RECENT LITERATURE

Edited by Edward H. Burtt, Jr.

BANDING AND LONGEVITY

(See also 24, 57, 58, 79)

1. Banding of juvenile Whooping Cranes on the breeding range in the Northwest Territories, Canada. E. Kuyt. 1979. *N. Amer. Bird Band.*, **4:** 24–25.—The use of plastic color bands on 17 young Whooping Cranes (*Grus americana*), nine banded in 1977 and eight in 1978, has shown that one bird did not winter on the Aransas National Wildlife Refuge (it was seen in the spring in Kansas). Color marking also confirmed a suspected summering ground for yearlings between the Sass and Klewi Rivers near the principal nesting range.—Richard J. Clark.

MIGRATION, ORIENTATION, AND HOMING

(See also 57, 58, 64, 90)

2. Environmental variables and the nightly emigration ratio of the Robin (*Erithacus rubecula*) on the island Hjelm, Denmark. J. Rabøl and K. Hansen. 1978. *In* Animal Migration, Navigation, and Homing, K. Schmidt-Koenig and W. T. Keeton (eds.), p. 294–301. Heidelberg, Springer-Verlag.—Radar studies have shown that the probability of a bird migrating is highly weather-dependent. Using daily banding recoveries, Rabøl and Hansen calculated an "emigration ratio" as a measure of migratory readiness different from that used in radar studies. Basically, the emigration ratio for an area is the number of birds initiating migration on a night relative to the total number of birds present. This study concerned only European Robins. Surprisingly, initiation of migration was independent of wind direction, contrasting markedly with radar studies, virtually all of which emphasize the role of wind direction on the magnitude of migration. The implication of these results is that the effect of wind is manifest after birds have initiated migration, an intuitively pleasing interpretation since surface winds can differ significantly from those at altitudes where most birds migrate. Alternatively, movements from a small island such as Hjelm may reflect limited access to a needed resource and not migration, per se. The emigration ratio was only slightly correlated with the number of birds on the island, arguing against such an interpretation.—Verner P. Bingman.

3. Effects of alpine topography and winds on migrating birds. B. Bruderer. 1978. *In* Animal Migration, Navigation, and Homing, K. Schmidt-Koenig and W. T. Keeton (eds.), p. 252–265. Heidelberg, Springer-Verlag.—Radar tracks of migrants passing through the Alps show that the principal direction of movement parallels the main ranges, independent of flight altitude. This results in migrants moving along a more E–W oriented flight axis than that observed outside the Alps, suggesting a leading line effect. This conclusion is strengthened by the observation of migrants flying similar directions in winds blowing toward seasonally inappropriate directions, the birds presumably compensating for the effects of wind. Visual contact with mountain ridges was apparently not necessary for migrants to parallel them. However, individual bird tracks recorded clear effects of local topographic features when they were visible. These results render any interpretation of the general behavior of migrants through the Alps speculative at this time.—Verner P. Bingman.

4. Bullfinch dispersal and migration in relation to fruit bud damage. D. D. B. Summers. 1979. *Brit. Birds*, **72**(6): 249–263.—Data from ringed Bullfinches (*Pyrrhula pyrrhula*) indicate that from 1910 to 1960 populations from the Weald of Kent were sedentary. During the winter of 1961–1962 and in later years a small proportion of the Bullfinches showed irruptive dispersal. Recovery data show an interesting pattern of age and sex differences during autumn and winter movements. Apparently more adult males move farther than adult females and more first-year birds move farther than the adults. The three winters of most movement corresponded to a depleted winter food supply (ash seed) and to damage of orchards by Bullfinch.—Patricia A. Gowaty.

5. Characteristics of Peregrine Falcons migrating through central Alberta, 1969–1978. D. Dekker. 1979. *Can. Field-Nat.*, **93:** 296–302.—From 1968 to 1978, 226 migrating Peregrine Falcons (*Falco peregrinus*) were sighted in spring in central Alberta; 27 falcons were sighted in fall. Most migrant falcons passed through the study area between 4 and 23 May with adults preceding immatures by about a week. Males constituted less than 40% of the migrant falcons. The consistently small proportion of males among migrant Peregrine Falcons (Ward and Berry, *J. Wildl. Manag.*, **36:** 484–492, 1972; Hunt, Rogers, Slowe, *Can. Field-Nat.*, **89:** 111–123, 1975) suggests that the sex ratio may actually be unbalanced. Certainly the problem merits further study. Migrant falcons arrived from the S and departed to the NNW. Wind speed and direction near the ground had little influence on arrivals and departures, but here, as with directional information, quantitative data are lacking. Soaring was a common mode of progression, but no information is given on frequency and duration of different modes of flight. The study is an excellent qualitative description of the migratory habits of the species, but many unanswered questions remain.—Edward H. Burtt, Jr.

6. Pigeon navigation: effects upon homing behaviour by reversing wind direction at the loft. P. Ioalé, F. Papi, V. Fiaschi, and N. E. Baldaccini. 1978. *J. Comp. Physiol. A*, **128:** 285–295.—This paper reports a more refined and elaborate application of a technique first reported by Papi et al. (*J. Comp. Physiol. A*, **94:** 187–193, 1974). Three elongate corridors aligned parallel to the prevailing westerly winds near Pisa were used. When winds blew from the W or E, one group of pigeons in a closed corridor was exposed to fan-generated winds from that direction, whereas another group was presented with air blown from the opposite direction. When winds blew from other directions, the fans were inactive. A third group in a corridor with screen ends experienced natural winds from the two experimental quadrants whereas a fourth group was never exposed to natural or artificial winds. When released along the axis of prevailing winds, the olfactory hypothesis predicts that the two fan groups should initially fly in opposite directions with the first group homeward oriented. Birds exposed to natural winds should orient homeward and those never exposed to winds of any kind should fly off at random. In general, the results were consistent with these predictions: in five of eight releases the second experimental group did tend to fly more or less away from home (random in the three other cases); experimentals from the first group and the control group that experienced natural winds were homeward oriented in every case; birds shielded from all winds were statistically random in four releases, although they showed a strong tendency toward bimodality along the homeward axis. These experiments are perhaps the clearest in implicating some wind-related factor in the observed effects on initial orientation. Odors are not definitely implicated as the cause of the observed differences, but they seem the most likely possibility.—Kenneth P. Able.

7. Do American and Italian pigeons rely on different homing mechanisms? F. Papi, W. T. Keeton, A. I. Brown, and S. Benvenuti. 1978. *J. Comp. Physiol. A*, **128:** 303–317.—I have frequently reviewed the dramatic results of experiments on the role of olfaction in pigeon homing performed at Pisa; I have also called attention to several largely unsuccessful attempts to repeat these experiments by Keeton's group at Cornell. During the summer of 1977, a series of collaborative studies was conducted at Ithaca with Cornell pigeons. Many of the standard Papi experiments were performed with the following results: (1) olfactory nerve section—two releases performed using pigeons with one nerve sectioned and the opposite nostril plugged. No significant differences in initial orientation; in one release experimentals had poor homing success. (2) nasal tubes—two releases from familiar and two from unfamiliar sites. Results variable; one group of experimentals had poorer homing performance from unfamiliar site. (3) masking odor—α-pinene used in seven releases of birds whose nostrils were also plugged during transport. Results variable with no significant differences. (4) anosmic transport—two types of experiments performed, one with birds with nostrils plugged, the other with birds transported in aluminum containers supplied with bottled air. No clear directional trends, but once again experimentals showed significant decrements in homing speed. (5) detour experiments—in two of four releases a significant difference in the predicted direction

was found between the two groups. The results of deflector cage experiments were described in a separate paper (see review **8**). Overall, these results were less than successful replications of the work of Papi et al. with Italian pigeons. The reasons for this are not clear and the Pisa and Ithaca investigators were unable to reach consensus as to the interpretation of the results: the paper was published with separate discussions by the two groups. Keeton and Brown concluded that major differences in the homing behavior of Cornell and Pisa pigeons must exist because no consistent effect of olfactory deprivation on initial orientation has been found at Ithaca. Papi and Benvenuti state that no major differences were apparent. The weight of evidence favors, although not unequivocally, Keeton's interpretation that the frequently poorer performance of experimentals may have nothing to do with navigation per se, but simply reflects a diminished motivation to home due to trauma or interference with respiration.—Kenneth P. Able.

8. Homing pigeon orientation influenced by deflected winds at home loft. J. A. Waldvogel, S. Benvenuti, W. T. Keeton, and F. Papi. 1978. *J. Comp. Physiol. A,* **128:** 297–301.—This paper reports the most clear-cut positive results of the collaborative studies described in the preceding review. Pigeons were housed in standard Papi deflector cages (see previous review) for six weeks beginning at 4–7 weeks of age. The birds had no prior homing experience and releases were performed at distances of 16–20 km. Vanishing bearings were significantly oriented in four releases. In each, the predicted geometric relationship between clockwise- and counterclockwise-expected groups obtained and the two experimental groups differed significantly in three of the four. The deflections were not as great as those usually seen in the Italian experiments and the deflector cage groups often did not differ in directionality from the controls. In general, these results support the earlier results from Papi's group (Baldaccini et al., *J. Comp. Physiol. A,* **99:** 177–186, 1975) and Benvenuti and Papi interpret them in that light. It is important to note, however, that this paradigm (as well as the detour experiment) does not unambiguously test the olfactory hypothesis. Odors reaching the birds from altered directions may be responsible for the shifts in initial headings, but other potentially relevant orientation information (e.g., sun position and polarization patterns) is apparently also altered by the cages.—Kenneth P. Able.

9. The timing of arrival and departure of the Spotted Redshank *Tringa erythropus* in Finland. O. Hildén. 1979. *Ornis Fenn.,* **56:** 18–23.—Spotted Redshanks keep to a migration calendar more closely than other breeding birds of northern Europe. Hildén proposes that it is thus an "instinct migrant" with a time schedule controlled by an internal annual rhythm. The time of departure does vary a few days from year to year, with earlier departures in warmer summers. Why? Also, why elaborate on instinct and internal clocks without conducting any experiments?—Robert B. Payne.

POPULATION DYNAMICS

(See also 5, 19, 24, 36, 44)

10. Recent changes in forest bird populations in northern Finland. O. Järvinen and R. A. Väisänen. 1978. *Ann. Zool. Fennici,* **15:** 279–289.—The two authors of this paper have extensively refined methodology of the line transect as bird population estimators of northern European birds. Using these methods they have been able to compare population estimates with dates from various years between 1943 and 1977. The years were lumped into three periods, 1942–1949, 1952–1963 and 1973–1977. They found changes of two basic types: within habitat and in the amount of suitable habitat. Habitat changes (clear-cutting of old pine forests) may have been responsible for changes in species such as *Perisoreus infaustus.* Within-habitat changes were more critical in the majority of common species. *Parus cristatus* and *P. montanus* have decreased while *Turdus iliacus* and *Muscicapa striata* have increased. Within-habitat changes may be linked with changes in forest structure that affect winter resources or with habitat expansion resulting in increases due to increases in forest edge, in brush layer of the forest and in the number of trees of young age classes.—C. M. White.

11. Estimating relative densities of land birds by point counts. O. Järvinen. 1978. *Ann. Zool. Fennici,* **15:** 290–293.—In Europe three methods are widely applied for censusing breeding land birds: mapping, line transects, and point counts. Mapping requires eight or more visits to well defined study plots. Line transects are planned so that all habitats of a large region are included in their true proportions. Point counts are based on 5 to 20-min stops during which birds observed are recorded. It is desirable to compare results obtained from the three methods. Some experimental data are available on the efficiency of line transects compared with mapping. Meaningful comparisons between point counts (mainly Swedish) and line transects (mainly Finnish) are difficult. This paper presents a simple method by which the two may be roughly compared. Järvinen suggests that transects are more accurate than point counts.—C. M. White.

12. On the relationship between avian clutch size and life span. E. Haukioja and T. Hakala. 1979. *Ornis Fenn.,* **56:** 45–55.—The trade-off between birth rate (clutch size) and survival rate of adult birds is a broad target for biophilosophers. This paper muddles through and misses the mark. The authors conclude that the concepts of "natural selection" and "fitness" are obscure, and practical problems prevent us from following the survival of individual birds with different breeding histories. They state that "Our analysis produced the following *a posteriori* goal for organisms: maximal probability of bridging gaps in time." As a paper in a double issue of *Ornis Fennica* dedicated to L. von Haartman, the paper would have been a more appropriate contribution had some analysis of data from bird populations actually been presented. In contrast to Stearns' (*Ann. Rev. Ecol. Syst.,* **8,** 145–173, 1977) thoughtful and critical review of life history traits, the authors do not emphasize the importance of testing predictions from natural selection theory within a population, and they are essentially pessimistic about the possibilities of developing testable hypotheses or of finding out what we want to know. As they remark regarding the evolution of individual adaptability in clutch size, "the chances of obtaining such material are very slight."—Robert B. Payne.

