RECENT LITERATURE

Edited by Edward H. Burtt, Jr.

BANDING AND LONGEVITY

(See also 37)

1. **Variation in skull pneumatization patterns of certain passerines.** R. P. Yunick. 1979. *N. Amer. Bird Bander,* **4:** 145–147.—By wetting and matting the feathers of the occipital region and moving the loose skin over the skull, the extent and locale of pneumatization of the skull can be observed. Pneumatization proceeds at a characteristic rate for many passerine species and can serve to identify hatching-year birds in the late summer and early autumn. The author observed and drew the patterns in an unspecified number of individuals of 17 species. The observations were aided by a 20-watt, illuminated 10× magnifier. The developmental process was identified as either *median line* (i.e., pneumatization emanated from the mid-line and periphery and closed with an elliptical window on either side of the mid-line) or *peripheral pneumatization* (i.e., the process emanated from the periphery only and proceeded with a v-shaped or heart-shaped window resulting in the later stages). It should be noted that the type, either median-line or peripheral, cannot always be discerned by looking at the later stages only because a variant of the peripheral process can leave elliptical windows on either side of the median line. Those species showing median-line pneumatization were the Dark-eyed Junco (*Junco hyemalis*), Evening Grosbeak (*Hesperiphona vespertina*), Purple Finch (*Carpodacus purpureus*), White-throated Sparrow (*Zonotrichia albicollis*), Fox Sparrow (*Passerella iliaca*), Swamp Sparrow (*Melospiza georgiana*), and White-breasted Nuthatch (*Sitta carolinensis*). Species showing the peripheral pattern were Black-capped Chickadee (*Parus atricapillus*), Red-breasted Nuthatch (*Sitta canadensis*), Brown Creeper (*Certhia familiaris*), Golden-crowned Kinglet (*Regulus satrapa*), Ruby-crowned Kinglet (*R. calendula*), Yellow-rumped Warbler (*Dendroica coronata*), American Goldfinch (*Carduelis tristis*), and the Common Redpoll (*C. flammea*). The author compares his results with others from the literature. His findings concur with others on the White-throated Sparrow and Dark-eyed Junco but disagree on the Fox Sparrow belonging to the peripheral pneumatization group. The author invokes the pattern of the Goldcrest (*Regulus regulus*) in support of the Ruby-crowned Kinglet, a "very closely related species," being of the peripheral category. Yet examining the two lists above shows that the two nuthatches are in different categories.—Richard J. Clark.

2. **Body weights of the Santa Cruz Island Scrub Jay.** J. L. Atwood. *N. Amer. Bird Bander,* **4:** 148–153.—A total of 248 individuals of this island race of the Scrub Jay (*Aphelocoma coerulescens insularis*) were trapped and uniquely marked with color bands between January 1975 and November 1977. Many body weights were obtained (236 data points) and summarized. Of the 25 jays retrapped within two days, 52% showed a decrease in weight (mean of 4% of initial body weight), 27% increased in body weight (mean of 2%), and 21% showed no change. Thus "handling shock" is suggested. The mean weight of known males was 120.6 g ($n = 22$) and of females was 107.5 g ($n = 27$) with the difference being statistically significant at the 95% level. However, considerable overlap and seasonal variations make it difficult to ascertain sex on the basis of weight alone. Weights of individuals trapped at least once during each of the four seasons ($n = 16$) suggest a trend of peak weights during the fall and minimal weights in the winter. Low-weight nonbreeders were found: three were females >one year old (two of them were in the lowest 3% of all weights recorded), one was a nonbreeder for three consecutive seasons), and four were of unknown sex. The presence of nonbreeders older than one year is similar to that seen in the Florida race (*A. c. coerulescens*); however, the former race failed to demonstrate the well-developed helper system of the Florida race.—Richard J. Clark.

3. **Some observations on nesting Barn Owls in New Jersey.** L. J. Soucy, Jr. *N. Amer. Bird Bander,* **4:** 164–165.—Banded nestlings and adults at a single nest site in Somerset County between 1973 and 1977 revealed the following: 23 young produced by five nestings gave an average of 3.83 young per nesting, nestlings banded in May, June, July and

September, young banded as a "four week old" on 29 May still attached to the nest site on 31 July (it was healthy and could fly), a banded female with one four-week-old nestling on 29 May was with a second brood of five nestlings (one to two weeks old) on 31 July.—Richard J. Clark.

4. Bird trapping by cannon net in Poland. C. Nitesci. 1978. *Notatki Ornitologiczne,* **19**(1–4): 86–88. (In Polish with English summary.)—The only cannon net still used in Poland is described and illustrated. A net (18 × 18 m, with meshes 20 cm) was dropped on trap-baited gulls. In 80 discharges over 6,000 gulls, including Black-headed (*Larus ridibundus*), Herring (*L. argentatus*), Common (*L. canus*), and Great Black-backed (*L. marinus*), were captured for banding. Cannon netting is an efficient and economical method if conducted as described.—Leon Kelso.

5. Some problems with Canada Geese neckbands. S. R. Craven. 1979. *Wildl. Soc. Bull.*, **7**: 268–273.—Four digits, engraved on plastic neckbands in various digit-neckband/color-combinations, were placed on 6,426 Mississippi flyway Canada Geese (*Branta canadensis*). Color-combination visibilities were recorded by various personnel during 25,100 field encounters over three years. White on blue and black on white, the most visible digit-neckband/color-combinations, were usually readable at 500 m. Inexperienced observers made errors in reading neckband codes because geese known to be dead were reported seen live in the field. Neckbands became brittle and cracked with age and 21% were lost each year (calculated by legband recaptures). They did not cause any topological damage to the goose but did impair goose movement by collecting ice. No statistically significant difference was found in return rates between neckbanded and legbanded geese indicating no differential mortality.—Richard M. Zammuto.

MIGRATION, ORIENTATION, AND HOMING

(See also 60, 79)

6. Transfer-experiments on problems of imprinting to the birth-place in the Pied Flycatcher (*Ficedula hypoleuca*). (Verfrachtungs-Experimente zur Frage der Geburtsortsprägung beim Trauerschnäpper (*Ficedula hypoleuca*).) R. Berndt and W. Winkel. 1979. *J. Ornithol.,* **120**(1): 41–53.—The experiments were designed to test whether the "faithfulness to birthplace" ("Geburtsortstreue") was acquired or innate. A total of 301 young were transferred between two sites 250 km apart. These birds either fledged or were released as fledglings in a location other than where the eggs were laid. In subsequent years 25 of the birds were recovered, all from the locations to which they were transferred. This indicates that a learning or imprinting procedure occurs in the juvenile stage. The migratory path is also thought to be learned in this species.—Robert C. Beason.

