in Precocial Birds**—now a standard reference on avian developmental modes. Other volumes include Eisenmann's (1955) **The Species of Middle American**

Birds (Vol. 7), Tinbergen's (1939) **The Behavior of the Snow Bunting in Spring** (Vol. 5), Nice's (1937, 1943) **Studies in the Life History of the Song Sparrow** (I. Population, Vol. 4; II. Behavior, Vol. 6). With such precedents one can only look foward to the appearance of a new Transactions.

The most recent one contains 10 papers on different aspects of colonial waterbird research, e.g., distribution, populations, censusing techniques, nesting adaptations and success, pollution, and species diversity. Almost all the papers are comprehensive, compelling, and interesting, though the 3 longest ones would have benefited from better editing. All presentations are followed by lively comments by conference participants.

In the lead paper, W. R. P. Bourne raises some questions and generalizations that derive from consideration of the influences of oceanography and geology on seabird distributions. He points out that the marine bird communities on opposite sides of tropical oceans are often more similar to those in the adjacent parts of neighboring oceans than they are to each other. For instance, the marine birds of the eastern tropical Pacific show a closer resemblance to those of the western tropical Atlantic than those in the western Pacific. Such affinities may reflect an interchange between oceans in the recent geological past and the formidable barriers created by large expanses of open tropical ocean.

In another illuminating contribution, R. G. B. Brown uses examples to discuss the analysis of oceanographic factors that determine the seasonal distributions of marine birds. The possibilities of using quantitative distributional data to study seabird communities and to relate these directly to zooplankton substrates should be very rewarding. Aerial surveying is proving to be the preferred method of data collection, though interdisciplinary approaches from ships that involve the simultaneous collection of seabird, planktonic, and other oceanographic data will remain a very powerful way in which to study the interplay of these factors and gain insights into their causal linkages.

P. A. and F. G. Buckley have drawn together 5 yr of findings on the populations and colony-site tenacity of the colonial waterbirds of Long Island, New York. Some highlights are: (1) though the population of Black-crowned Night Herons (*Nycticorax nycticorax*) is only about a quarter of its size of 50 yr ago, the species showed a steady increase throughout the study, (2) Herring Gulls (*Larus argentatus*) were found to be decreasing (moving elsewhere?), (3) about 20% (or 2000–3000 pairs) of the Common Terns (*Sterna hirundo*) are nesting in stable colonies in salt marshes, (4) Roseate Terns (*S. dougallii*) showed a drastic decrease through five years from ~1900 to ~500 pairs and are the most threatened colonial waterbird, (5) two new locally breeding species were found—Laughing Gulls (*Larus atricilla*) and Gull-billed Terns (*Gelochelidon nilotica*), (6) colony sizes at major inlets were positively related to local tidal prisms (assumed related to fish abundance). Censusing was carried out by helicopter, and the authors conclude that well-timed (early June), intensive (but brief) surveying is the most efficient and least disturbing way to go. This important paper would have been enhanced if tables and figures were kept in order with text citation sequence, and if some of the 21 photographs, such as the seemingly out of focus Fig. 8, had not been included.

W. H. Drury points out that different problems (including budgets) and objectives often require different degrees of accuracy and are best countered by a variety of censusing strategies that require varying levels of "rigor" (standardization). This is a difficult argument to make, but Drury does a credible job. Previous data, such as that in early accounts, collected with little "rigor," may be useful in pointing out population trends, if obtained over several decades and if large changes occurred. His argument suggests that too much standardization of technique and statistical analysis may yield misleading results owing to a lack of full biological understanding of short- and long-term fluctuations in numbers at colonies. Certainly increasing levels of standardization need not obscure understanding, especially when carried out in conjunction with other studies of breeding biology/ecology. Moreover, increased standardization might make it easier for those counting in the same places decades hence. Drury concludes that informative generalizations can be drawn from systematic counts or estimates which involved differences in sampling techniques and in levels of precision, if population changes have been large and the reasons for short-term (days, weeks) fluctuations were known. He contends that no conclusions should be drawn from a few years of data (no matter how systematically obtained).