13. Population cycles in the Tetraonidae. A. Watson and R. Moss. 1979. *Ornis Fenn.,* **56:** 87–109.—A review essay of the causes of population cycles in grouse applies the authors' explanation of cycles of Red Grouse (*Lagopus lagopus scoticus*) to other grouse species. Red Grouse respond to high density by changing their territorial spacing behavior, and as a result the dispersal of grouse in summer and the over-winter mortality act to regulate population size. Research by the authors has shown that birds unable to obtain good territories in autumn suffer high mortality in winter, and young birds disperse to avoid competition for local territories and to find unoccupied areas. Some grouse populations are noncyclic, some are sometimes cyclic and at other times not. Some cycle in 3–4, 6, or 10 years. Some species are not territorial except for holding small mating territories in the breeding season, and some grouse populations change their numbers dramatically with cold or wet weather, predators, food shortage, diseases, vegetation changes, or other causes extrinsic to the populations. The authors discuss all these problems, then conclude that changes in spacing behavior that occur at high density provide the most useful general explanation of changing numbers in grouse. Other factors such as food shortage or predation may cause large losses of eggs and young before winter, so the effects of spacing behavior may not always come into operation.—Robert B. Payne.

14. On changes and the rate of fluctuation of populations of small birds: a five year study in central Europe. (Über Bestandsentwicklung und Fluktuationsrate von Kleinvogelpopulationen: Fünfjährige Untersuchungen in Mitteleuropa.) P. Bergtold and U. Querner. 1979. *Ornis Fenn.,* **56:** 110–123.—Are populations of small breeding birds declining in northern Europe? Analyses of numbers of birds caught by standardized techniques at three trapping stations in Germany and Austria suggest declining trends in most species. Species showing the most consistent declines were the Great Reed Warbler (*Acrocephalus arundinaceus*) and Bluethroat (*Luscinia svecica.*). The authors calculate a mean rate of change from year to year as 38% (from coefficients of variation), and they estimate that "stable" bird populations probably fluctuate around 20–30% of their long-term means.

The statistical analysis in this report is deplorable. Data were taken from only five years, but for each set of numbers a linear regression is calculated—standard statistical trend analysis requires more than five sample points for any tests of significance to be meaningfully applied. Also, the authors lump trapping sites in some analyses, although the numbers of birds trapped sometimes varied more than 2,000% between sites. The data (trappings of over 100,000 individuals!) simply are not sufficient to test the authors' hypotheses of long-term population trends. Adequate data would involve using more census sites and more years.—Robert B. Payne.

NESTING AND REPRODUCTION

(See also 30, 34, 37, 49)

15. Is nesting success of birds low in the tropics? Y. Oniki. 1979. *Biotropica,* **11:** 60–69.—According to this study, earlier reports of low nesting success in tropical birds were probably an artifact caused by human activities. The data indicate that in a relatively undisturbed forest habitat, where large predators still exist, nest success is greater than in open areas and greater than reported in most earlier studies. Cup nests were less successful than open nests. The author predicts low nest mortality rates in natural forests that have both large and small predators, but higher rates in forests where human activity or island biology effects have eliminated the large predators that normally control populations of small predators. Additional circumstantial evidence for low rates of nest predation include the long incubation and nestling stages of most tropical forest birds. Much study is needed in various habitats within the tropics to determine the "natural" rate of nest mortality. This paper should stimulate research in that direction.—Robert C. Beason.

16. Nightjar habitats and breeding in East Anglia. R. Berry. 1979. *Brit. Birds,* **72**(5): 207–218.—Berry reports breeding data from 1968–1977 on Nightjars (*Caprimulgus europaeus*) whose numbers are declining due to woodland succession (destruction of breeding habitat), climatic change, and human disturbance. Most observations of breeding Nightjars are consistent with Lack's earlier reports on Nightjar breeding. Male Nightjars were never found in charge of the young even when a pair was double-brooded as Lack reported earlier. Eighteen nests were observed. The optimum nesting habitat is within an area where silver-birch scrub is expanding across open heathland.—Patricia A. Gowaty.

17. Peregrines at a Welsh coastal eyrie. A. Parker. 1979. *Brit. Birds,* **72**(3): 104–114.—This intimate account of the family life of Peregrine Falcons (*Falco peregrinus*) based on 496 hr of observations at a single eyrie from late May until the end of June 1973–1975 contains notes on breeding, timing of developmental events, female and male parental duties, and predation by peregrines, in addition to drawings of particular behavioral patterns.—Patricia A. Gowaty.

18. Nesting biology and development of young in Ontario Black Terns. E. H. Dunn. 1979. *Can. Field-Nat.,* **93:** 276–281.—Black Terns (*Chlidonias niger*) typically return to former breeding marshes where the nest is placed on floating debris in moderately dense, emergent vegetation growing in about 1 m of water. If suitable nest sites are unavailable, Black Terns readily seek more suitable marshes. Success is remarkably low; only 15 of 55 (27%) nests hatched one or more eggs. Measurements of chicks include weight and length of tarsus, culmen, ulna, skull, and feathers. Black Tern chicks develop more rapidly than chicks of other species of terns, but an adult Black Tern is smaller than adults of other species of terns and comparisons of growth in relation to asymptotic weight suggest that the Black Tern's growth rate is typical of birds its size.—Edward H. Burtt, Jr.

19. The age of breeding in the Stubble Quail. H. J. deS. Disney. 1978. *Corella,* **5:** 81–84.—The author presents circumstantial field evidence of *Coturnix novaezealandiae pectoralis* breeding at ages of less than four months, facilitating rapid population increase under favorable weather conditions.—C. J. Ralph.

20. Influence of age and habitat on reproduction by the American Goldfinch. A. L. A. Middleton. 1979. *Ecology*, **60:** 418–432.—The American Goldfinch (*Carduelis tristis*) can now join the ranks of those species for which the most productive clutch size (6) is not the commonest clutch size (5) as Lack originally postulated. Middleton's work over eight successive years in natural old field-shrub-woodlot habitats and fewer years in nursery and city habitats not only contradicts Lack's hypothesis, but also shows that an array of factors interacts to cause variations in clutch size and nesting success. As is commonly the case among passerines, clutch size is larger for females after their first year than for females breeding their first time. Middleton suggests that this is due to the inability of inexperienced birds to rear large numbers of young rather than a physiological limit on the number of eggs that the female can lay. Some support for this suggestion comes from the data in that, for all nests, the age of the male has a significant influence on fledging and nesting success. Clutch size and fledging success also varied with habitat. Reasons for the variation potentially include age of the females choosing each habitat type, differences in predators and predation rates between habitats, and the absence of cowbird parasitism in the city habitat. Considering the impressive amount of data summarized by Middleton, I wish he had found a way to perform a multivariate analysis and thereby identify the most critical factors producing the many isolated patterns noted.—A. John Gatz, Jr.

21. Initial investment, clutch size, and brood reduction in the Common Grackle (*Quiscalus quiscala* L.). H. F. Howe. 1978. *Ecology*, **59:** 1109–1122.—This study is a provocative mix of modern "selfish gene" theory with classical "Lackian" views on brood size adjustment. Unlike Common Grackles laying small clutches (2 to 4), parents of large broods (5 or 6 eggs) do two things that seem contradictory: they produce larger eggs later in the laying sequence and they commence incubating before the end of laying, leading to an asynchronous hatch. The size increase is a true addition of albumen and yolk stores, not just water. Thus the later-hatched chicks have some physical advantages (parental investment in the form of extra nutrients) to help compensate for the temporal disadvantages of hatching in the company of older, competitive siblings. Howe interprets this as parental "bet-hedging," behavioral and physiological adaptations by which the maximum number of chicks is maintained as long as food supplies last, followed by brood reduction (via starvation) if necessary. An especially nice feature of Howe's discussion is that he repeatedly draws attention to the ways *individuals* are involved in the brood reduction system. This contrasts with much of the extant literature that traffics heavily in population averages. Since natural selection deals far more potently with individuals than with populations,this makes good sense.—Douglas W. Mock.

22. Notes on the nesting of three common tanagers in French Guiana. (Notes sur la nidification de trois tangaras communs en Guyane Française.) J. Ingels. 1978. *L'Oiseau et R. F. O.*, **48**(2): 107–114. (In French with English summary.)—Ingels describes habitats, nests, behavior in defense of the nest, and other aspects of breeding biology observed in August and September 1974 for Blue-grey Tanager (*Thraupis episcopus*)—2 nests, 1 with eggs, the other with young; Palm Tanager (*T. palmarum*)—adults with a fledgling; and Silver-beaked Tanager (*Ramphocelus carbo*)—4 nests, 1 with eggs, the rest empty. Although anecdotal, the observations are useful because information on the birds of French Guiana is scarce.—Paul B. Hamel.

23. Why do songbirds lay their eggs early in the morning? (Warum legen Singvögel (Passeres) ihre Eier am frühen Morgen?). L. Schifferli. 1979. *Orn. Beob.*, **76:** 33–36.—In the House Sparrow (*Passer domesticus*) the egg membranes are formed in the afternoon and the calcareous shell at night. As a result, the egg is ready for laying about 2 hr before dawn. The advantage of this arrangement is that because the egg is most susceptible to damage during the period when the shell is being formed, the best time for shell formation is when the bird is inactive—at night.—Robert C. Beason.

24. Population dynamics of the Garden Warbler *Sylvia borin* in southern Finland. T. Solonen. 1979. *Ornis Fenn.*, **56:** 3–12.—In an area of 27 ha a "population" of 21–26 pairs of warblers was studied for several years. More than half the nests were successful; most failures were due to predation. About 71% of eggs hatched, and 46% of eggs pro-

duced a fledgling. Mean success of young fledged per female per year was 3.3. Some individuals chose nest sites several hundred m apart in successive years. Local movements were probably responsible for the very low local recovery rates of ringed birds (25% for males, 6% for females). This result points out the need to census a sufficiently large area to find returning banded birds. The movements of the warblers in this study do not allow an analysis of their "population dynamics," although some aspects were adequately covered.—Robert B. Payne.

25. Breeding seasons of birds in deciduous woodland at Zimbabuc, Rhodesia, from 1970 to 1974. C. J. Vernon. 1978. *Ostrich,* **49:** 102–115.—This is a good study of 1,645 nests of 71 species. The author documents a correlation between low rainfall the previous season (resulting in delayed leaf flush of leguminous trees) and the delayed breeding of several of the species. The described system, and others like it, would seem to be amenable to experimental manipulation, e.g., through artificial watering of tracts of land. This could provide information on cause and effect relationships between bird and habitat.—C. J. Ralph.

26. Egg chilling and the thermal environment of the Fork-tailed Storm Petrel (*Oceanodroma furcata*) nest. N. T. Wheelwright and P. D. Boersma. 1979. *Physiol. Zool.,* **52:** 231–239.—Considerable interest has been shown recently in the dynamics of incubation. The present paper contributes to that trend by describing the thermal environment of a species whose eggs and chicks are often unattended because of the great distance adults must travel to forage. Egg temperatures during incubation never exceeded 27.5°C and averaged far less when periods of neglect are included. This is considerably below incubation temperatures of other species and the authors suggest that biochemical adjustments may permit development at low temperatures. Chick temperatures were sometimes as low as 12°C during the first week after hatching. The nests were relatively simple and provided little insulation. The poor nest environment apparently contributes to the length of the developmental period and may be a major factor in mortality of the young.—C. R. Blem.

27. Altitudinal difference in breeding schedules of Golden Plovers *Pluvialis apricaria* (L.) in South Norway. I. Byrkjedal. 1978. *Sterna,* **77:** 1–20. Here is further documentation of behavioral adjustments that facilitate breeding by the same species under different environmental regimes. Adjustments similar to those discussed here have been shown in some passerines (e.g., Lapland Longspur) and other nonpasserines (e.g., Peregrine Falcon) and usually involve some delay in the onset of egg laying or compression of the length of courtship behavior independent of a photoperiod influence.