7. Seasonal variations in the mass of waders in Southern Africa, with special reference to migration. R. W. Summers and M. Waltner. 1979. *Ostrich,* **50:** 21–37.—Here is an important piece of fieldwork bringing together captures of more than 5,000 birds in the southwestern Cape area. Fat extractions yielded information on a sample of the commoner birds. Estimates of flight ranges from these data suggest that only 3 or 4 stops would be necessary for their migration. The species leave South Africa with fat reserves sufficient for, on the average, more than a 4,000-km flight (using McNeil and Cadieu's equations). A wealth of data is distilled in a few graphs and tables augmented by a very readable style.—C. J. Ralph.

POPULATION DYNAMICS

(See also 20, 30, 44, 48)

8. Population regulation in Spruce Grouse: a working hypothesis. D. A. Boag, K. H. McCourt, P. W. Herzog, and J. H. Alway. 1979. *Can. J. Zool.,* **57**(12): 2275–2284.—Contrary to the situation in Red Grouse (*Lagopus lagopus*), winter survival in Franklin's Spruce Grouse (*Canachites canadensis franklinii*) is so uniformly high that it is not critical in determining breeding population density the following spring. Boag et al. synthesize

10 yr of data on individually marked birds in 555 ha of pine forest in Alberta to reach their conclusions and develop hypotheses on the effects of spring recruitment on population regulation that could be tested with experimental manipulations. Adult mortality of 32% occurs primarily in the late spring and summer each year, yet population size was fairly stable as yearlings, mostly immigrants, replaced those adults lost. The number of juveniles surviving to independence each year was inversely related to the number of adults and yearlings present, and thus further damped fluctuations in population size.—A. John Gatz, Jr.

9. Variation in the production of young of swans wintering in Sweden. L. Nilsson. 1979. *Wildfowl,* **30:** 129–134.—Data on proportions of young in flocks of wintering Mute (*Cygnus olor*) and Whooper (*C. cygnus*) swans were available from 1966 through 1978. Whooper Swan data show good statistical correlation with winter weather conditions—lower production occurring after cold winters in Sweden and after cold conditions on the breeding route. These relationships did not hold up for the Mute Swan, possibly because the species nests farther south and can delay breeding until better weather occurs.—Bruce D. J. Batt.

NESTING AND REPRODUCTION

(See also 3, 9, 27, 41, 43, 48, 50, 54, 57, 71, 80)

10. Abundance of the Starling, *Sturnus vulgaris* L. in the breeding season in the Gdansk vicinity. M. Gromadzki. 1978. *Acta Ornithol.,* **16**(13): 325–334. (In English with Polish and Russian summaries.)—Which more attractively encourages nesting of desirable birds, natural or artificial structures? That question is still debated. "Starlings built 53% of their nests in buildings, 43% in tree holes, and only 5% in nest boxes. The density of nests with young was 12.15 nests per km^2." Estimation of the breeding population of the Starling and its preferred site are the objectives of this paper. Yet it was considered questionable whether to convert density obtained in small areas into pairs per km^2. More preferable were abundance estimates for large areas of over 100 km^2. It had long been observed that Starlings nest more readily in tree and roof cavities than in boxes. It was noted that in successive years nests were placed in the same niches, "which proved the great conservatism of Starlings in this respect."—Leon Kelso.

11. Spatial and temporal multi-species nesting aggregations in birds as anti-parasite and anti-predator defense. K. L. Clark and R. J. Robertson. 1979. *Behav. Ecol. Sociobiol.,* **5:** 359–371.—Systematic search of suitable habitat revealed that Yellow Warblers (*Dendroica petechia*) nest in close proximity to members of their own and other species forming loose, multi-species aggregations. Might this dispersion pattern be a response to the selective pressures of predation and brood parasitism? The incidence of predation was 37% of all nests (109 located over three seasons). The number of nests parasitized was slightly higher (41%).

An individual could gain some advantage by nesting synchronously with conspecifics or other species and as a result "swamp" local predators. Results confirm that nests that were earlier or later than the majority of birds suffered significantly higher predation and parasitism than nests synchronized with the majority. This trend was evident in all three breeding seasons. Prey species could also reduce predation or brood parasitism pressures by nesting close to larger, aggressive or particularly alert neighbors—species more effective in deterring predators than yourself. For example, Red-winged Blackbirds (*Agelaius phoeniceus*) are highly aggressive toward predators and often actively mob them. Yet Yellow Warblers nesting inside Red-winged Blackbird territories suffered the same predation as those outside. However, predation on Yellow Warbler nests was significantly reduced inside (relative to outside) Gray Catbird (*Dumetella carolinensis*) territories, while no protection from cowbird parasitism was gained. A previous study by Robertson (Robertson and Norman, *Can. J. Zool.,* **55:** 508–518, 1977) showed that catbirds exhibit lower aggression toward cowbirds than either Red-winged Blackbirds or Yellow Warblers. Interestingly, parasitism was significantly lower on nests located inside Red-winged Blackbird territories—Frank R. Moore.

12. Impact of Marsh Wrens on reproductive strategy of Red-winged Blackbirds. J. Picman. 1980. *Can. J. Zool.,* **58**(3): 337–350.—As a result of reviewing the literature on nesting systems in Red-winged Blackbirds (*Agelaius phoeniceus*) Picman concludes: (1) that predation may provide the primary influence on reproductive strategy, and (2) that quantitative information on mortality caused by particular predators does not exist. Picman, therefore, presents a study of the egg and nestling mortality over a two-yr period caused by the Long-billed Marsh Wren (*Cistothorus palustris*), and an examination of the adaptiveness of the red-wing's nesting behavior relative to these depredations. Both years he found significant negative associations of the nests of the two species and significant positive correlations of both nesting success of red-wings (i.e., fledging at least one young) and proportion of eggs fledged with distance of the red-wing nest from a wren nest. Additionally, nests of the red-wing were clumped, and nesting success of red-wings close to wrens was higher for red-wings in such clumps than for red-wings farther from conspecifics. That is, group defense may be a selective pressure for clumped nesting in red-wings in this British Columbia marsh, although small inter-nest distances of red-wings are maintained even if wrens are not nesting nearby. Reduced clutch sizes in red-wings nesting near wrens relative to those nesting farther away suggests further that chasing wrens away from the nest site may rob the reproductive energy budget. Aggressive neglect as the nesting season continues is also probable.—A. John Gatz, Jr.