J. C. Ogden, H. W. Kale, and S. A. Nesbitt's study on the influences of annual variation in rainfall on Florida wading bird colonies and populations seems based on too few years of data to adequately assess the problem posed. Tentative findings are based on a 3-year (ongoing) study of 5 species, of which only 3 are analyzed for 3 years and all are considered for 2 years. Data on the water table were not obtained, so even though water levels in most interior swamps and marshes are directly correlated with rainfall, it is impossible in this study to consider the relative importance of inter-colony site differences. Arguments from their data are reasonable but not compelling, a matter which is not independent of their selective consideration of data and absence of statistical testing. Over-generalizations based on too few censuses obtained from fixed-winged aircraft are the over-riding impression I got.

R. M. Erwin reported that, because they were less subject to error introduced by spatial distributions, strip transects (20% sample) were superior to a point-centered quarter method in the field and to both the point-centered quarter and a quadrat sampling method in an interesting series of tests with artificial populations (colored discs) in the lab. His computations lead to the suggestion that log transformation of data may improve regression analysis outputs. Using the same census takers should help control for massive variability associated with inter-observer differences and enhance relative comparisons across years.

D. A. McCrimmon, Jr. reviewed the influences of annual timing, nest dispersion, and habitat selection on nesting success. The review is quite comprehensive, but probably less critical or integrative than would be desired by researchers concerned with these problems. He emphasizes the important issue of studying the interactive effects of temporal, spatial, and habitat factors.

I. C. T. Nisbet neatly overviews the types of toxic effects that environmental pollutants can have on productivity. Such effects fall into 4 major categories: acute poisoning, delayed lethal effects, reduced reproductivity in the absence of overt mortality (e.g., chick abnormalities), and relatively covert (or low level) effects that may only have impact in the presence of other stress factors (e.g., many species that have experienced eggshell thinning have not had corresponding declines in production). The last category is a most interesting one to consider, and with it Nisbet also cites some intriguing cases of parent birds breaking or rejecting apparently "contaminated" eggs (such occurrences suggest fascinating potential studies for behaviorists). The suggestion that female-female pairings in some *Larus* sp. may be due to pollution is also raised. Efforts to find field instances that match toxic effects found in the lab will probably lead to increased awareness among field workers. The productivity of many species has improved recently in conjunction with reductions in environmental levels of DDE and dieldrin in North America and western Europe. DDT and dieldrin are still being used extensively in "Third World" countries, though studies of effects on waterbirds there are lacking.

In considering the utility of methods for censusing Gulf Coast waterbird colonies in different habitats, J. W. Portnoy delineates the characteristics of species populations that might provide natural assays of environmental conditions. Such avian indicator species should be conspicuous, predictable in nesting place and time, reproductively synchronous within and among colonies, be inexpensively, easily, and reliably censused with minimal disturbance and truly indicative of environmental changes. A hierarchical classification (based on reliability) of census techniques that can be used for different species in different habitats is developed. Portnoy suggests that while individual researchers must implement methods most appropriate for the species/habitat being investigated, the establishment of procedures for census method selection might help increase information exchange and compatability of findings.

H. F. and J. A. Recher present interesting foraging data and interpretations about heron species diversity. They argue that over-emphasis on explanations of diversity based on interspecific competition has obscured alternative explanations, such as selection for increased foraging efficiency which should evolve even if interspecific competition were not at play. They interpret the inverse relationship between diversity and latitude along the east coast of North America to reflect the greater year-round productivity of southern regions. They show that species in more southern locations take more different kinds of prey (an indicator of increased niche breadth), which they contend would not occur if interspecific competition were the over-riding selection for diversity; such selection should favor increased specialization, i.e. decreased niche breadth, and be seen in decreased diet diversity. Their argument was not found to hold for the Reef Heron (*Egretta sacra*), which is the only heron to inhabit the extremely productive Great Barrier Reef of Australia. The authors "explain away" this contradiction by pointing out this reef may not be so productive, as indicated by the Reef Heron's low foraging efficiency (seemingly circular reasoning). Might not the absence of competitors "allow" the Reef Heron to indulge in this inefficiency? The authors show that different foraging techniques, which bring different returns, can be dichotomously classified as searching or pursuing. They found as predicted that searchers (and large herons), i.e. Great White Heron (*Ardea herodias occidentalis*), Great Blue Heron (*A. herodias*), Great Egret (*Egretta alba*), Little Blue Heron (*Egretta caerulea*), Reef Heron, and Green Heron (*Ardeola striata*) had a greater diversity of diet than pursuers, i.e. Tricolored Heron (*Egretta tricolor*), Snowy Egret (*Egretta thula*), and Reddish Egret (*Egretta rufescens*). All species studied could obtain daily food requirements within a few hours of hunting. They suggested that the Great Blue Heron is the most northerly distributed species because its large size allows it to exploit all sizes of prey encountered in that comparatively less productive habitat. The Green Heron, the smallest species, is the next species added in northerly regions, because it is the most different in size from the Great Blue and because small prey may be more abundant than large. Competition overtones? Taking a world view the authors propose that 3 is the maximum number of heron species of the same size class (giant, large, medium, small) that can be packed into a community. Their conclusions that there are different sizes and kinds of herons, because there are different kinds and sizes of prey are convincingly and thoughtfully derived, though, as the authors emphasize, their conclusions are not meant to exclude alternative interpretations.—W. A. Montevecchi.