Golden Plovers breeding at 300 m altitude in southern Norway were compared with those breeding at 1,300 m altitude on a study plot about 2° Lat. farther north. On the southern plot the breeding population arrived in March–April when ground was essentially snow free. At the higher site the plovers arrived a month later, when the ground was still snow covered. Whereas the birds on the lower elevation sites began laying within a month of arrival, birds at the high elevation site not only arrived later but delayed onset of laying for over a month. The onset of laying after the longer delay correlated with the intense snow thaw.

With these data at hand the author discussed the effect of the amount of snow to bare ground on predation rates and also the effect of snow on the emergence of major insect food fauna. Despite the protracted periods of breeding at the higher site, the molt schedules were essentially the same; thus, plovers at the lower elevation had independent young at the onset of the molt while birds at the high elevation had just finished egg laying. Such a situation would be a prime target for a study on energy balance and budget. Someone should pursue it.—C. M. White.

28. On breeding of the Booted Warbler in Zeravshan River lowlands. (Ot razmnozhenii bormotushki yuzhnoi (*Hippolais caligata rama* Sykes) v nizovrakkh reki Zeravshan.) S. Bakaev. 1978. *Vestnik Zool.,* **1978**(6): 31–35. (In Russian.)—Bakaev presents data on 20 nests of the Booted Warbler found 10–60 cm above the ground in shrubbery, mostly in desert oases. Only females built nests; males stood guard and furnished some

material. Construction time was 2–6 days; egg-laying, 3–6 days for 3–5 eggs per clutch; incubation, 12–13 days. Average nest proportions were, height, 82 mm; diameter, 85 mm; depth of cup, 45 mm; diameter, 42 mm (based on 20 nests). Of 39 nests, 21 had 4, 7 had 5 and 11 had 2–3 eggs. Of 69 eggs, the mean weight was 1.27 g; length 16 mm, width 12 mm. All young in a brood hatched on the same day, after about 13 days incubation. They were naked, blind, with the ear closed, and the oral cavity had two well marked dark patches. On the 3rd day the eyes and ears opened. The young grew rapidly from 4–10 g in 10 days. The young fledged at 11–13 days. Thermoregulation was established at 8 days of age. Of 56 eggs, 23 hatched and 15 young fledged. The low success was attributed to the availability of open nests to raptors.—Leon Kelso.

BEHAVIOR

(See also 27, 35, 41, 50)

29. Display and nesting behavior of the Relict Gull (*Larus relictus*) on Barun-Tor Lake. (Demonstratsionnoe i gnezdovoe povedenie reliktovoi chaiki [*Larus relictus* Lonnb.] na ozere Barun-Torei.) V. Zubakin. 1979. *Byull. Mosk. Obshch. Ispyt. Prirody Biol. Div.*, **84**(2): 15–20. (In Russian with English summary.)—Despite many published accounts, the Relict Gull remains taxonomically controversial. Neither the authorities originally suggesting its existence, nor those observing and collecting it in areas where it has been found agree on its distinctive features. The known behavior of the Relict Gull includes: oblique-cum-long-call, upright, choking, jabbing, threat at close distance, mew call, facing away, and head tossing. The most distinctive and trenchant feature claimed for this species by Zubakin is its frequent brood cannibalism on its own young.—Leon Kelso.

30. Functions of display flights by males of the Least Sandpiper, *Calidris minutilla* (Vieill.), on Sable Island, Nova Scotia. E. H. Miller. 1979. *Can. J. Zool.*, **57**(4): 876–893.—Pitelka et al. (*Am. Zool.*, **14:** 185–204, 1974) reviewed the social organization of arctic sandpipers and noted the sparse knowledge of their spacing systems. Miller, by intensive study and mapping of display flight areas and nesting sites of the Least Sandpiper on Sable Island, has filled the gap in our knowledge for one species. The display flights of the male are performed to attract the attention of the female, and females apparently choose a mate that displays over preferred nesting habitat and defends it as his territory. Display flights are only rarely over suitable brood rearing or foraging areas, so after nesting both parents and chicks move to communal, undefended locations as is common in other northern scolopacids.—A. John Gatz, Jr.

31. Territory regulation, tenure, and migration in Rufous Hummingbirds. C. L. Gass. 1979. *Can. J. Zool.*, **57**(4): 914–923.—Gass has been studying territoriality in Rufous Hummingbirds (*Selasphorus rufus*) for years, and this paper provides information on one more aspect of their territorial behavior: how is territory size regulated? Unfortunately for those who like clear-cut explanations, Gass' analysis is replete with negative results. True, territory size varies inversely with food density, but the strength of the relationship varied from 30% to 70% in the two years of this study for unknown reasons. Length of stay of an individual bird on a territory was not related to the quality of that territory as might logically be expected, and arrival and departure dates of birds from the meadow were randomly distributed in time. Significantly, age (adult vs. immature) and sex of the hummingbirds influences the length of stay, and individual birds make daily adjustments in the size, shape, and position of their territories. For at least one bird, these adjustments resulted in a gain in territory quality (number of inflorescences per m^2). As Gass states, the interactions in the alpine meadows have implications for the migratory patterns of Rufous Hummingbirds, but many more seasons of observing those migrants and perhaps performing the manipulations Gass suggests are necessary before definite conclusions can be drawn.—A. John Gatz, Jr.

32. Territoriality and site tenacity of Temminck's Stint *Calidris temminckii*. O. Hildén. 1979. *Ornis Fenn.*, **56:** 56–74.—A breeding population on the west coast of Finland was studied for 10 years. Males were territorial and territorial behavior seemed to limit population size, although no experiments and no yearly differences in behavior are de-

scribed that would account for the yearly changes in population (27 adults to 33–36, then a decline to 15). The population was very dense with up to 40 males/10 ha. Males usually reoccupied the same territories in later years.

Hildén claims that central males usually reoccupied, while marginal males tried to establish new territories in or closer to the "optimal" area. The study area, however, was a long peninsula seldom more than two territories wide and the only habitat differences mentioned for "central" vs. "marginal" areas was the presence of horses in the "central" area. Were the central areas "optimal" in terms of breeding success, nesting sites, or some other feature independent of the male site fidelity? Young males sometimes took over a "central" territory, but some were forced to the margins or went without a permanent territory. Females appeared less attracted to their previous nesting site. Young birds returning to their birth area did not tend to settle near the territory where they were born. The long-term population study is admirable, but I wish the author had discussed individual characteristics of each bird (e.g., previous year's success, social factors involved in "central" position) that would explain the differences in behavior of the individual birds.—Robert B. Payne.

33. Mate selection in the Great Tit *Parus major* in relation to age, status and natal dispersal. P. J. Greenwood, P. H. Harvey, and C. M. Perrins. 1979. *Ornis Fenn.*, **56:** 75–86.—Long-term observations in Wytham Woods, England, are revealing the population structure of banded tits. In a series of papers the authors have determined the degree of dispersal and inbreeding in this population. Analysis of mate combinations in the present paper showed that most (67.5%) first-year males were paired with first-year females, but only 43% of first-year females were paired with first-year males. Also, 34.6% of older males were paired with first-year females, and 16% of older females were paired with first-year males. So the average age of the mate was higher for females than males, and higher among older birds of both sexes. The average age of tits was greater for males in the breeding population; however, an undetermined number of first-year males were likely present but unable to find a mate. Details such as this must be worked out for a picture of how the mating structure may depart from one expected at random.

Older birds, re-pairing after the death or divorce of a mate, did not pick older mates than did birds breeding for the first time. Also, most birds tend to keep their mate from year to year if both are alive (in spite of a 30% divorce rate). Thus, the mate combinations in the population may simply reflect a different mortality rate of males and females (higher for females) and a mate selection independent of age but following the age structure of the population.

Tits breeding in Wytham come from two sources, residents born in the woods and immigrants from other local populations. Females disperse farther than males, on the average. A result of this differential dispersal is that resident females are likely to pair with resident males. This effect does not occur in males, perhaps because there are fewer resident females in the local population, or perhaps females choose among the males, but males mate with any female they can get. The resulting tendency for assortative mating of behavior types (residents pair with residents, and immigrants with immigrants) may have evolutionary consequences. What behavioral cues the birds may use in mate choice are not known.

The median bird disperses 6.6 territories from its birth site to its first mating site. It is likely that members of a pair almost always are born a number of territories away and so are not siblings or other close relatives. The authors suggest that the limited local dispersal and an ability to distinguish similar and dissimilar birds (resident vs. immigrants) may be a behavioral means of "optimally outbreeding," avoiding any depressing genetic effects of inbreeding yet not breeding with a greatly dissimilar mate. It will take further work to test directly the idea that there is any "behavioural basis of inbreeding avoidance in wild birds based on the recognition of relatives," or to test directly the potentially racial hypothesis of the advantage of similar birds breeding together in a local area.—Robert B. Payne.

34. Behaviour of a Willow Grouse *Lagopus l. lagopus* at the nest. E. Pulliainen. 1978. *Ornis Fenn.*, **55:** 141–148.—A nesting pair of Willow Grouse was studied with a remote control field TV system. The hen was on the nest more than 94% of the time in

the continuous 24 hr daylight, and was active for 24 hr with settling, egg shifting, preening, and other movements. When the hen was off the nest in the laying and incubating stages, she was accompanied by the cock. During the hatching of the chicks the female was exceptionally active in preening, catching flying insects (or at least it made catching movements), and nest building movements. About 20.5 days elapsed from laying of the last egg to the hatching and departure of young from the nest.—Robert B. Payne.

ECOLOGY

(See also 13, 20, 31, 32, 45, 70, 73, 74, 76, 80, 85)

35. Birds and army ants. E. O. Willis and Y. Oniki. 1978. *Ann. Rev. Ecol. Syst.* **9:** 243–263.—The paper synopsizes the current knowledge regarding birds that associate with army ants, including literature and thousands of hours of unpublished field observations by the authors. The ants themselves are probably not used intentionally as food by any bird. Instead the ant following species take other insects and invertebrates flushed by the foraging ants. Some species of ants are followed more than others and some species of birds are more likely than others to follow ants. The most dominant species of a foraging group is found in the zone closest to the ants and is usually a "professional" ant following species. More subordinate species and individuals occur with increasing distance from the best locations. Some species maintain fixed territories and never leave them. Others have territories for nesting and roosting (presumably) but may feed away from the territory for days. At this time they are subordinate to the resident individuals of the territory they are feeding on.

Tropical species of birds are usually ascribed high nest predation rates and low adult mortality rates. The recent findings of Willis and Oniki cast some doubts on these generalizations. Low clutch size may be the result of "too many fingers in the pie." The demographics of tropical species appear to be much more complex than was originally expected. Variations between locations appear, in some cases at least, related to human activities: killing large predators, clearing forest, etc.—Robert C. Beason.

36. Demographic and dietary responses of Red-tailed Hawks during a Snowshoe Hare fluctuation. R. S. Adamcik, A. W. Todd, and L. B. Keith. 1979. *Can. Field-Nat.*, **93:** 16–27.—A population of Red-tailed Hawks (*Buteo jamaicensis*) near Rochester, Alberta exhibits remarkable stability and reproductive persistence despite fluctuation in the number of Snowshoe Hares (*Lepus americanus*), its major prey. Annual productivity of the hawks was affected by nestling mortality. Adults brought less food when hares were scarce, but nestling mortality increased only when reduced food was associated with above-average rainfall. Because fluctuations in the rainfall are unpredictable, an accommodating reproductive strategy is unlikely to evolve.

The paper is an excellent description of the demographic response of predators to fluctuations in availability of prey, but the implications of their results are unexplored by the authors. For example, how can the population's reproductive success change without affecting population size? Many answers are possible, but the intriguing question of a stable population in the face of fluctuating productivity is never discussed.

In addition to the demographic focus of the paper I was surprized to learn that with hares and ground squirrels scarce, Red-tailed Hawks preyed on waterfowl. Suffering from the same scarcity of mammalian prey, Great Horned Owls (*Bubo virginianus*) became a major predator on young Red-tailed Hawks.—Edward H. Burtt, Jr.