13. A shifting of breeding location in the colonial Fieldfare *Turdus pilaris* after nest loss. (Brutplatzverschiebungen bei der Wacholderdrossel *Turdus pilaris* nach Nestverlust.) R. K. Furrer. 1979. *J. Ornithol.,* **120**(1): 86–93.—Following nest predation, Fieldfares moved their nest sites to other locations, presumably within the colony. Because nest success was low (2.1%—7.7%), to achieve better success it would be adaptive to move to a new location following nest predation.—Robert C. Beason.

14. Reproductive biology of the Water Pipit. (Sur la biologie de reproduction du Pipit spioncelle alpin.) F. Catzeflis. 1978. *Nos Oiseaux,* **34:** 287–302.—Catzeflis studied breeding Water Pipits (*Anthus s. spinoletta*) in the Col de Balme area of the Franco-Swiss border on the massif of Mont-Blanc during 1972–1976, expending his most intensive efforts in 1973 and 1974. Nesting pairs were censused on three large (43, 122, 315 ha), areas of alpine meadow, and population densities were estimated. Calculated densities were more a function of size of census plot than any other factor, varying from 35 pairs/km^2 on the 43-ha area to 16 pairs/km^2 on the 315-ha area of which the former plot was a part. Catzeflis suggests a density of 15–20 pairs/km^2 as typical for the central Alps, a lower density than that reported from Wyoming by Verbeek (*Auk,* **87:** 425–451, 1973). The birds bred between 1,860–2,510 m, particularly between 1,950–2,350 m. The author presents useful details on nesting territory, song period, nest sites, clutch size, reproductive success, timing of nesting, and other topics. Three points are noteworthy. First, the birds demonstrated considerable behavioral flexibility in response to weather on the high altitude breeding meadows. The timing of late spring and early autumn storms, the extent of snow cover, and the timing of snow melt determine the onset of nesting and the termination of the breeding season. Early spring responses of the birds, involving daily vertical migrations of 200 m or more, are particularly telling in this regard. Furthermore, edges of snow patches were favorite foraging sites of the birds. Second, clutch size, hatching success, and fledging success of Water Pipits in the Alps were similar to figures recorded in Wyoming (Verbeek, op. cit.). Third, intensive bandings conducted during the late summer flocking period of the young revealed, contra Verbeek, that adults do not join flocks with their young, but that rapid turnover of hatching-year individuals in a small area (400% in five days in August, 1973) can occur, involving birds reared in areas possibly far removed from the flocking sites.—Paul B. Hamel.

15. Observations on the Wedge-tailed Shearwater (*Puffinus pacificus*) in the southwest Pacific. J. A. F. Jenkins. 1979. *Notornis,* **26:** 331–348.—The life history of a tropical seabird is inferred from long-term systematic observations from the deck of a merchant ship. It is based on numerous voyages between 1960–1978 in the general area between 12–36°S and 171°E–170°W. Wedge-tails arrive in the Tonga-Samoa-Fiji area in October, migrating at a rate of about 20–25 knots. The birds seem to arrive from the east or north, and since dark-phase birds disappear from the eastern Pacific at this time, Jenkins infers the wintering grounds of the local breeding population. From November through January they are found mostly near the breeding islands, feeding wherever conditions permit. By February numbers increase in the Tonga area and by March most have left the area. Jenkins speculates on the migration route, especially in relation to the strength and direction of the trade winds. His analysis is interesting and could be confirmed by critical observations elsewhere. There are good data on breeding areas and feeding, and excellent maps show seasonal distribution patterns. This is an excellent paper and illustrates how even spare-time observations can be used as the basis of a fine study.—J. R. Jehl, Jr.

16. Egg size in the Least Sandpiper *Calidris minutilla* on Sable Island, Nova Scotia, Canada. E. H. Miller. 1979. *Ornis Scand.,* **10**(1): 10–16.—The author examined egg dimensions from a population of Least Sandpipers. Egg length and volume were found to be proportional to culmen length. No significant change was noted in mean egg size between first and replacement clutches. Most of the paper is devoted to analysis and discussion of intra-clutch variation in egg size. Third and fourth eggs were significantly longer than first and second eggs. The author interprets this as an increased investment in later eggs and takes considerable pains discussing the investment pattern in terms of Henry Howe's investment ideas and the view that early eggs are more vulnerable to predation, warranting lowered investment. Slight increases in egg length, however, contribute little to pyriform egg volume and Miller's analyses found no significant differences in egg volume. The statistically insignificant increase in volume he did find would be even less evident if the constant that should be applied in calculations of egg volume had been reduced in accordance with changing shape in later eggs (as the shape becomes more conical, the constant (K) in the equation $V = (K)(\text{Length})(\text{Breadth}^2)$ becomes smaller, approaching a limit of ⅓). Thus the pattern is apparently one of virtually equal investment in all eggs.

Regarding the constancy of clutch size in shorebirds, Miller argues effectively against Safriel's hypothesis that no more than four chicks can be efficiently brooded. He concludes that selection for within-clutch hatching synchrony in shorebirds promotes maintenance of the thermally efficient contact properties of four pyriform eggs, constraining both clutch size and significant differential investment in eggs.—Marshall A. Howe.

17. An experimental operation of a mechanical actograph for monitoring foraging activity of the Hobby and Common Kestrel in the Naurzum Reserve. (Opty ispolzovaniya mekhanicheskogo aktografa dlya izucheniya troficheskoi aktivosti chegloka i obykhnovennoi pustelgi v naurzymskom zapovednike.) V. Pererva. 1977. *Ornitologiya,* **13:** 173–176. (In Russian.)—The thoroughness of "cradle to grave security" is recalled by the "egg to adult" attendance of the Hobby (*Falco subbuteo*) and Common Kestrel (*F. tinnunculus*). Two nests of each species were built in cups on supporting shafts bearing levers with recording paper drums that marked each adult visit with food, its time, and the adult's weight on arrival. The details are well illustrated. At the Hobby's nest which held two young, 467 visits were recorded in 1973 and 525 in 1974. The average number of visits per day at the former was 47, at the latter 75. About 80% of the diet was insects, mainly locusts. The average weight per item was 1 g, the weight of food per nestling per day was at least 25 g. For the two Kestrel nests adults made 152 visits. In one nest with 5 young there were 20 visits per day, whereas one with 4 got only 16. The former received about 180 g of food per day, the latter, 200 g. In the former nest each nestling took about 35 g of food, in the latter about 50 g. The foraging day was about 17 hours for the Hobby, about 18 hours for the Kestrel. The Hobby brooded its young nightly to 16 days of age, the Kestrel brooded nightly until the young were 13 days old. Thereafter the parents were absent at night.—Leon Kelso.