49. The moult of European songbirds—A fieldguide. (Die Mauser der Singvögel Europas—ein Feldführer). M. Kasparek. 1981. Dachverband Deutscher Avifaunisten, Lengede. 89 pp. DM 15.00. (German)—This monograph is a review of the molt of European passerines. There is a great deal of variation in the amount of data available from one species to another, but the data which are available for each species are presented, for both adult and juvenile birds. Some previously unpublished data collected by the author are also presented. The intensity of molt during the year is given for those species for which enough data are available. The monograph should prove a valuable reference because it provides a compilation of references as well as data on passerine molt.—Robert C. Beason.

50. A naturalist's adventure in Nepal: search for the Spiny Babbler. S. D. Ripley. 1981. Smithsonian Institution Press, Washington. 301 pp. $12.50.—Ripley's delightful book carries us to a land and an avifauna that few of us will see. The narrative is wonderfully evocative, from the hot, dusty, squalor of the Odh Tirhut Railway and Jogbani to the breath-taking beauty of Mangalbare. However, Ripley's account is more than just an adventure story. He explains the need for collecting, details the different collecting techniques, and repeatedly emphasizes the need for detailed records. Behavioral and ecological descriptions of species are frequent. The book closes with a discussion of zoogeography that emphasizes the ornithological significance of the expedition, the first collecting expedition into Nepal since Hodgson brought out specimens in 1843. Originally published in 1952, the reprinted volume would have profited from a brief addendum bringing the ornithological history of Nepal up to date.—Edward H. Burtt, Jr.

51. Nature Saskatoon: An account of the Saskatoon Natural History Society 1955–1980. C. S. Houston. 1980. Saskatoon Natural History Society, Saskatoon, Saskatchewan. 46 pp. $2.50.—Houston details the events and personalities involved in the 25-year development of the Saskatoon Natural History Society. The result is a folksy diary from which few details are omitted. For example, we are told of the attendance and programs of all the Society's meetings. Yet the account may be useful to more than members of the Society. Houston writes with pride of the record 12,442 Bohemian Waxwings (*Bombycilla garrulus*) identified on the 1975 Boxing Day (Dec. 26) Bird Count. He unabashedly records successes and failures of Society positions on environmental issues, and leaves a record of a number of individuals who made important contributions to the Society, the city of Saskatoon, and the University of Saskatchewan. Read this to see the warm, human side of an example of the many Natural History Societies that are the grassroots of the environmental movement in North America.—Paul B. Hamel.

52. North American Game Birds and Mammals. A. S. Leopold, R. J. Gutiérrez, and M. T. Bronson. Illustrated by G. M. Christman. 1981. Charles Scribner's Sons, New York. 198 pp. $19.95.—Here is a popular account by professional wildlife biologists of the lives of game birds and mammals of Canada, the United States, and northern Mexico. The authors aim "to raise the awareness of anyone interested in wild game—sportsmen, birders, naturalists, wildlife biologists, and wildlife management students," according to the dust cover. This is a fun and easy book to read. Each species account is divided into 3 sections: a brief description of range with an accompanying map, a brief description of habitat, and a lengthy account under "Remarks," which includes items of interest regarding the biology of the species. There are many tidbits that I found interesting or surprising. For example, the authors state that the Mourning Dove (*Zenaida macroura*) is probably the most important game bird in North America; 85,000 Prairie Chickens (*Tympanuchus cupido*) were harvested in 1970; young cranes are called colts; Wolverines (*Gulo luscus*) sometimes kill Caribou (*Rangifer* spp.); the elk (*Cervus canadensis*) is conspecific with the red deer; and the beaver (*Castor canadensis*) and wolf (*Canis lupus*) are the only mammals that mate for life. I do not know that all this is so, however, and the authors commit an error or 2. The worst is the authors' suggestion that the attenuated outer primaries in the American Woodcock (*Scolopax minor*) enable it to dodge and twist through brush similar to the flight of the White-tipped Dove (*Leptotila verreauxi*), which also has attenuated primaries. The outer primaries of these species are quite different, and those of the woodcock are undoubtedly involved with sound production. In a close runner-up, the authors define sympatric as "Closely related species coexisting on same area."