37. Avian nest dispersion and fledging success in field–forest ecotones. J. E. Gates and L. W. Gysel. 1978. *Ecology,* **59:** 871–883.—The diversity of habitat edges, relative to homogeneous interior zones, has long been known to support higher avian population densities. In the present study of 21 open-nesting passerines in a Michigan field-forest ecotone, an "edge-effect" was demonstrated once again: over half of 194 nests (two seasons) were located within 15 m of the habitat interface. On the other hand, clutch-size tended to be smaller near the edge and nest-failure, especially the 60% attributable to predation, was higher there. At least in the study area, the potential advantage of swamping predators with alternative meals (Hamilton's "selfish herd" idea) was apparently over-

ridden by the attraction of more predators (chipmunks, jays, owls, snakes, and others) at the edge. The authors suggest that habitat discontinuities can thus function as "ecological traps," in that they provide all the normal physiognomic cues that mixed-habitat bird species seek. As a consequence, nests are concentrated and density-dependent mortality increases. Lest all this sound profoundly maladaptive on the part of the edge-loving passerines, the authors point out that most field edges are man-made and recent. Species presently favoring them may not have had time to evolve adaptive responses to the "ecological trap." But it is unclear why these birds would not have faced a similar trap effect in natural edges.—Douglas W. Mock.

38. Seasonal variation in feeding habits of Darwin's ground finches. J. N. M. Smith, P. R. Grant, B. R. Grant, I. J. Abbott, and L. K. Abbott. 1978. *Ecology*, **59**(6): 1137–1150.—Abbott et al. (*Ecol. Monogr.*, **47:** 151–184, 1977) reported on the ecology and feeding habits of Darwin's finches based on studies performed during the wet season when food is abundant. This follow-up report provides information on feeding by these species during the dry season when foods can be scarce. Four of the study sites from the first work were revisited and data were also gathered from one additional location. All results from the comparison of foods used and niche overlaps of coexisting species in the two seasons are consistent with the predictions of the theory of interspecific competition. Where food volume actually decreased, so did the number of finches and the overlap between each species and the rest. At all sites during the dry season, a significant tendency was found for species to specialize according to their morphological adaptations. Although in the assessment of Smith et al. here, theirs is not a truly definitive study on seasonal changes in food usage and shortcomings may exist with some of the data, it still is one of the most complete of the 11 similar studies they tabulate for review. Besides this, the paper offers the tantalizing promise of further results on seasonal selection in these finches based on a morphological comparison of birds that survive the dry season and those that do not.—A. John Gatz, Jr.

39. Selective predation on lumbricids by Golden Plover *Pluvialis apricaria*. S. A. Bengston and S. Rundgren. 1978. *Oikos*, **31**(2): 164–168.—**Optimal foraging and size selection of worms by Redshank, *Tringa totanus* in the field.** J. Goss-Custard. 1977. *Anim. Behav.*, **25**(1): 10–29.—These could be considered homage to the lowly worm. Earthworms *Allobophora caliginosa* and *Lumbricus rubellus* comprised about 90% by wet weight of the stomach contents of the Golden Plover. In the stomachs of 17 plovers, collected in June, an average of 6 worms per stomach was found. The smallest and largest individuals were preferred over the medium sized prey. Worm abundance was reduced by about 50% in repeatedly visited pastures. The plovers preferred *Allobophora* over *Lumbricus*.

For the Redshank, a species that foraged in shallow water and mud, Goss-Custard found similar avoidance of moderate sized worms. "Much attention has been focused recently on the idea that natural selection favors the most economic of alternative foraging patterns and that this has played a major role in the evolution of the foraging behavior of predators." Redshanks seemed to prefer foraging sites affording the highest rates of ingestion, although not concentrating in such areas because pressure of the many individuals reduces feeding rate through interference.—Leon Kelso.

40. The bird fauna of abandoned shore pastures. M. Soikkeli and J. Salo. 1979. *Ornis Fenn.*, **56:** 124–132.—Do bird populations change in response to alteration in the local vegetation? Grazed meadows were sampled through the 1960's and the same sites were sampled again in 1975 and 1976. The earlier short-cropped pastures were invaded in the interim by reeds, bushes, and trees. The main changes in birds were the local disappearance of ducks, decline of waders, and increase of passerines living in early stages of developing forest. Ringed Plovers (*Charadrius hiaticula*) and Dunlin (*Calidris alpina*) disappeared locally and three other waders declined. The authors conclude that changing vegetation was probably responsible by habitat selection for some changes in the birds, but they caution that other factors may have been involved, as for the Dunlin in which numbers dropped due to years of poor reproduction caused by increased predation from crows and gulls.—Robert B. Payne.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(See also 11, 80, 84)

41. Characteristics of Ruffed Grouse drumming sites in western Washington and their relevance to management. L. J. Salo. 1978. *Ann. Zool. Fennici,* **15:** 261–278.—This is an interesting and currently relevant paper because of the emphasis on multiple use concepts. However, one wonders if it might not have been published in a journal more readily known and available to North American game managers and foresters at the working level. Whereas some of the same management practices may apply to the Hazel Grouse (*Tetrastes bonasia*) or related galliformes in Finland or northern Europe, the paper is aimed rather narrowly at a specific endemic North American species in a local region. Some of the findings of the study were: mean number of drumming logs per territory was 1.83, mean coverage of forest crown was 62% and understory 52%, mean visibility radius from main drumming log was 15.5 m, and mean distance to nearest opening or edge was about 27 m. In addition to a selection of adequate habitat by the male grouse for drumming and other reproductive needs he is also strongly attached to a permanent territory. This territory size is about 16 ha in winter and 4 ha during the drumming season. Broods also stay within relatively small home ranges that may be about 13 ha. To provide forest characterized by adequately sized trees and to create a mosaic of small blocks of habitat that will increase population density, the author concludes that a 40-yr rotation scheme of Douglas fir stands is the best management technique.—C. M. White.

42. Wild Mallard stocking in a large marsh habitat. R. O. Bailey. 1979. *Can. Field-Nat.,* **93:** 55–62.—Hand-reared, female Mallards (*Anas platyrhynchos*) from wild stock returned to release sites later the next spring, nested later, and produced fewer broods than wild females. The failure of hand-reared Mallards to enter successfully the reproducing population calls into question the value of stocking programs. The data are convincing, but the explanation is often difficult to follow.—Edward H. Burtt, Jr.

CONSERVATION AND ENVIRONMENTAL QUALITY

(See also 10, 16, 62, 63, 69, 81, 85, 86)

43. Effects of industrial air pollution on wildlife. J. R. Newman. 1979. *Biol. Conserv.,* **15:** 181–190.—Industrial air pollutants have had a worldwide effect on both wild birds and mammals, often causing marked decreases in local populations. This paper reviews the existing information on these effects. It is time for us to start heeding the warnings of rampant environmental deterioration coming to us from those who study wild birds and mammals.—Paul A. Stewart.

44. The Pelicans' fate on the Volga Delta. (Sudba pelikanov v Delte Volgi.) G. Krivonosov, and D. Bondarev. 1978. *Byull. Mosk. Obshch. Ispyt. Prirody, Biol. Div.,* **83**(5): 42–48. (In Russian with English summary.)—Fluctuations in the population (ever downward) and locations of colonies of *Pelecanus crispus,* and *P. onocrotalus* from 1959 to 1975 are detailed. Recreational and industrial development of the Volga Delta are causes of unease for the pelicans' future.—Leon Kelso.

45. Seasonal differences in bird counts in forests near Reefton, South Island, New Zealand. D. G. Dawson, P. J. Dilks, P. D. Gaze, J. G. R. McBurney, and P. R. Wilson. 1978. *Notornis,* **25**(4): 257–278.—Beech forests in southern New Zealand constitute a small remnant of the natural forest that once covered the island. Counts made in four distinct types of forest showed that many species moved seasonally, using different areas to avoid adverse weather or food shortage. Evidently large areas of various types of forest are needed for the diversity of avian species. Proposals to exploit the forest commercially must take account of these seasonal shifts.—J. R. Jehl, Jr.

46. Problems in Kyzyl-Agach. (Problemy Kyzyl-Agacha.) G. Krivonosov, N. Morozkin, and N. Skokova. 1978. *Okhota i okhot. khoz-vo.,* **1978**(11): 14–16. (In Russian.)—The Kyzyl-Agach Nature Sanctuary and adjacent protected areas on the flat southwestern shore of the Caspian Sea used to be a major wintering area in the USSR for waterfowl,

and harbored, among other species, the endangered Red-breasted Goose (*Branta ruficollis*) and the only Soviet population of flamingos. As the level of the Caspian has fallen, the amount of open water and wetland in Kyzyl-Agach, and hence of protected wintering (and nesting) habitat, has diminished. Local agriculture has shifted to crops that attract fewer birds. Most deleterious of all, impoundment and release of fresh water by commercial pond fisheries nearby adversely affect the salinity and level of water in the sanctuary, and negotiations have failed to solve this problem. Consequently, wintering birds number only $^1/_{20}$ of what they did two decades ago, and the area favored now by the flamingos is unprotected. To enclose one of the bays and supply it with fresh water from a river is suggested as a partial solution.—Elizabeth C. Anderson.

47. Strategy and tactics for rare bird conservation. (Strategiia i taktika okhrany redkikh vidov ptits.) V. E. Flint. 1978. *Priroda,* **1978**(8): 14–29 (In Russian.)—Efforts to conserve animals (including birds) whose existence is threatened can be used to conserve animal life overall, and may be able to show us how to keep the list of rare and endangered species from growing. However, we cannot merely list "Most successful methods." Since the situation of each species is unique, the strategy and tactics devised to conserve it must also be unique.

Strategy has three aspects: organizational (inventory and census), scientific (comprehensive studies of the biology of rare species as the basis for measures to protect the animals and increase their numbers), and practical (putting such measures into effect). Inventory and census take the form of Red Data Books (every Soviet republic has one as well as a national one). The scientific aspects of strategy include: determining the geographic range and habitats, evaluating seasonal use of different areas, enumerating limiting factors, and determining reasons for species' decline. These four aspects can be ascertained by study of population dynamics; age, sex, and social structure of the population, diet, reproduction, mortality, and productivity. Human pressures on the species must be investigated, and techniques for captive breeding and maintenance and for reintroductions must be researched. The use of closely related but nonendangered species as "stand-ins" in preliminary studies is urged. Practical aspects include: legal measures (domestic and international) for protection of the species and regulation of trade and curtailment of collecting, habitat protection, captive breeding, revival of disappearing populations, germ cell banks, and educational work and citizen involvement.

As an example of species-specific conservation *tactics,* cranes are discussed. Morphologically and systematically closely related, these birds are ecologically different. The Siberian Crane (*Grus leucogeranus*), whose nesting habitat is relatively secure in the remote far north of Siberia, needs for protection international conventions with the countries where it migrates and winters more than it needs nature reserve status for its Soviet range. In contrast the Manchurian Crane (*G. japonensis*), already protected by international law and by tradition, lives in prime agricultural areas, where some land must be set aside for it.—Elizabeth C. Anderson.

48. The Sociable Plover. (Krechetka.) V. V. Khrokov. 1978. *Priroda,* **1978**(12): 92–96. (In Russian.)—Cultivation of the virgin lands of the USSR's Kazakh Republic is blamed for the decline over the past 30–40 years of *Chettusia gregaria,* the Sociable Plover. Spottily distributed in most of the Kazakh Republic, it is not found elsewhere as a nesting bird, although it wanders far on migration. Wintering grounds are in northeastern Africa, Iran, Iraq, northern India, and Pakistan. The Sociable Plover favors uncultivated, dry, clayey wormwood steppe or wormwood-sheep's fescue steppe with sparse vegetation and salt pans. Here on the shores of brackish lakes and the adjacent steppe it feeds on caterpillars, adult arthropods, and molluscs.

In appearance, this species resembles the Lapwing, but is slimmer and taller and colored brown, beige, and black. It nests in colonies of up to 30 pairs, usually fewer. Nests are built on the ground and lined with dry vegetation. Clutches vary from 2 to 5 eggs, each weighing about 30 g. Both parents incubate for about 3 weeks. Some pairs may raise two sets of young per year. The author never observed the fierce spring fights for which the males are noted, but did see a group of about 12 males flying at and retreating from each other, no bird suffering any injury.

The Sociable Plover is quite tolerant of humans and their associated activities, and suffers from loss of habitat to agriculture and from disturbance and destruction of nests by cattle and people. Increasing the area of the nature preserve where much of the population nests is urged.—Elizabeth C. Anderson.