18. Trumpeter Swan nesting behaviour. J. A. Cooper. 1979. *Wildfowl,* **30:** 55–71.—The behavior of four pairs of captive nesting Trumpeter Swans (*Cygnus cygnus buccinator*) was studied in public parks near Minneapolis, Minn. Sixteen excellent pen-and-ink drawings by Nancy Kane lend visual impressiveness to the article. They portray incubation postures described in detail in the text. Only the female incubates and she remains on the nest 95–96% of the time. The incubation period is 33 days, one of the longest among all the species of swans. Published information on other northern swans (*C. cygnus cygnus, C. c. columbianus* and *C. columbianus bewickii*) provides marked contrasts between these congenerics which show different degrees of both male-female cooperation and incubation constancy. The author asserts that maintenance of territory and food reserves for young are important components of the Trumpeter Swan's breeding strategy, but this seemingly sound arrangement is not strongly supported with new data in this study. Incubation recesses were most often (49%) caused by defense of the nest from intruding Canada Geese (*Branta canadensis*). One wonders if this had any great effect on calculations of incubation constancy and recess frequency and, more generally, why these birds are so interspecifically aggressive.—Bruce D. J. Batt.

19. Egg deposition by Snow Geese in alien nests. (Podkladyvanie belymi gusyamie yaits v chuzhie gnezda.) E Syroechkovskii. 1979. *Zool. Zhurn.,* **58**(7): 1033–1041. (In Russian with English summary.)—On Wrangell Island Snow Geese (*Anser caerulescens*) have been studied by the author since 1969. Eggs are laid on the ground and in alien nests (1–20 per nest) by certain individuals. Is it a matter of economy, progressive nest parasitism, or what? The phenomenon varies from near absence in certain years to about 82% of the nests of a given colony in others. Some eggs were found on snow in clusters of 20 to 30, and even 70. Alien eggs were added to certain nests at a rate of 4–5 per day. Geese having no nest would pass over a colony periodically seeking to alight on some nest. Only the more aggressive owners would expel invading layers. An egg-laying after settling took about 15 to 20 seconds. An incubating female may roll into the nest eggs left not more than 100 to 115 cm from the edge. One egg was found in the nest of a Snowy Owl. The nestling hatched from this was brooded by the owl. "Soon after this gosling disappeared, possibly drawn away by some passing goose brood."

Several conclusions were reached. In unfavorable springs, weather favored early occupation of nesting territories by elder geese. Elder birds can afford nesting each year, whereas younger individuals of about two years may have home nests only in years of mild spring weather. In years of harsh spring weather, nesting sites are occupied by the earliest geese; elders evidently arrive earlier than the young. The elder occupy the first sites freed by the snow melt—high ground within the colony—whereas the younger geese nest on the periphery—the lower sites which are exposed later.

Reports of the Snow Goose laying eggs in nests of other species are noted. Here the relationship to high density in colony populations and the obvious similarity to nest parasitism are mentioned. The average weight of eggs in home nests was 110 g for 384; of alien eggs, 119 g for 257. The author concluded that alien nest deposition increases colony productivity and mollifies the effects of severe spring weather and predation by the Arctic Fox.—Leon Kelso.

BEHAVIOR

(See also 2, 6, 11, 12, 14, 18, 39)

20. Territoriality of the Great Spotted Woodpecker, *Dendrocopos major* (L.) in a pine-wood. B. Rycnlik. 1979. *Acta Ornithol.,* **16**(17): 451–466. (In Polish with Russian and English summaries.)—This is an analysis of local territorial behavior in the Great Spotted Woodpecker observed for one year in Poland in an area of 130 ha. The vegetation was a *Vaccinio-myrtilli-pinetum* complex under 80–100-year-old pines. Four female, 5 male, and 3 juvenile woodpeckers occupied the study site with an average territory of 8.45 ha. Their activities comprised vocal, displacement (tapping on cones), and intruder-pursuit flight behavior. Age, of bird, situation and possibility of defense influenced size of territories. From August to March woodpeckers are solitary (but see review **24**), from April to June, paired, breeding and occupying combined territories. In July recently fledged families circulate in groups. In early August solitary areal occupancy was resumed. Individual woodpeckers were not banded, but were marked only by plumage and behavior features. Several reliable authors are cited in support of this method.—Leon Kelso.

21. Effects of aggregation on feeding and survival in a communal wren. K. N. Rabenold and C. R. Christensen. 1979. *Behav. Ecol. Sociobiol.*, **6:** 39–44.—The evolution of social behavior depends upon a balance between selective advantages and disadvantages. The Stripe-backed Wren (*Campylorhynchus nuchalis*) is a communally breeding insectivore that lives in cooperative groups of up to 14 members. Beyond probable advantages associated with their breeding system, might not group living enhance (1) foraging success or (2) predator avoidance, or both? For example, group foraging could increase efficiency of prey capture through transfer of information about food location or cooperative foraging. However, individuals were found to be significantly more successful (higher capture rates) when foraging alone than when aggregated. Observations of foraging behavior revealed that potential witnesses of a capture actually avoided successful foragers—not the sort of behavior to be expected if birds are imitating other group members. Furthermore, successful foragers did not restrict their search to recently productive sites. Aggregation seems to be disadvantageous for foraging. Why? Stripe-backed Wrens hunt for dispersed, cryptic, foliage insects. A dispersed and reasonably predictable food supply probably favors solitary rather than flock foraging. If group living promotes predator avoidance, for example, through improved detection, larger groups might experience reduced predation (improved survival). No relationship existed between survival and group size (26 groups over a 1-yr period). Actually the relationship between prey group size and predation is not simple. Although the predator's chance of being detected increases with group size, the probability of being able to detect the prey group also increases.

The selective pressures that shape the social behavior of a species vary in kind, strength and direction; some tend to promote sociality, and others tend to make a species more solitary (see B. C. Bertram. *In* Behavioral Ecology, Krebs and Davies, eds., p. 64–96. 1978). This study is a commendable effort to explore that claim.—Frank R. Moore.