In contrast to many books of this type, the species are not listed in conventional systematic order. The authors found that their students had difficulty in distinguishing the species of ducks, so they chose to introduce their readers to game birds with accounts of the "more readily identifiable" Gruiformes.

The pencil drawings by Christman are simple illustrations intended to emphasize those features used in distinguishing species. They are not the illustrations found in field guides, however, and the characteristic features are not indicated. Although the drawings are well executed, the tyro will have difficulty in knowing what to look for in telling some species apart. For some reason or another, the drawings on a single page are not to scale. There seems to be little difference in size between the Chukar Partridge (*Alectoris chukar*), Ring-necked Pheasant (*Phasianus colchicus*), and Wild Turkey (*Meleagris gallopavo*) and between the nutria (*Myocaster coypus*) and beaver, whereas the Common Goldeneye (*Bucephala clangula*) is half again as large as the Barrow's Goldeneye (*B. islandica*).

Nevertheless, the authors have achieved their goal. No doubt, many sportsmen, naturalists, and wildlife biologists will enjoy reading this introduction to the biology of North American game animals.—Bertram G. Murray, Jr.

53. Phylogenetic Patterns and the Evolutionary Process. N. Eldredge and J. Cracraft. 1980. Columbia Univ. Press, New York. $27.50—Systematics and taxonomy have been in turmoil for the last 20 yr. A rhetorical battle is being waged in the pages of *Systematic Zoology* over the philosophy and techniques that ought to be used to infer evolutionary trees and create classifications. Two of the 3 major schools of thought involved in the debate, "Evolutionary Systematics" and "Numerical Phenetics", have produced books that represent overviews of their positions (i.e., E. Mayr, **Principles of Systematic Zoology,** McGraw-Hill, New York, 1969, and P. H. A. Sneath and R. R. Sokal, **Numerical Taxonomy,** W. H. Freeman, San Francisco, 1973). In brief, numerical pheneticists evaluate the similarities of taxa by measuring a large number of attributes or characteristics of their organisms, and then group them hierarchically according to overall similarity. A classification is created simply by assigning a taxonomic rank to a given level of overall similarity. Evolutionary systematists use a somewhat eclectic approach in that they insist that taxa not only reflect phylogeny (evolutionary genealogy), but, in addition, major gaps in overall similarity must be incorporated into the classification so that the final taxonomic boundaries reflect amounts of differentiation, and not just branching patterns. Now the various members of the third school, known as cladists, have begun to produce longer statements of their views and methods of systematics. The volume by Eldredge and Cracraft is the most complete statement thus far. The book is composed of 2 parts. The first 5 chapters form a review of the cladistic approach to the inference of phylogenetic trees and the construction of classifications. The last chapter deals with the inference of evolutionary processes.

In spite of several shortcomings, the first 5 chapters comprise a very useful introduction to the methodology as well as the philosophy of the cladist school. In addition, major differences among the 3 approaches are summarized. The central premise of the cladists, that establishment of taxonomic hierarchies be based on the identification of derived character states shared among taxa, is described and illustrated. Not all characteristics of an organism are considered useful to this school; only derived characters within a taxon are used. If characters can be found that are not subject to reversal or convergence, then this insistence that only derived states of character (as opposed to relict or primitive ones) be used in defining relationship will result in the correct branching pattern for a set of monophyletic taxa. The difficult problem of determining polarity, that is, establishing the sequence of character states, is briefly discussed. However, the more general theory of phylogenetic reasoning, of which cladistics is a special case, is not discussed. The interested reader can find a discussion of this area of research in Felsenstein (Syst. Zool. 28:49–62, 1978). A related problem is the absence of any discussion of statistics; it is assumed that a single character is sufficient to define a clade. This is equivalent to an assertion that evolution does not result in reversals or convergences, and that systematists do not make mistakes in analyzing their characters. If these assumptions are not true, then the identification of clades becomes a statistical problem. This aspect of phylogenetic inference has been addressed in part by Hecht and Edwards (Am. Nat. 110:653–677, 1976) and by Straney (**Mammalian Population Genetics,** Univ. Georgia Press, Athens, pp. 100–138, 1981).