PHYSIOLOGY

(See also 8, 9, 23, 26, 54)

49. Energy cost of incubation in the American Kestrel. J. A. Gessaman and P. R. Findell. 1979. *Comp. Biochem. Physiol.,* **63A:** 57–62.—Measurement of the metabolic rates of incubating male and female kestrels indicates that incubation may be accomplished while the adults are at resting metabolic levels. In the last five days of the incubation period, the contribution of the eggs themselves may amount to 19–25% of the total heat required. The authors provide interesting descriptions of metabolism of eggs and the relationship of metabolism to ambient temperature in nesting kestrels and have used methods that are original and imaginative. Although the number of kestrels tested is small, this paper should be read both by biologists interested in a general introduction to the "state of the art" and long-time students of avian metabolism.—C. R. Blem.

50. Hormone changes triggered by aggression in a natural population of blackbirds. C. F. Harding and B. K. Follett. 1979. *Science,* **203:** 918–920.—In the spring of 1976, examples of breeding (*Agelaius phoeniceus*) were trapped under two different conditions: (a) showing aggression toward a live decoy with playback of the male's advertising song and (b) trapped in an often-used feeding area. Blood was obtained promptly by cardiac puncture. Levels of 5α-dihydrotestosterone (DHT), testosterone, corticosterone, and luteinizing hormone (LH) were determined. A positive correlation between DHT and LH levels was found in aggressive males but not in foraging males. It is also shown that the mean level of LH is higher in foraging than in aggressive males and that the distribution of DHT levels differs between the two groups although the mean levels are not significantly different.—C. H. Blake.

51. Bioenergetics of larger passerines. 1. Rest and existence energy metabolism. (Bioenergetica krupnykh vorobinykh ptits. 1. Metabolizm i energiya sushchestvovaniya.) E. Gavrilov. 1979. *Zool. Zhurn.,* **58**(4): 530–541. (In Russian with English summary.)—Metabolism at 0°C and heat inductance at high and low temperatures are dealt with. Basic metabolism and thermoneutrality ranges were determined for 13 species: *Turdus iliacus, T. philomelos, T. merula, T. viscivorus, Nucifraga caryocatactes, Garrulus glandarius, Pica pica, Pyrrhocorax graculus, Coleus monedula, Corvus frugilegus, C. corone, C. ruficollis,* and *C. corax.* Body weights ranged from 57 to 1,203 g. Thermal conductance was found to range 5 to 7-fold during one season. This affords heat transfer control over a wide range of external temperatures and seasons without change of basal metabolism. The heat transfer system thus achieved is facilitated by shifting of feather positions. This maintains "an upper limit of thermoneutrality zone" at almost the same level characteristic of most other passerine species, 36°C.—Leon Kelso.

MORPHOLOGY AND ANATOMY

52. The Kiwi. B. Reid, and G. Williams. 1975. *Biogeography and Ecology in New Zealand.* G. Kuschel, ed. The Hague, W. Junk, *Monographae Biologicae,* **27:** 301–330.

The Kiwi. W. Calder. 1978. *Sci. Am.,* **239**(1): 132–142.—These are probably the most substantial modern accounts. "Whatever the true evolutionary history of Kiwis may be the end result is a bizarre flightless, nocturnal creature—tailless and bewhiskered and almost devoid of wings; and New Zealanders . . . knowing little about the bird and seldom seeing or even hearing it, nevertheless have a great affection for, and take pride in associating themselves closely with this unique avian enigma, now their national emblem." Despite its apparently reduced quantity, plumage accounts for 4–7% of the body weight, about equal to that of most other species of birds. Females are about 20% heavier than males with bills that are about 25–30% longer. Calder continues "When one adds to this list the kiwi's burrow habitat, its furlike body feathers, and its nocturnal foraging, highly dependent on

its sense of smell, the evidence for convergence (with mammals) seems overpowering." "For this behavior and for the many other reasons I have cited, I award this remarkable bird the status of an honorary mammal."—Leon Kelso.

PLUMAGES AND MOLTS

(See also 27, 52)

53. Ross's Gull in Alaska. M. Densley. 1979. *Brit. Birds,* **72**(1): 23–28.—Notes on the life history of Ross's Gull (*Rhodostethia rosea*) include descriptions of adult and immature plumages, migration and feeding flights and methods, interspecific feeding associations with Sabine's Gull (*Larus sabini*), and a credible functional explanation for the eye patches of Ross's Gull in winter plumage. The feathers of the eye patch have tips "that look like several individual, very fine, stiff black hairs, 3–6 mm long." Densley proposes that these stiff, hair-like feathers function to protect the eye from freezing spray encountered during feeding on or near the surface of temporarily open water in the arctic winter. He also suggests that these dark eye patches may reduce risk of damage to gull's sight from ice and water glare in much the same way as soot on the face works as a precaution against sun blindness in Eskimos.—Patricia A. Gowaty.

54. Experimental research on photoperiodic regulation of postnuptial molt in the Greenfinch (*Chloris chloris* L.). (Eksperimentalnoe issledovanie fotoperiodicheskoi linki obyknovennoi zelenushki, *Chloris chloris* L.) G. Noskov and E. Smirnov. 1979. *Zool. Nauki,* **1979**(3): 38–45. (In Russian.)—Postnuptial molt may occur during days with 12–18 hr of light. The short end of that range of daylight increased whereas the long end decreased the tempo of molt. At different stages of molt different light periods were required, with more hours of light at the start, and less light at the end. With 8–12 hr light days late in nuptial activity the Greenfinch passes into the winter stage without postnuptial molt; 18-hr and longer light days impede the conclusion of molt. These experiments indicated the independence of different stages of molt and some fluctuation in sensitivity to daylength during molt.—Leon Kelso.

ZOOGEOGRAPHY AND DISTRIBUTION

(See also 1, 4, 27, 45, 48, 82, 83, 84, 88, 89)

55. Birds and the Bering land bridge problem. (Ptitsy i vopros o beringiiskom coedinenii materikov.) A. Kishchinskii. 1979. *Byull. Mosk. Obshch. Isp. Prirody, Biol. Div.,* **84**(1): 5–12. (In Russian with English summary.)—Essentially here is a replay of a frequently discussed problem. The analysis of literature, 58 titles by 48 authors, and enumeration of birds concerned includes discussion of American species reaching but not ranging across the strait: *Branta canadensis, Calidris ruficollis, Passerculus sandvicensis,* and *Spizella arborea.* Also discussed are those palaearctic species that range through the Aleutians in spring: *Cuculus canorus, C. saturatus, Alauda arvensis, Turdus obscurus, Fringilla montifringilla, Coccothraustes coccothraustes, Pyrrhula pyrrhula,* and *Emberiza rustica.* Earlier affiliates to Alaska were *Limosa lapponica, Oenanthe oenanthe,* and *Phylloscopus borealis,* and to the palaearctic tundra, *Catharus minimus, Anser caerulescens, Calidris melanotos, Gavia pacifica, Limnodromus griseus,* and *Grus canadensis.* Kishchinskii stresses that occasional occurrences or even breeding instances are not sufficient proof of former range connections. The possibility of successive faunal links between Asia and North America has been discussed by Stegmann and others since 1936. In all it is concluded that evidence does not suffice to show the number and times of Bering land junctures in the past nor even the existence of such.—Leon Kelso.

56. Colonial-nesting Herring Gulls and Common Terns in northeastern Saskatchewan. H. A. Stelfox and G. J. Brewster. 1979. *Can. Field-Nat.,* **93:** 132–138.—Twenty-seven colonies of Common Terns (*Sterna hirundo*) and 11 colonies of Herring Gulls (*Larus argentatus*) were found in Reindeer Lake and its watershed in northeastern Saskatchewan. Colonies of terns averaged 16 nests in 1973 and 23 nests in 1974. Herring Gull colonies

were also small, 13 nests/colony in both years. Islands chosen as colony sites were small, usually less than 1,000 m, and low, usually under 3 m above water level.

Small colony size in northern, inland latitudes has been noted previously (e.g., Nero, *Can. Field-Nat.*, **69:** 93–116, 1955), but the latitudinal correlation remains unexplained. Are the colony-sites in this study a representative sample of islands or are they a biased sample chosen for particular characteristics? The article is an excellent descriptive study of colony-sites, but fails to explore interesting functional and ecological questions raised by the descriptive results.—Edward H. Burtt, Jr.

57. Radial dispersal of Wood Ducks after the nesting season and before fall migration. P. A. Stewart. 1979. *N. Amer. Bird Band.*, **4**(1): 1–3.—This study examines 164 recoveries made from three banding sites selected because they yielded reasonably large numbers of recoveries. The sites were in northern New York, extreme northeastern Iowa, and the northwestern corner of Louisiana. Only recoveries from birds that were (a) banded on the breeding grounds (i.e., banded during the breeding season April through August), (b) shot by hunters, and (c) with precise recovery times known were used. Also, only records of recoveries made prior to known migration times were used although the author suggests some migration may have been involved in recoveries from the northernmost site. This is the only site from which random dispersal was not clearly shown. The author concludes that dispersal of *Aix sponsa* is performed independent of migration and occurs throughout the breeding range (presumably the main breeding range with no records for the western population is examined). The possibility that rapid movement may characterize dispersal and leisurely movement typify migration is posed.—Richard J. Clark.

58. Dispersal and migratory patterns of San Francisco Bay produced herons, egrets and terns. R. Gill, Jr. and L. R. Mewaldt. 1979. *N. Amer. Bird Band.*, **4**(1): 4–13.—This report examines 144 recoveries that resulted from the 6,987 bandings of this study plus a few recoveries from additional bandings. These bandings represent 83% of the western North American bandings for the years 1971–1973 for the Great Blue Heron (*Ardea herodias*) 187, Snowy Egret (*Egretta thula*) 1,499, Black-crowned Night Heron (*Nycticorax nycticorax*) 1,615, Forster's Tern (*Sterna forsteri*) 2,943, and Caspian Tern (*Sterna caspia*) 743. The specific study locale was the South San Francisco Bay Estuary. Recoveries were separated into *direct* (i.e., of birds less than 11 months old and considered juvenile) and *indirect* or of birds greater than 10 months of age and considered adults. Recoveries from birds made in nonbreeding seasons or from southern California and Mexico were considered to be from *migrants*. All others from birds outside their natal 10-min block of latitude and longitude were treated as *dispersed* birds (dispersants?). Migration and dispersal recoveries are examined for randomness by chi-square analysis although the validity of this seems questionable in view of some small samples, and the two categories appear to be arbitrarily determined. Results are as follows. The Great Blue Heron population shows no evidence of migration, and philopatry (i.e., fidelity to the natal grounds) is suggested. Juvenile Snowy Egrets (some at least) tend to migrate but adults tend to be sedentary or migrate short distances. Dispersants of this species moved nonrandomly in directions leading to areas of appropriate habitat. Dispersal of Black-crowned Night Herons was nonrandom and along major water courses. Forster's Terns typically migrate southeasterly from the study area, and some dispersal to the north is noted. Caspian Terns exhibit a strong migratory tendency from the area with the west coast of Mexico being a major wintering area. Two recoveries of birds from Washington state and Alberta pose the possibility of long distance dispersal and perhaps leap-frog colonization.—Richard J. Clark.

59. Leach's fork-tailed storm petrel. P. Fooks. 1978. *Notornis* **25**(4): 278.—The second New Zealand record in April 1978. The bird was white-rumped; no racial identity was given.—J. R. Jehl, Jr.

60. Seabird observations between New Zealand and Fiji. T. G. Lovegrove. 1978. *Notornis*, **25**(4): 291–298.—Presented are notes on 33 species of seabirds observed during a yacht race between New Zealand and Fiji and return from 30 April–7 May and 22 May–

1 June 1977. Two plates picture various *Pterodromas* and storm-petrels in flight.—J. R. Jehl, Jr.

61. Some recent observations on seabirds breeding in Fiji. M. K. Tarburton. 1978. *Notornis,* **25**(4): 303–316.—The history and status of seabirds in the Fiji Islands is reviewed, with important supplemental data from observations in 1974–1976. Data are given by island and include information on breeding status and population size.—J. R. Jehl, Jr.

62. The distribution and numbers of New Zealand Falcons (*Falco novaeseelandiae*). N. C. Fox. 1978. *Notornis,* **24**(4): 317–331.—This paper summarizes the history and current distribution of the New Zealand Falcon, which is subdivided into three populations (good range maps are provided). The total species population comprises 3,000–4,500 pairs. The problem of interpreting data from untrained observers is treated nicely, and reports that the falcon may have decreased in recent years are due in part to technological changes in farming: one is more likely to see birds from a horse-drawn wagon than from a motorized tractor.—J. R. Jehl, Jr.