22. A simple model for competition between behaviour patterns. P. J. B. Slater. 1979. *Behaviour,* **67**(3/4): 236–258.—An element of special intrigue here: feather physiology, in Zebra Finches (*Poephila guttata*). "A further behavior pattern which has been studied is ruffling or feather shaking. In some ways this shows the most predictable pattern of all; it very seldom occurs in bouts of more than one act and these are regularly distributed, tending to occur about once every 5 minutes." Slater's simple model "highlights the point that complexity is bound to arise when several acts compete for expression regardless of how simple are the mechanisms underlying each individual behaviour pattern."—Leon Kelso.

23. Effect of social environment within the brood on dominance rank in gallinaceous birds (Tetraonidae and Phasianidae). D. A. Boag and J. H. Alway. 1980. *Can. J. Zool.*, **58**(1): 44–49.—Earlier data on Spruce Grouse (*Canachites canadensis,* see review **8**) suggested to Alway and Boag that the dominance of a bird within adult flocks depended at least in part on the number of chicks of the same sex with which the bird interacted in its brood. This report, based on laboratory studies of Red Grouse (*Lagopus lagopus*) and Japanese Quail (*Coturnix coturnix*) lends further support to this proposed mechanism whereby brood environment can affect dominance. No assessment of the relative importance of inheritance in dominance is possible due to the experimental design of randomly selecting chicks to place together as artificial broods.—A. John Gatz, Jr.

24. Aggregate settlements of the Great Spotted Woodpecker. (Gruppovoe poselenie bolshogo pestrogo dyatla.) G. Simkin. 1977. *Ornitologiya,* **13:** 134–145. (In Russian.)—The consequences of increasing social pressure are evident in the gregarious behavior of the Great Spotted Woodpecker (*Dendrocopos major*). Their year-round vocal clamor, noisy excavation, drumming and display behavior render their presence inescapable. Females tend to dominate the small groups that form following the nesting season. An unexpected point is the expulsion of adults from these groups by juveniles. Discussion and explanations offered include the "heredity versus environment," "instinctive-behavior," "nature versus nurture," and the "innate versus acquired" problems treated by Lorenz, Hebb, Lehrman, and Schneirla. A bewildering number of details is consolidated into these 10 pages; for example: "In the course of early morning operations, the more experienced and wary individuals start the morning with a close survey of the territory from the tree tops, while uttering sharp calls, others fly to nearby trees and start the day by a "toilet" (preening): shaking, lifting and stretching the wings, and preening the plumage. Some individuals first proceed to hammer the cones. However, more often after toilet and a "light breakfast" most of the birds fly off to individual territories before engaging in their main occupation: hammering at the cones."—Leon Kelso.

25. Symbolic communication between two pigeons (*Columba livia domestica*). R. Epstein, R. P. Lanza, and B. F. Skinner. 1980. *Science,* **207:** 543–545.—One bird could press a colored button which turned on a colored light in the adjacent cage. The second bird could press a button with the symbol for that color. If the second bird gave the right answer, both cages remained lighted and the first bird would press a button labelled "Thank You" and release a little food into the second cage. The subjects were "White Carneaux" breed.—C. H. Blake.

26. Display inventory of the Torrent Duck. J. L. Eldridge. 1979. *Wildfowl,* **30:** 5–15.—This is a report of a field study conducted in the lake district on Rio Nalcus, Osorno, Chile. Sonograms of both male and female calls are presented, the frequencies being above the background noise of the rapids characteristic of the species' habitat. Many drawings of display sequences illustrate the paper, leaving this reader desirous of seeing the bird perform in nature. Eldridge argues that the Torrent Duck should rightfully be classified in a monotypic tribe, Merganettini.—Bruce D. J. Batt.

27. Territoriality in Snow Geese or the protection of parenthood—Ryder's and Inglis's hypotheses re-assessed. P. Mineau and F. Cooke. 1979. *Wildfowl,* **30:** 16–19.—**Territorial behaviour in breeding geese—a re-examination of Ryder's hypothesis.** M. Owen and R. Wells. 1979. *Wildfowl,* **30:** 20–26.—These two papers are the most recent contributions to an interesting sequence of papers dealing with the function of territorial behavior in colonially nesting geese. With these papers, data from four species of geese have now been presented: Ross's Goose (*Anser rossi,* Ryder, *Wildfowl,* **26:** 114–116, 1975), Pink-footed Goose (*A. brachyrhynchus,* Inglis, *Wildfowl,* **27:** 95–99, 1976), Snow Goose (*A. c. caerulescens,* Mineau and Cooke) and Barnacle Goose (*Branta leucopsis,* Owen and Wells). The proposed functions are: (1) to protect the incubating female from attack, (2) to provide the male with enough food to allow him to carry out (1), (3) to provide food near the nest for the female during the early part of the nesting period, (4) to defend the nest against parasitic egg deposition, (5) to defend the female from rapists, and (6) to defend the nest from being taken over by intruding birds. Owen and Wells suggest some possibilities for experimental manipulations that might help sort out the proposed functions.—Bruce D. J. Batt.

28. Biological principles of behavior control in birds. (Biologicheskie osnovyi unpravleniya povedeniem ptits. 1. Kyrinye, Galliformes.) V. Ilyichev and A. Tikhonov. 1979. *Zool. Zhurn.,* **58**(7): 1021–1032. (In Russian with English summary.)—**Biological principles of behavior control in birds.** (2. Plastinchatoklyuvye, Anseriformes.) *Zool. Zhurn.,* **58**(8): 1172–1182. (In Russian with English summary.)—The former study analyzed 12 species of Galliformes, with special attention to reactions during early ontogeny. Acoustic stimulation during prenatal development accelerated and synchronized the hatching. The reactions of rapprochement and imprinting of acoustic signals during "critical" (sensitive) periods of development are considered as biological principles of motor reaction controls. For developing modes of behavioral control in birds, recognition of the importance of early ontogeny is imperative. There are practical recommendations for control of poultry and breeding of game birds. In the second study, similar procedures and results were developed in 23 species of Anseriformes. The authors found that imprinting during the critical period is the biological basis of control of locomotory reactions in the ducklings. Their acoustic signals and behavioral patterns were defined as indicators of their "social" states.—Leon Kelso.