Chapter 5 contains a good review of the problems associated with creating a classification. The authors' views are well-stated and defended. Their objection to "not-A" groups—taxa defined by the lack of characters—seems to be an important one. The problem of the proliferation of names and categories, which arises if cladograms are to be directly readable from a classification, is discussed at some length.

Chapter 6 is less successful. While it addresses many of the outstanding issues in systematics and evolution today, it is difficult to read in places, and probably could be better organized. Nevertheless, this may be the best introduction there is to some of the contemporary issues. Researchers interested in speciation and macroevolution will be especially interested in this chapter.

Systematics, described as partly an art as recently as the early sixties, has now become a quantitative science, in large part as a result of the challenges presented by the cladists and the pheneticists. Systematists have an obligation to their science to understand what the issues are, and to future workers to articulate their own views and procedures. A researcher can't build on past work if that work is not reproducible. This book is a reasonable place to start in coming to terms with these issues.—George F. Barrowclough.

54. The Plovers, Sandpipers, and Snipes of the world. P. A. Johnsgard. 1981. University of Nebraska Press, Lincoln. 493 pp. $45.00.—My remarks concerning Professor Johnsgard's newest book must be prefaced by an unabashed admission of fondness for shorebirds. One of the appealing features of shorebirds to birdwatchers and researchers alike is that they tend to be highly visible. It's often possible to sit and study details of size, shape, and plumage, to watch them feed, and to have unobstructed views of their postures and behaviors. Shorebirds are also a particularly good group in which to study migration. They include several of the longest-distance migrants known for all animals, and many concentrate at traditional stopover places during migration, thus making banding and marking programs a practical method of study. It is no accident, then, that shorebirds are an appealing group to birdwatchers and ornithologists alike. Ecologists favor shorebirds as one of a select few groups of birds whose habitats and food resources can readily be sampled and quantified, and whose morphological adaptations for foraging may differ markedly among sympatric but closely related species. Zoogeographers should also be attracted to shorebirds because of their well-studied taxonomic affinities, and their unusual but reasonably well-known distribution patterns. Finally, students of mating systems in animals have found shorebirds a fruitful group to work with.

Johnsgard's book will appeal to a number of the interest groups described above. The book is primarily descriptive, but early sections are taxonomic summaries, with systematics based principally on information from several studies published since 1960. These early sections are followed by keys to identification of specimens in the hand and by a long section giving detailed accounts for 165 species of plovers, sandpipers, and snipes. The species accounts include text on appellation, biometrics, identification characters, distribution, natural history, suggested reading, a breeding range map, and attractive line drawings. Birders and scientists will find these informative accounts complete and up to date with respect to literature through the mid-70's.

On the technical side, **The Plovers, Sandpipers, and Snipes of the World** is reasonably well produced, excepting the poor reproduction of color plates. I found few typographical errors and minor errors in captions on figures. The range maps are sometimes difficult to decipher, a problem that could have been resolved by different shading methods.

My major criticsm is that the book is largely descriptive, excepting the interesting treatment of taxonomy. Johnsgard notes that he excluded considerations of migration and molt for want of space. Perhaps for the same reasons he did not give more attention to synthesizing the information he has given on zoogeography, ecology, etc.; it would have been an interesting and stimulating addition.

Finally, some words about the illustrations. The book is profusely illustrated with very nice line drawings which reproduced very well—they present various types of portraits, often including the natal plumage of pulli. Two color plates of chicks in natal plumage are also included. Alas, little reference is made to these illustrations, and hence their significance to the average reader will be lost. There are also 59 color photographs of shorebirds, each produced on at least half a page; given their poor reproduction, I do not believe they merit the space allotted to them, and that Johnsgard could have included more information about migration, molt, etc.

In closing, although I am somewhat critical of some of the decisions which have been made in producing **The Plovers, Sandpipers, and Snipes of the World,** I do not mean to suggest that ornithologists and birders will not find the book useful—they certainly will! Johnsgard is to be commended for compiling an enormous body of information in one resource that birders, ornithologists, and others will find extremely useful as a basic reference.—Brian A. Harrington.