63. Nesting of sea birds in French Guiana. (Nidifications d'oiseaux de mer en Guyane.). M. Condamin. 1978. *L'Oiseau et R. F. O.,* **48**(2): 115–121. (In French with English summary.)—Condamin documents nesting of several species for the first time on islands off the French Guiana coast based on information gathered during explorations related to establishment of wildlife refuges. The species are Magnificent Frigatebird (*Fregata magnificens*), Laughing Gull (*Larus atricilla*), Sooty or Bridled Tern (*Sterna fuscata* or *S. anaetheta*), Royal Tern (*Thalasseus maximus*), Cayenne Tern (*T. eurygnathus*), and Common Noddy (*Anous stolidus*).—Paul B. Hamel.

64. Whooper Swans winter in Kamchatka. (Zimovka lebedei na Kamchatke.) A. Stenchenko. 1979. *Okhota i okhot. khoz-vo.,* **1979**(2): 12–13. (In Russian.)—Up to 5,000 Whooper Swans (*Cygnus cygnus cygnus*) occur from November through March on the Kamchatka Peninsula in the Soviet Far East, because it is an active volcanic region. The birds are fairly well distributed on the peninsula from the end of November to the beginning of December, when migration ceases and winter flocks are formed. From January through the beginning of February, however, the swans are found almost exclusively at hot springs; blizzards are frequent and all other water is frozen then. Beginning in mid-February they disperse again and show migratory restlessness; departures begin in mid-March.—Elizabeth C. Anderson.

65. Dispersal of Caspian Terns *Sterna caspia* in the Baltic. R. Staav. 1979. *Ornis Fenn.,* **56:** 13–17.—Banding of colonial seabirds has shown that some species return to the colony of their birth to breed, whereas others disperse to new areas. About half of the population of about 1,000 Caspian Terns breeding in Sweden have now been banded. Individuals were identified in breeding colonies by reading the band number through a telescope. About half of the birds identified bred within 10 km of their birth site, and a third within 11–200 km of their birth site. In a new colony nearly half the identified birds came from 43 km away; the others were from more distant colonies up to 500 km. Tern colonies in the Baltic thus frequently exchange birds and are not genetic isolates.—Robert B. Payne.

SYSTEMATICS AND PALEONTOLOGY

(See also 29, 84, 86)

66. The early bird. H. Koopmans, J. A. Lackey, B. Borowsky, and J. H. Ostrom. 1979. *Amer. Scientist,* **67**(3): 262–264.—These are three letters relative to Ostrom's article in the same volume (p. 46–56) and Ostrom's reply. Each of the first three writers rejects the view that the wing feathers were evolved as an insect catching device. The first two writers suggest that the feathered forelimbs aided in balancing the running bird, perhaps also contributing a little lift. Borowsky favors a role of these feathers during courtship by enabling the bird to leap into the air more easily. Ostrom points out that he considered the insect net use to be only in precursors of *Archaeopteryx.* In any event he rejects the Williston-Nopcsa "propeller into wing" hypothesis.—C. H. Blake.

EVOLUTION AND GENETICS

(See also 12, 33, 65, 66)

67. Song pattern of the Cypress Hills population of White-crowned Sparrows. M. R. Lien. 1979. *Can. Field-Nat.*, **93:** 272–275.—Fourteen male White-crowned Sparrows (*Zonotrichia leucophrys oriantha*) from the Cypress Hills of southeastern Alberta and southwestern Saskatchewan sing similar songs that differ dramatically from the songs of conspecific populations in the Rocky Mountains. Based on these data Lien suggests that the population in the Cypress Hills is truly isolated and exchanges few or no genes with populations within the main range of the subspecies. This is an impressive example of the power of thoughtful sonographic analysis.—Edward H. Burtt, Jr.

FOOD AND FEEDING

(See also 4, 35, 36, 39, 48)

68. Autumn predation of *Parus major* and *P. montanus* upon two leaf-mining species of *Lithocolletis* (Lepidoptera). J. Itamies and M. Ojanen. 1978. *Ann. Zool. Fennici.*, **14**(4): 235–241.—Of 21,145 leaves examined, 5,211 showed 10,591 channels. In autumn 1975, 18.9% were opened whereas 13.7% were opened in autumn 1976. Predation on leaf-miner larvae was evident only where 10% or more of a leaf was "mined."—Leon Kelso.

69. Winter predation by Goshawks in lowland Britain. R. E. Kenward. 1979. *Brit. Birds*, **72**(2): 64–73.—Radio-tagged Goshawks (*Accipiter gentilis*) were followed to obtain records of diet, their rate of predation on Woodpigeons (*Columba palumbus*), and their ability to survive in lowland Britain. Woodpigeons formed 40% of the diet, rabbits (*Oryctolagus cuniculus*) and Moorhens (*Gallinula chloropus*) made up another 38%. Kenward concludes that any reduction of crop damage by pigeons as a result of predation by Goshawks is likely to be slight.—Patricia A. Gowaty.

70. Feeding habits of six species of honeyeater in south-western Australia. S. A. Halse. 1978. *Emu*, **78**(3): 145–148.—Although another study showing that sympatric species differ in habitat or foraging niche may seem superfluous, this study sheds some light on the frequently found lack of correlation between bird and plant species diversity. Usually foliage complexity is at the heart of the matter, birds being rather poor plant taxonomists. This heath-land assemblage of honeyeaters was apparently organized around a single botanical species, the flowering bush *Dryandra sessilis*. The paper would have been greatly improved had sample sizes and statistical tests for the observations been included.—C. J. Ralph.

71. Capercaille and gastrolites. (Glukhar' i gastrolity.) V. Telepnev. 1978. *Okhota i okhot. khoz-vo.*, **1978**(12): 8–9. (In Russian.)—In the south of Western Siberia, gravel is not everywhere accessible to grouse. One population of Capercaille (*Tetrao urogallus*) substitutes seeds, fruit stones and pits, and short twigs. If gravel becomes available, the birds immediately consume it, but the stones, like the organic gastrolites, do not stay long in their gizzards. Another population makes an annual visit to gravel beds to gather stones. This occurs only in fall, which suggests that these birds manage to keep a good supply of pebbles inside for a year, although this is not stated explicitly. Since birds marked, apparently at the gravel deposits, were never recovered farther than 15 km away, and some Capercaille collected 5–20 km from gravel lacked gastrolites, earlier assertions that Capercaille fly up to 50 km to gather grit are rendered doubtful. The reader is left wondering how the availability of gravel affects population density and health of Capercailles.—Elizabeth C. Anderson.

72. Uneven sex ratio of voles in the food of *Aegolius funereus* and *Strix aluco*. M. Lagerström and I. Häkkinen. 1978. *Ornis Fenn.*, **55:** 149–153.—Tengmalm's Owls (*Aegolius funereus*) and Tawny Owls (*Strix aluco*) fed mainly voles *Clethrionomys glareolus* and *Microtus* sp. to their nestlings. Sex of the voles was determined by examination of the genitals or

the gonads. The owls took significantly more male than female *Clethrionomys*. The authors also trapped voles and found sex ratios like those in the owl nests. They conclude that vole populations may have a sex ratio of 1:1, but male voles in spring are more active than females and are more readily caught by owls and traps.—Robert B. Payne.

73. The diet of the Curlew Sandpiper at Langebaan Lagoon, South Africa. G. M. Puttick. 1978. *Ostrich*, **49:** 158–167.—The author excruciatingly analyzes and compares the stomach contents to the esophagus contents of some 240 wintering adults and young of both sexes of Curlew Sandpiper (*Erolia ferruginea*). Contents of stomach and esophagus appeared to differ significantly, an important point to those of us using the more removed method of food analysis, the droppings. However, the figure showing this difference *apparently* had the esophagus data labeled as stomach and vice versa! An important claim is made for "immatures" (first and second-year birds combined) taking smaller prey than adults, but no tests of significance are given. There is doubt in my mind that the differences are significant, judging from the figure. The strongest, and most interesting, results are the sexual differences, males taking significantly different and smaller prey items than the larger females. Unfortunately, the author chooses to omit indications of sample sizes for any age or sex class. Some statistics are applied, but unevenly throughout, and seldom was the type of test indicated. Such a difficult and thorough analysis merits more attention to the mechanics of statistical testing.—C. J. Ralph.

74. Mortality of the monarch butterfly (*Danaus plexippus* L.): avian predation at five overwintering sites in Mexico. W. H. Calvert, L. E. Hedrick, and L. P. Brower. 1979. *Science*, **204:** 847–851.—Many monarch butterflies contain cardenolides (cardiac glycosides) derived from the milkweed eaten by the larvae. These substances are concentrated in the exoskeleton. It appears that birds avoid cardenolides by one of two procedures: stripping out and eating the contents of the abdomen and sometimes the thorax or selecting by taste the non-noxious individuals. The predators in Mexico were: *Icterus parisorum, I. abeillei,* and *Pheucticus melanocephalus* and rarely *Piranga flava* and *Cyanocitta stelleri.* The five colonies of butterflies differed in area by an order of magnitude and daily mortality varied from 10,000 to 32,000. Mortality due to predation varies inversely but non-linearly with colony area. Deaths not caused by predation are essentially independent of colony area.—C. H. Blake.

SONG AND VOCALIZATION

(See also 67)

75. Geographic variation in the song of Belding's Savannah Sparrow (*Passerculus sandwichensis beldingi*). R. A. Bradley. 1977. *Bull. Florida State Mus., Biol. Sci.*, **22**(2): 57–99. ($1.70).—Bradley recorded the songs of 280 individuals from 14 of the 15 (or 16, see his Tables 1 and 3) known breeding localities of the Belding's Savannah Sparrow between Goleta Slough near Santa Barbara and Laguna El Rosario in Baha California del Norte. Spectrographic analysis showed 86 distinct note types. Each male sang a single song pattern, which did not vary during the season, at least at Anaheim Bay where seasonal variation was studied. Variation occurred both within and between populations, but certain notes characterized the songs of a particular population. Bradley agrees with and reviews briefly the ideas regarding the origin and selective advantage of dialects in bird songs.—Bertram G. Murray, Jr.

76. Aggressive responses of two hole-nesting passerines, *Parus major* and *Ficedula hypoleuca*, to the play-back of sympatric species song. T. Järvi, T. Radesäter, and S. Jakobsson. 1978. *Ornis Fenn.*, **55:** 154–157.—Pied Flycatchers (*Ficedula hypoleuca*) respond aggressively not only to songs of their own species but also to the songs of Great Tits (*Parus major*). Great Tits in contrast responded to songs of their own species but not to songs of Pied Flycatchers. Both species frequently responded to songs of Marsh Tit (*Parus palustris*), and neither responded to songs of Willow Warbler (*Phylloscopus trochilus*).

Pied Flycatchers and Great Tits compete for nest boxes often fighting and sometimes killing each other. The flycatchers are the more aggressive and dominate the tit outside

the nesting box, but once incubating in a nesting box the tits hold their own. No such interaction occurs between either species and the Marsh Tit, perhaps because the smaller Marsh Tit avoids them and settles for smaller nesting cavities. Willow Warblers do not use nest holes or nest boxes. None of the species are regularly interspecifically territorial towards the others. The results suggest a dominance order in access to nest boxes and a mechanism for interspecific competition. The experimental design is questionable (all four species' songs were presented in 5 min of playback), the criteria for determining an aggressive response were not described, and the sample size is small (six of each of the two species), but the results nevertheless are of interest.—Robert B. Payne.

MISCELLANEOUS

77. Sociobiology and its Critics. C. Frankel. 1979. *Commentary,* **68**(1): 39–47.—Significant enough to be remembered, at least for reference in the future. "Sociobiology has caused a considerable commotion. It has come to birth in a culture impregnated with a sense of historical relativities, deeply aware of ethnic diversity and the plasticity of human behavior, and influenced by the hope that, through the proper manipulation of the human environment, violence, poverty, and injustice can be reduced and perhaps abolished. Sociobiology has broken upon the world . . . not simply as an event in science but as a political and ideological *cause celebre.* The key book in the charting of this new discipline is *Sociobiology*: *The New Synthesis,* by Edward O. Wilson, professor of science and curator of entomology at Harvard. Belknap/Harvard University Press, 1975." (Further commentary: "Charles Frankel, the distinguished philosopher and humanist, and a cherished contributor to *Commentary,* completed this article a few days before he was murdered in his home by intruders this past May.")—Leon Kelso.