29. The extent of stereotypy in sexual behavior of two Kestrel species, *Falco tinnunculus*, and *F. naumanni*. (O stepenii stereotipnosti polovogo povedeñiya u dvukh vidov pustelg.) G. Kostina and E. Panov. 1979. *Zool. Zhurn.*, **58**(9): 1380–1390. (In Russian with English summary.)—According to common texts the Kestrel is less vigorous and aggressive than the Lesser Kestrel. These 10 pages supported by five figures and two tables provide further evidence of the behavioral difference. Behavior preceding copulation was recorded for 16 pairs of Kestrels and 3 pairs of Lesser Kestrels, totaling 112 interactions. Both species used "similar sets of motor signal reactions." "No definite relationship was found between motor reactions and the acoustic signals." In both species individuals differed markedly in number and composition of components, order of sequence, and partner responses. These all changed during the course of the nesting period. The interrelationships of successive acts were estimated by the authors' own modes of "information theory" application. All in all, questioning and analyzing stereotypy by modernistic analysis and reasoning rendered the situation more complicated than before.—Leon Kelso.

ECOLOGY

(See also 14, 58, 80)

30. Problems of evolutionary ecology. (Voprosy evolyutsionnoi ekologii.) N. Naumov. 1979. *Byull. Mosk. Obshch. Ispyt. Prirody, Biol. Div.*, **84**(6): 15–26. (In Russian with English summary.)—This review defines evolutionary ecology as the analysis of ecological patterns relative to natural selection. Attention is focussed on (a) the function and dynamics of population structure and (b) interaction of populations within the species. Population dynamics involves not only age and sex, but also territorial groups and "parcels" as breeding sites. The prevalent concept of a species as a hierarchical spatial system is confirmed here. The "systemic" status is sustained by an interpopulational exchange of the young as "waves of life" involving mass displacements. Certain sites facilitate individual encounters of different populations. A hierarchical stratification of the species assures both isolation and autonomy of populations. This spatial design promotes "competition." Schmalhausen has marked competition as the most trenchant prerequisite for speciation and progressive evolution.—Leon Kelso.

31. Reproductive responses of Northern Orioles to a changing food supply. S. G. Sealy. 1980. *Can. J. Zool.*, **58**(2): 221–227.—Data from "natural experiments" are always welcome, and this report is no exception. Sealy reports limited data from 1975, the year before a tent caterpillar outbreak, and extensive data for the two years of a localized outbreak on a Manitoba ridge (1976 and 1977) and a final year without tent caterpillars (1978). Nesting density in 1977 was double that of either 1976 or 1978 with a significant decrease in the distance between nests. Although both hatching failure and nestling deaths increased in 1977, productivity for the population as a whole was still highest in 1977 due to the sheer number of pairs per hectare (10.5). No support for Lack's hypothesis was seen as clutch size showed no significant changes in response to variation in the food supply. Sealy suggests that clutch size for this local population of *Icterus g. galbula* is already very high relative to the species as a whole due to the presence, even in non-tent caterpillar years, of a superabundance of adult midges. Maybe the "natural experiment" was more one of altering the supply of a preferred prey than raising prey density above some critical minimum.—A. John Gatz, Jr.

32. Bird communities and the structure of urban habitats. R. K. Lancaster and W. E. Rees. 1979. *Can. J. Zool.*, **57**(12): 2358–2368.—Previous studies on urban bird communities have shown: (1) higher biomass and abundance and lower species diversity in urban areas than adjacent natural areas; and (2) very few species, most of which are introduced species, in the most highly urbanized habitats. Lancaster and Rees verify these points for the birds of Vancouver, B.C. and report further observations that suggest causes for some of these results. They propose that avian species diversity decreases with increase in the habitat diversity of man-made structures such as roof-tops and pavement because of the barrenness of these features relative to the perching, feeding, or nesting needs of most species. The exceptions here are the holes, cavities, and ledges of buildings that favor nesting by Starlings (*Sturnus vulgaris*), Rock Doves (*Columba livia*), and House Sparrows (*Passer domesticus*). Their survey of home owners and apartment dwellers showed that enormous percentages (sometimes >200%) of the caloric needs of the resident birds were being met by direct feeding. Again, however, particular types of birds—non-territorial, ground-feeding granivorous or omnivorous species—were being favored by this aspect of the urban environment. In spite of all this, bird species diversity did increase with foliage height diversity within Vancouver just as MacArthur and MacArthur first reported for tropical forests, so it presumably would be possible to change some urban trends by extensive and varied planting.—A. John Gatz, Jr.

33. Niche separation in three species of waterbirds. P. R. Martin, B. G. Thompson, and S. J. Witts. 1979. *Corella,* **3:** 1–6.—Do not be misled by the title. Although a nice little study of *Fulica atra, Porphyrio porphyrio,* and *Gallinula tenebrosa,* it comes to rather grand conclusions on far too few data. From only two days of observation the authors propose niche separation between the species. Although it may not come as too great a surprise that the three species have different feeding niches, this study cannot show it. This is probably the most extreme example I have encountered recently of many conclusions chasing too few data. With luck, an investigator might make some tentative conclusions after a season's work in several areas. He or she would be on far firmer ground after two or three years. Niche separations are the result of complex behavioral and ecological adaptations, the causes of which are poorly documented. This study does not document either the causes or the phenomenon.—C. J. Ralph.

34. The adaptive syndromes of two guilds of insectivorous birds in the Colorado Rocky Mountains. R. C. Eckhardt. 1979. *Ecol. Monogr.,* **49**(2): 129–149.—Optimal foraging models have been developed and refined for nearly 20 years now, but field tests of their predictions remain rare. Part of the reason for this dearth, as Eckhardt compellingly argues, is the impossibility of objectively measuring search/pursuit ratios in order to classify species along the searcher-pursuer continuum of predator types used in the models. Intuitive categorizations of three species of Parulidae as searchers and five species of Tyrannidae as pursuers are used in the present study. Eckhardt and his assistants spent 765 hr over a three-summer period observing foraging and determining territory boundaries for the eight sympatric species in order to describe thoroughly the manner of resource utilization for the birds and to test predictions of optimal foraging theory. One has difficulty faulting either the methods or the thoroughness of the work; but, as Eckhardt writes, ". . . the fit between reality and theory is poor." Eckhardt further suggests that predator categories might more profitably be studied in terms of adaptive syndromes. He proposes that certain characteristics can be recognized as core adaptations which, together with other adaptations, can be used to define objectively adaptive syndromes of different predator types. It is his hope that extension of the adaptive syndrome idea to more species and different animal groups might lead to a useful restructuring of optimal foraging theory.—A. John Gatz, Jr.

35. Feeding ecology of piscivorous birds at Lake St. Lucia, Part 1: diving birds; Part 2: wading birds; Part 3: swimming birds. A. K. Whitfield and S. J. M. Blaber. 1978–1979. *Ostrich,* **49:** 185–198; **50:** 1–9; **50:** 10–20.—This is an excellent study on the various fish-eating species in Natal, South Africa. In-depth work on the food habits, preferred habitat, breeding seasons and success, and prey availability come together in a very good picture of the species' ecology. Many other excellent studies take one, or at the most two, of these components and make an interesting paper. This study attempts, and largely succeeds, in tying together all the strings of resource availability, use, and the ecological consequences. Especially interesting are the data and discussions on the subdivision of the resource through size, spatial substrate, and time.

This is the type of paper that encourages the rest of us to produce good solid factual bases for our more flighty theoretical fancies.—C. J. Ralph.

36. Distributional features of larks in principal biomes of left-bank steppes of the Ukraine. (Osobennosti raspredeleniya zharoronkov v osnovnykh biotopakh levoberezhnoi stepi Ukrainy.) V. Papenko. 1979. *Vestnik Zool.,* **1979**(a): 40–43. (In Russian.)—Biotopes inhabited by five species of larks (*Alauda arvensis, Galerida cristata, Calandrella cinerea, C. rufescens,* and *Melanocorypha calandra*) were examined relative to plant communities occupied and food preferences. During the breeding season the larks were associated with definite biotopes. Limiting factors seemed to be moisture, shelter, and foods. Each species displayed particular plant preferences, with certain food species in abundance. *Alauda arvensis* favored *Bromus inermis* and *Poa angustifolia. Galerida cristata* favored *Artemisia* spp., *Tanacetum millefolium,* and *Kochia prostrata. Calandrella cinerea* was most abundant in turf-grass areas and showed a preference for insect foods. *C. rufescens* frequented alkaline flats on the Azov and Black Sea coasts. The last species was more restricted to human populated centers affording densely weeded and grassy cover. In this habitat they captured and excavated a high percentage of large insects, particularly beetles.—Leon Kelso.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(See also 28, 67)

37. Movements of blackbirds and Starlings in southwestern Quebec and eastern Ontario in relation to crop damage and control. P. J. Weatherhead, R. G. Clark, J. R. Bider, and R. T. Titman. 1980. *Can. Field-Nat.,* **94:** 75–79.—Autumnal aggregations of blackbirds in the St. Lawrence Valley eat millions of dollars worth of corn and small grains. Banding data suggest that only in the late spring or early fall would control efforts eliminate the birds primarily responsible for agricultural losses in the early fall. The authors recommend more extensive banding of Red-winged Blackbirds (*Agelaius phoeniceus*) north of the St. Lawrence Valley in order to document better the potential role of migrants in crop depredation. However, I suggest an entirely different approach. Farmers have documented the damage to harvestable crops, but ornithologists have not documented the savings to farmers which result from birds that nest in corn fields and feed vast quantities of insectan pests to their young. Perhaps future research should focus on the net economic impact of blackbirds rather than identification of the culprits. Could the benefits of pest control dwarf the loss of grain? We do not know.—Edward H. Burtt, Jr.

38. Relationships between fruit-eating birds and seed dispersal in urbanized areas. K. Karasawa. 1978. *Tori,* **27**(1): 1–20. —The foraging ecology of frugivores was studied in the Tokyo and Chiba areas of Japan from October 1976 to March 1978. Of 35 species that overwinter, *Hypsipetes amaurotis, Sturnus cineraceus, Turdus naumanii,* and *Cyanopica cyana* were the more effective dispersers of fruit. The frugivores' foods were mainly species planted for greenery in an urban environment. Some plants were climbers and twiners serving for perching and shelter. Short distance dispersal within 300 m prevailed. Almost all seeds dispersed by birds germinated in May. Birds were most attracted (92%) to red, orange, and black. Of the foods favored by frugivores, 70% were in clusters.—Leon Kelso.

39. Interactions of Pheasants and Prairie Chickens in Illinois. D. R. Vance and R. L. Westemeier. 1979. *Wildl. Soc. Bull.,* **7:** 221–225.—Even though there is an active restoration program and no longer an open hunting season on Prairie Chickens (*Tympanuchus cupido pinnatus*) in Illinois, there is a potential threat to the chicken's continued existence resulting from increasing competition with introduced pheasants (*Phasianus colchicus*). This paper reports interactions between these two species over a 13-year observation period.

When present near the booming ground, cock pheasants harassed chickens on 43% of the mornings when a booming ground was observed. Pheasants were dominant in 78% of these encounters. They concentrated their attacks on nonbreeding cock chickens, but also attacked dominant cock and hen chickens. In some cases, a single cock pheasant disrupted booming by the entire chicken flock, sometimes chasing male and/or female chickens for more than 1,000 m from the booming ground. When individual troublesome cocks were removed by the researchers, another cock simply moved in to take his place. Pheasants also laid eggs in chicken nests causing a statistically significant depression in nest success. The authors suggest several management alternatives.—Richard M. Zammuto.

40. Evaluation of a Ruffed Grouse reintroduction in northern Indiana. S. T. Kelly and C. M. Kirkpatrick. 1979. *Wildl. Soc. Bull.,* **7:** 288–291.—A 15-year reintroduction program designed to restore Ruffed Grouse to its former range in northern Indiana was successful at one release site. Population estimates (drumming counts, transects) found grouse densities similar to those in nearby states whereas before reintroduction none were present and ingress could not have occurred.—Richard M. Zammuto.

CONSERVATION AND ENVIRONMENTAL QUALITY

(See also 32, 39, 40)

41. Abundance and productivity of ducks on boreal lakes in northern Sweden. K. Danell and K. Sjoberg. 1979. *Ann. Zool. Fenn.,* **16:** 123–128.—International cooperation is required to preserve European waterfowl, their overwintering areas, their migration routes, and particularly their nesting habitat. However, little is known about the population dynamics of waterfowl breeding throughout the boreal forests of northern Europe. Danell and Sjoberg provide extensive data on the distribution and breeding populations of waterfowl nesting on lakes in the Finnoscandian boreal forest. Ten species of ducks bred in the 56-km^2 study area during the summer of 1977, with the Tufted Duck (*Aythya fuligula*), Mallard (*Anas platyrhynchos*), and Goldeneye (*Bucephala clangula*) being the most common. The authors stress the necessity for full documentation of the aquatic characteristics (e.g., lake morphometry, water chemistry) so that waterfowl populations in different regions can be meaningfully compared.—Edward H. Burtt, Jr.