78. A Soldier–Scientist in the American Southwest. Being a Narrative of the Travels of Brevet Captain Elliott Coues, Assistant Surgeon, U.S.A., through Kansas and the Territories of Colorado and New Mexico to Arizona, and thence to the Coast of California; Together with his Observations upon the Natural History, especially the Avifauna, of the Regions Traversed, 1864–1865. M. J. Brodhead. 1973. Historical Monogr. No. 1. The Arizona Historical Society. Tucson, Arizona. 74 p. (With selected color plates, particularly of the Yellow-headed Blackbird.)—Whatever biologists should be, to historians falls the task of revealing biologists as they were. "Coues kept a diary which seems never to have found its way to a manuscript repository." "A slender, pale-faced lantern-jawed, girlish-looking youth without a hair on lip or chin and hardly dry behind the ears.", that was Coues as portrayed by himself. Recall that in Coues' time systematics and the species were all. Other biological endeavors were but popular pursuits, per Ridgway. After leaving the Army Coues lost "even his scientific interest in the West." "Then about 1892 the place delighted him." Where once it had been "his misfortune to serve" there, now it was "my beloved Arizona." Unattractive features of the West that had repelled him at first, became loved as God's blessings at the last. Indeed the successes he later scored were all associated with the West. "Notes" p. 69–74, cover a bibliography of 113 entries from which this account was entrancingly composed.—Leon Kelso.

BOOKS AND MONOGRAPHS

79. Weights of 151 species of Pennsylvania birds analyzed by month, age, and sex. M. H. Clench and R. C. Leberman. 1978. *Bull. Carnegie Mus. Nat. Hist.* **No. 5.** 87 p. ($5.00)—The 97,762 weights of birds are arranged by month, by age from "hatching year" to "after third year," and by sex. Each of these categories includes the sample size, mean weight, standard deviation (for samples of 5 or more), and minimum and maximum weights. The 151 species include only 30 nonpasserines. However, the data are not analyzed or compared with weights from other areas, nor is there a bibliography. Nevertheless, this compilation should prove to be an invaluable reference for anyone interested in the weights of eastern American birds.—Bertram G. Murray, Jr.

80. Proceedings of the Workshop Management of Southern Forests for Nongame Birds. R. M. DeGraaf, Tech. Coord. 1978. USDA Forest Serv., Gen. Tech. Rep. SE-14, 176 p. Available from Southeast. For. Exp. Stn., Asheville, N.C.—In recent years land managers and nongame biologists in the U. S. have shared an increased consciousness of the intimate relationship between land management decisions and the conditions of habitats for nongame species. That germinating concern has sprouted in the wake of the Endangered Species Act and concomitant public outcry over the too-frequent role of habitat destruction in the extinction of species. This workshop, third in a series jointly sponsored by several federal agencies and private environmental organizations, sought to bring together land managers, administrators, researchers, and other interested parties to investigate the state of knowledge of management of nongame birds and the application of that knowledge to southern forest ecosystems. The *Proceedings* reflects the concerns, and the uncertainties, involved in addressing the task of actually managing for nongame avifauna rather than giving lip service to that management. This reviewer's major response to the contributions is a sense of their expressed willingness to accommodate nongame bird species into management programs; at the same time only minimal amounts of requisite information exist concerning effects of various management practices on bird species and avian communities. If this workshop has no other effect than to marshal research energies to plug important gaps in knowledge of nongame species-habitat relationships, it will have been a great success.

The 14 papers run the gamut from passable to stimulating, and from practical to theoretical; four general topics serve to organize the work. In the first, "Forest Ecosystem Structure and Function and the Effects on Birdlife," the task of the workshop is introduced by M. T. Zagata. H. H. Shugart, T. M. Smith, J. T. Kitchings, and R. L. Kroodsma present a happy blend of empiricism, theory, and practical application in an overview of southern forests, succession, and their relations to nongame birds. S. A. Gauthreaux reviews the organization of forest avian communities in a paper rich with literature citations. The second topic, "Effects of Management Practices on Nongame Birds," addresses the state of knowledge of bird communities in six different southeastern forest habitats. Nowhere is the lack of information more clearly evident than in this section. J. A. Meyers and A. S. Johnson provide an outstanding contribution by reviewing the relatively well-studied loblolly-shortleaf pine avifaunas. B. R. Noon and K. P. Able combine theory and empirical data in an analysis of montane communities in the northern and southern Appalachians, whereas J. G. Dickson, K. E. Evans, and R. G. Hooper capably treat respectively the avifaunas of bottomland hardwoods, oak-hickory forests, and cove forests. G. W. Wood and L. Niles discuss the management practices generally applied to longleaf-slash pine forests. The third section, "Specialized Bird Habitats and Management," features a thorough and scholarly analysis of census techniques by C. S. Robbins, and treatments of management of wading birds by M. C. Landin, snags by R. N. Conner, and raptors by M. G. Edwards. In the final section, "Research Plans," R. L. Curtis, Jr., examines research efforts devoted to nongame birds in the southeast.

The style of the contributions to the *Proceedings* is as uneven as the backgrounds of the participants were diverse. Nevertheless, these papers serve to outline research needs in nongame bird management in the South.—Paul B. Hamel.

81. The Red Data Book of the USSR. (Krasnaya kniga SSSR.) Part 2: Birds. V. E. Flint, ed. 1978. Lesnaya Promyshlennost Publishers, Moscow. 460 p. (In Russian.)—This volume catalogues birds considered rare and endangered in the USSR (accompanying sections of this Red Data Book deal with mammals, reptiles, amphibians, and plants). Status, distribution, habitats and their present condition, wild population, breeding biology, competitors/enemies/diseases, reasons for change in population, captive population, captive breeding, conservation measures taken, and conservation measures needed are given for each species. Each species is depicted in a very good line drawing and its range in the USSR shown on a map. For some species the accounts are more complete than for others, as for example in describing captive birds: sometimes information is presented on birds in foreign zoos, sometimes only for Soviet zoos even though representatives of the species are held abroad as well. Nevertheless, it is useful to have the essential facts about these species brought together, up-dated, and distilled.—Elizabeth C. Anderson.

82. Rare and Endangered Biota of Florida. Peter C. H. Pritchard, series editor. Volume 2. Birds. Herbert W. Kale, II, ed. 1979. Gainesville, University Presses of Florida. $7.00. 121 p.—Sponsored by the Florida Audubon Society and Florida Defenders of the Environment, this volume is an outgrowth of a special committee on rare and endangered plants and animals in the state. For birds specifically, several categories are defined: Endangered (11 species), Threatened (13), Rare (11), Species of Special Concern (29), Status Undetermined (5), Recently Extirpated (3), and Recently Extinct (2). Experts for the 74 species are responsible for each species' account which usually includes information on Description (plus generally excellent black-and-white photographs), Habitat, Life History and Ecology, Specialized or Unique Characteristics, Basis of Status Classification, Recommendations, and Selected References. Over and over again we are reminded of man's environmental exploitations and the resulting species' decline: drainage of wetlands, destruction of mangrove and cypress swamps, conversion of native grasslands to pasturelands, and the like. These species' accounts are valuable to the conservation-minded ecologist and ornithologist.

Accompanying nearly every species' account is a stylized map which immediately catches the reader's eye even before reading the text. And the maps constitute my principal objection to this booklet. Out of 67 maps I easily detected obvious errors in 21 of them! For some species (Peregrine Falcon, Kirtland's Warbler, Osprey, as examples), the map is totally blank. In some others (e.g., Am. Kestrel) the entire state is zipatoned. Of what possible value are such maps when most ornithologists know that none of these species occur throughout the state? To make matters worse, the depicted distributions of many species (e.g., Red-cockaded Woodpecker, Black-whiskered Vireo, Burrowing Owl, Scrub Jay), are incomplete, even ignoring *published* records. The map for the Louisiana Waterthrush shows it breeding in mid-Marion County instead of Alachua County. And so on. Greater care should have been exercised in the preparation and editing of these maps because flagrant flaws mar an otherwise useful publication on Florida's threatened and endangered species. A reader 25 or 50 years from now will be hard-pressed to know accurate details of distribution in 1979.—David W. Johnston.

83. Birds of Southeastern Michigan and Southwestern Ontario. A. H. Kelley. 1978. Bloomfield Hills, Mich., Cranbrook Inst. Sci. Bull. 57, 99 p.—This paperback brings up to date the author's Birds of the Detroit-Windsor Area (1963). Species' accounts include information on local status and abundance, extreme and mean dates of occurrence, and, for the less common species, dates and localities of observation. The list of 337 species adds 52 to those of the previous bulletin. For breeding birds, included are extreme dates of nesting, and, for some, estimates of the peak of nesting. Many common species are still known as local breeding birds from a handful of nesting records—nests of Red-tailed Hawks have not yet been reported from all eight counties in the survey area. Birds increasing in numbers in recent years are Sandhill Crane, Little Gull, Red-bellied Woodpecker, Mockingbird, and Brown-headed Cowbird. Birds decreasing are Red-shouldered Hawk, Cooper's Hawk, Marsh Hawk, Turkey Vulture, Ruffed Grouse, King Rail, Black Tern, Barn Owl, Loggerhead Shrike, Orchard Oriole, and Eastern Phoebe. Apparent causes of change include fluctuating water levels of the Great Lakes, pesticides, shooting, and severe weather in migration. Three pairs of Bald Eagles remain in summer and may still breed. Piping Plovers are gone as breeding birds due to increasing human disturbance on the beaches of the Great Lakes. Bird-banding has shown seasonal migrations in Sawwhet Owls, Black-capped Chickadees, and Blue Jays. Among jays, some local birds occur only in successive winters, others only in successive breeding seasons (no mention is made of any individuals known to be residents). The species' accounts are documented with reference to museum specimens or observers of uncommon species, although published records are generally not cited and a few have been overlooked (Bachman's Sparrows at Point Pelee). The bulletin is a useful summary of the status of the birds of this area.—Robert B. Payne.

84. Working Bibliography of the Bald Eagle. J. L. Lincer, W. S. Clark and M. N. LeFranc, Jr. 1979. NWF Scientific/Technical Ser.; No. 2. 245 p. $9.00 from the Raptor

Information Center, National Wildlife Federation, 1412 Sixteenth St., N. W. Washington, D.C. 20036.—"The Problem whould be more than clear

What man ignores year after year
Is that he like all the rest
Is but part of Nature's nest."

And so the senior author has pointed out the reason why the Bald Eagles' (*Haliaeetus leucocephalus*) plight is a part of our own. The above segment is from a poem entitled "Man's Problem" which underscores the frontispiece of this extensive working bibliography on our National Bird. A foreword by Dean Amadon reiterates the above message.

The Introduction (Chap. 1) provides an historical perspective, reviews the taxonomy, distribution and life history of the Bald Eagle, and then briefly discusses limiting factors and management needs for the species. Also included in the chapter is information on how the bibliography was produced, how it is organized, and how it might be most effectively used. Chapter 2 reviews the eagle's status in detail state by state (including Ontario and British Columbia, and a survey of current Bald Eagle research). In Chap. 3, 2,000 citations are given, listed alphabetically by author and chronologically under author. Then 136 pages are devoted to the "Permuted List of Keywords" (Chap. 4). This is the key to the bibliography. Although the title of the list may make it sound complicated and difficult to use, it is not. The author(s) read each work, or pertinent segment of it, and assigned keywords that describe the locale and specific content of the article. The list of keywords *for each work* was rearranged so as to use each keyword to begin the sequence referencing that work once. Each sequence was then alphabetized; thus each work is referenced (alphabetically) according to *every* keyword assigned it. The Master Number assigned each work, in Chap. 3, was carried along with each keyword sequence in the alphabetizing process and accompanies each reference in the permuted list of keywords, thus linking the two. A very workable system. Although not noted in the bibliography I think it worth pointing out that standard abbreviations are alphabetized at the end of each lettered section rather than taking their alphabetical turn within that lettered segment. An appendixed Dictionary of Keywords elaborates on the specific meanings of words which are not obvious. I attempted to locate typographical errors in the work, to reassure myself that authors were human, but failed to do so.

Finally, because of the broad approach the authors used in examining the literature on the Bald Eagle combined with the specific approach used in referencing the citations, this fine work should be useful to a wide audience. As examples, legislators, journalists, and natural historians should find it as useful as biologists, conservationists, wildlife managers, environmental technicians find it indispensable in getting into the literature on our National Bird.—Richard J. Clark.

85. Hawks and Owls of North America. D. S. Heintzelman. 1979. New York, Universe Books. 197 p. $18.50, cloth.—The title of this work defines its content. The text is written in a popular style, is quite readable, and is aimed at "students, birders, ecologists, conservationists and raptor enthusiasts at less than professional level." The 17 chapters start with an introduction and then deal with descriptive chapters on the major groups: vultures, kites, accipiters, soaring hawks, eagles, falcons, and a potpourri chapter on the Northern Harrier, Osprey, and Caracara. Two chapters on owls follow. Concluding chapters cover raptor ecology, hawk and owl migrations, fossil hawks and owls, endangered raptors, increasing raptor populations, and raptor conservation efforts. A brief epilogue (on Golden Eagle shooting in Texas), an appendix of major raptor conservation organizations, selected references, a useful index, and a brief autobiographical sketch complete the work. About 20% of the text deals with owls, so the emphasis is on hawks. Generally excellent black-and-white photographs (63) and eight fine color photographs are included. The author has done a good job of placing raptors in an ecological context explaining that good and bad, destructive and beneficial were value judgments earlier placed on the raptors and indicated a short-sighted view ignoring their function in biological communities.

Although considerable current, pertinent information is found here, some major

works should have been included. For example "The Book of Owls," (Walker, A. A. Knopf, 1974) has a good section on the Spotted Owl which belies the author's contention that "relatively little is known about this rare species . . . ." Certainly "Owls of the World—their Evolution, Structure and Ecology" (Burton ed., E. P. Dutton and Co., 1973) is worth listing. The often mentioned hypothesis that Goshawks are replacing Cooper's Hawks in the northeast is certainly mellowed when one reads Storer's classic paper (*Auk,* **83:** 423–436, 1966) on Accipiter niches in North America. Clark's (R.J.) monograph on the Short-eared Owl is listed as a 1971 *Dissertation Abstract* when it is now available as *Wildl. Monogr.,* No. 47, 1975. In a popular vein, Hamerstrom's "An Eagle to the Sky" (Iowa State University Press, 1970) and R. Olendorff's "Golden Eagle Country" (A. A. Knopf, 1975) seem noteworthy. J. J. Brett and A. C. Nagy's "Feathers in the Wind" (Hawk Mountain Sanctuary Association, Kempton, Penn.) dealing with hawk migration is omitted.

The book is a convenient size and well produced (only one typographical error is noted and *Athene cunicularia* is listed as *Speotyto cunicularia* for the Burrowing Owl). The cost seems high (due in large part, no doubt, to the color plates).—Richard J. Clark.

86. Systematics of Smaller Asian Night Birds Based on Voice. J. T. Marshall. 1978. *Ornithol. Monogr.* No. 25. 58 p. Supplemented by a 33 rpm long-playing record.—The systematics of the smaller Asian owls are more in a state of benign neglect than total confusion. According to Joe Marshall, most of the confusion stems from a reliance on morphology and color pattern to determine species and group limits. Although these provide indices to the outlines of some assemblages, the patterns are cryptic and vary geographically with background configuration. How, then, can one determine relationships within a poorly known, inconspicuous group of birds, most of which are poorly represented in collections? Marshall allows the owls themselves to set the limits, under the assumption that the territorial songs are conservative. Granted this, the genus *Otus* "can be hewed down to a manageable number of widely-distributed species whose zoogeography can then be better appreciated."

For each of the forms the text includes data on general range, behavior and ecology, as well as a list of reference material available. Important data on vocalizations include information rarely found on even the best known North American species, such as duetting between males and females, song frequency, and rate.

For those of us not gifted with the ability to find owls, the magnitude of Marshall's field work is awesome. He also includes important data on frogmouths (*Batrachostomus*) and a unique key to the species of Asian nightjars that include vocalizations. Many useful appendices are included, even one that contains proposed amendments to Vol. IV of Peters.

The text is accompanied by an LP recording of owl and frogmouth vocalizations. It stands as an impressive contribution by itself, and even if you are not interested in the systematic questions, it is interesting to listen to the night sounds of Asian forests. My major complaint is that individuals (especially librarians) will find the record a nuisance to catalog. Would it not be more convenient to issue small tapes which could be included in the pocket of a dust jacket—and which could be used directly in the field in future research?

Marshall's concern for environmental problems is obvious, and it is sobering to realize that many of the species may never be studied or recorded again because of the increasing destruction of tropical forests. The ecological significance of that subject, although beyond the scope of this review, is far more serious than the disappearance of a few owls and ought to concern all biologists.

By virtue of his long experience in Asia and as a student of nocturnal birds, Marshall is uniquely qualified to tackle problems of owl taxonomy. His writing is clear and his arguments cogent—and refreshingly iconoclastic. And if the subject were not so directly taxonomic, the paper would be fun to read. I wish Marshall would sometimes turn his talents toward writing for a broader audience.

For those who believe that all we really need to know about most species is either already known or easily derivable from present museum collections, this monograph is an eye-opener.—Joseph R. Jehl, Jr.

87. How to Make Working Decoys. G. R. Starr, Jr. 1978. New York, Winchester Press. $15.00.—Bird carving, especially decoy carving, is a rapidly growing craft and a number of recent books give instructions for making intricately carved and painted decorative pieces. As the title indicates, this book deals with making simple, functional decoys which one might use in a hunting rig. Dr. Starr is not only a carver and hunter but also an avid decoy collector, and the brief introduction to the history of decoy use and manufacture is interesting reading. The instructions for making decoys lead the aspiring decoy maker with clear, practical suggestions and numerous photographs through each step of production from planning and design, choosing materials and tools to carving and finally painting. The instructions are clear and easily followed and make up for the fact that the photographs occasionally lack important details either because the lighting is flat in some cases or the shadows are too dark in others. Although restricted to waterfowl, this book will be useful to anyone who wants to make models of any species for any purpose.—William D. Stull.

88. Birds of Southwestern Oklahoma. J. D. Tyler. 1979. Contrib. Stovall Mus., Univ. Oklahoma, No. 2.—This is a short (65 p.) summary of all the distributional information available for the birds inhabiting the southwestern fourth of Oklahoma. The author has apparently gone to considerable trouble, digging back through army journals of the 1850's and everything since. The area is particularly interesting from a zoogeographical perspective because of some 16 East-West species pairs (e.g., meadowlarks, bluebirds, orioles, buntings, pewees, phoebes, and hummingbirds) that exist sympatrically during certain seasons. The book should draw research attention to the area in addition, of course, to making birdwatching easier.—Douglas W. Mock.

89. The Birds of South Dakota, an Annotated Check List. N. R. Whitney, Jr., B. E. Harrell, B. K. Harris, N. Holden, J. W. Johnson, B. J. Rose, and P. F. Springer. 1978. S. D. Ornithol. U., Vermillion. 311 p. No price given. Available from W. H. Over Museum, Vermillion, SD 57069.—The members of the Check List Committee of the South Dakota Ornithologists' Union have done a thorough, commendable job of compiling distribution information on the 377 species of the South Dakota avifauna (10 additional species comprise a "Hypothetical List"). Useful introductory sections are devoted to the physiography, vegetation, avifauna, and human modifications of the state's environment, to the history of South Dakota ornithology, and to the history of the work itself. Various habitats in the state are illustrated by 43 photographs. Species' accounts typically include a map and appropriate paragraphs on status, habitat, nesting, spring and fall migrations, and winter. The various seasonal paragraphs are further efficiently subdivided into statements about the "normal period," "earliest dates," and "latest dates." The material is up-to-date, including 9 references dated 1976 or 1977. In numerous accounts additional explanatory sections, such as historical introduction of Galliform species, are included. Often the habitat paragraphs are particularly informative. Primary source of information for the accounts has been *South Dakota Bird Notes* with surprisingly few citations from *American Birds.* The work is amply illustrated by 54 black-and-white line drawings, 51 by E. W. Steffens, and a color frontispiece by W. Trimm. Separate indices for persons, localities, and birds, plus a page of errata, make this a completely executed work. Unfortunately the quality of reproduction of the photographs in my copy is poor, as even the cover photograph of the Badlands is 1 mm out of register.

"Birds of South Dakota," like most other such works, presents a static and autecological rather than a dynamic and synecological overview of the distribution of the state's birds. It is well-done, and should find wide acceptance in the scientific as well as the general audience.—Paul B. Hamel.

90. Bird Migration in Asia. (Migratsii ptits v Azii.) K. T. Yurlov, ed. USSR Academy of Sciences Siberian Branch. Proc. Biol. Inst., No. 33. "Nauka" Press, Siberian Branch, Novosibirsk. 1977. 248 p. (In Russian.)—This book contains 32 articles wholly or partly involving bird-banding. Contributors were stationed in Western Siberia, Kazakhstan, and Central Asia, and operated from 1971 to 1977. These articles could justify an indefinitely long review; I list them by title only.

Bird migration in diverse areal zones, Division 1: comparative features of specific migrants in mixed forest and intrazones of Western Siberia per synchronous surveys; seasonal migration of grebes around Lake Chan; seasonal migration of Lapwings, Ruff, and Common Snipe around Lake Chan; features of specific migrations of Laridae in south Barabinsk lowlands; fall migrations of Paridae around Lake Malyi Chan; seasonal migration of Paddy-field Warbler and Sedge Warbler in South Baraby; notes on fall migration of the Hooded Crow at Baraby and the Ob; some preliminary results of Black-headed Gull banding in south Baraby; on bird migrants of the Tomsk region per banding data; phenology of spring flights in the Tomsk region; spring flights in Turgaya lowlands; comparisons of flights in mountains and foothills of Talassko Alatau; altitude particulars of movements in Dzhungar passes in spring of 1973; on some itinerant and nesting species on Issik-Kul and Son-Kul lakes; sites of mass aggregations during migration in Chuisk valley; bird migration in southeast Kyzilkums; meteorological influences on spring bird flights in Uzbekistan: on bird flights in Bakhshska valley in Tadzhikistan; avian populations and migration rates in Muryab valley (Turkmeniya); general features of fall flights and winter movements of waterfowl and wetland species in Eastern Caspia; on the wintering of Rooks in Turkmeniya.

Distribution of rare and little known bird migrants, Division 2: new and rare birds around Lake Chan (Western Siberia); ornithological discoveries in Ural lowlands; on new and rare species in Kurgaldzhinsk Reserve; supplement to the ornithofauna of Western Tyan-Shan; observations on little–known birds of Kirghiz; supplement to the list of breeding birds of Chuisk Valley.

Field methods of migrant bird research, Division 3: the use of "drive" nets for trapping young of the Black-headed Gull for study and banding; on trapping molting river ducks by the "mamyra" method; a method for trapping and banding Bank Swallows; a mode of trapping the Great Reed Warbler at the nest; a mode of rapid recording of molting passerines for mass banding during migration.

In all, 216 species in 41 families are mentioned in these numerous studies. As informative and well illustrated as any is the study of the Bank Swallow by N. Grigoreva which implemented both rapid trapping and banding opposite a perpendicular surface.—Leon Kelso.

REQUESTS FOR INFORMATION

Mississippi Kites are being marked with colored leg bands and patagial tags in western Kansas and Oklahoma and northcentral Texas. Each kite carries a U.S. Fish and Wildlife Service band and from one to three additional color bands in combinations of red, blue, green, yellow, and silver. Kites captured as adults also wear a pair of patagial streamers on the wings. Streamer colors are red, dark blue, light blue, orange, yellow, and green; about 1 in of each streamer extends beyond the ends of the secondary feathers. Persons observing the marked kites are requested to send as much information about the kite and its situation as possible to: CHIEF, *Bird Banding Laboratory, Laurel, MD 20810.* Please send a copy plus any additional information to the bander, JAMES W. PARKER, *Biology Department, State University College, Fredonia, NY 14063.*

COLOR-MARKED GREENLAND WHITE-FRONTED GEESE

The Greenland White-fronted Goose study group is planning to mark *Anser albifrons flavirostris* with large-numbered, white Darvic rings on the west coast of Greenland in summer 1979. Sight records are wanted, giving the serial number of the Darvic ring, which can be read through a telescope, the date, and the locality. Other details (adult, immature, pair, family size, flock size) would also be useful. The serial number of the ring (letter-digit-digit) should be carefully checked; the initial letter falls nearest the lower end of the tarsus. The subspecies winters in Ireland, Scotland and Wales, with occasional records in eastern North America. Observers in all parts of the range are asked to scan flocks for marked birds. All sightings should be sent to P. J. BELMAN, *107 Grange Road, Ealing, London W5 3PH.*