42. Shooting in Italy: the present situation and future perspective. F. Cassola. 1979. *Biol. Conserv.,* **16:** 85–106.—Italy is on an important bird migration route because it is used as a land bridge by many birds for part of their migrations across the Mediterranean from Europe to Africa. This makes the attitudes of Italians to bird protection a matter of international importance. As is shown by Cassola, hunters largely control what laws are made for bird protection in Italy. The number of Italian hunters is estimated at 2,000,000, or about 8/km^2. Cassola notes that "the real shooting situation in Italy is virtually unknown abroad, and poorly known even to most Italians, the large majority of whom are rather indifferent to it." Cassola makes the further observation that "public opinion is slowly becoming better informed, the opponents of shooting are increasing, and the idea of a national referendum for the full abrogation of the shooting laws is gaining ground."

Clearly, in Italy as elsewhere, the people with the most money are still the ones that influence the use to which nature is put.—Paul A. Stewart.

43. Man's influence on potential nesting sites and populations of swallows in Canada. A. J. Erskins. 1980. *Can. Field-Nat.,* **93:** 371–377.—The human impact on swallows is mixed. The settlement of North America by Europeans provided homes for Purple Martins (*Progne subis*) and Tree Swallows (*Iridoprocne bicolor*) and nesting sites for Barn Swallows (*Hirundo rustica*), Cliff Swallows (*Petrochelidon pyrrhonota*), and Bank Swallows (*Riparia riparia*). Removal of the forests, especially the large, dead trees favored by woodpeckers and subsequently swallows, has adversely affected Purple Martins and Tree Swallows which have also been adversely affected by the reduction in flying insects around urban and suburban areas. Violet-green Swallows (*Tachycineta thalassina*) and Rough-winged Swallows (*Stelgidopteryx ruficollis*) occupy nest sites relatively unaffected by man. Erskine's conclusions are based on analysis of the Canadian nest records schemes and emphasize the value of such programs.—Edward H. Burtt, Jr.

44. The past and current status of the Greenland White-fronted Goose in Ireland and Britain. R. F. Ruttledge and M. A. Ogilvie. 1979. *Irish Birds,* **1:** 293–363.—The Greenland White-fronted Goose (*Anser albifrons flavirostris*) is one of the rarest subspecies of goose in the world, with a population of no more than 15,000. A survey of all known winter haunts shows a 43% decline in Ireland with 29 of the 70 sites deserted, a 94%

decline in Wales and England with two of the three sites deserted, and a 47% increase in Scotland with two new sites colonized, all since the 1950's (the authors' figures for percent population change do not agree with their data and are here recalculated). The decline in Ireland is more serious than at first sight as numbers at the one main haunt have remained stable. The most important reason for the decline is loss of bog habitat in Ireland, accompanied by shooting and disturbance. Dependence on bogs is much less in Scotland where agriculural land is exploited, and it is significant that the decline has occurred in those parts of the range where farmland is in small parcels, aggravating the effects of hunting and disturbance. For a hunted species the annual level of production of 17.8% is low (because under 20% of adults breed, although the brood size of 3.3 is higher than other White-front subspecies) and is in imbalance with the 20% rate of mortality. This paper is a plea for conservation, particularly in Ireland, and contains the good news that complete protection in Scotland is likely in the near future.—P. J. Belman.

45. The black tide (oilspill) from the Amoco Cadiz. (La marée noire de l'Amoco Cadiz.) 1978. *Penn Ar Bed,* **11**(2 & 3): 299–408. (In French.)—The enormous catastrophe caused by the shipwreck of the Amoco Cadiz and the resulting spill of 230,000 tons of crude oil onto the northern coast of Brittany in March 1978 prompted the devotion of two entire issues of this journal of the Society for Study and Protection of the Environment in Brittany to the subject of that shipwreck and of oilspill cleanup in general. Nine articles and a photographic essay comprise this impromptu symposium, including:

Characteristics and behavior of oil spilled on the sea. (Caractéristiques et comportement du pétrole déversé à la mer.) J.-P. Guyomarc'h and J.-Y. Monnat. P. 299–310.

A preliminary account of the ecological impact of the shipwreck of the Amoco Cadiz after six months. (Six mois après la marée noire de l'Amoco Cadiz, bilan provisoire de l'impact écologique.) C. Chasse and D. Morvan. P. 311–338.

Bird mortality after the shipwreck of the oil tanker Amoco Cadiz. (Mortalités d'oiseaux à la suite du naufrage du pétrolier Amoco Cadiz.) J.-Y. Monnat. P. 339–360. (see review **46.**)

Beachings of marine mammals during the oilspill from the Amoco Cadiz. (Échouages de mammifères marins pendant la marée noire de l'Amoco Cadiz.) D. Prieur and E. Hussenot. P. 361–364.

A rare dolphin found on the Finistere coast: *Lagenorhynchus acutus*. (Un dauphin rare trouvé sur les côtes du Finistère: *L. a.*) R. Duguy. P. 365–366.

Impacts of the Amoco Cadiz oilspill on human biology. (Impacts de la marée noire (Amoco Cadiz) en biologie humaine.) J.-F. Menez, F. Berthou, D. Picart, and C. Riche. P. 367–378.

Photo Essay. (Les événements en quelques images.) P. 379–386.

The marine fishermen's side to the disaster of the Amoco Cadiz. (Les marins-pêcheurs face au sinistre de l'Amoco Cadiz.) H. Didou. P. 387–390.

The question of catastrophes beyond that of the Amoco Cadiz. (Au-delà de l'Amoco Cadiz: la question des catastrophes.) P. Lagadec. P. 391–400.

Do the new navigation rules increase the risks of pollution? (Les nouvelles règles de navigation accroissent-elles les risques d'abordage?) R. Moirand. P. 401–403.

The spectrum of these papers, written in a semi-popular vehicle, provide the interested reader with an important perspective on a major ecological-human disaster of our times, that perspective of the people whose coast was inundated by the "marée noire de l'Amoco Cadiz."—Paul B. Hamel.

46. Bird mortality after the shipwreck of the oil tanker Amoco Cadiz. (Mortalités d'oiseaux à la suite du naufrage du pétrolier Amoco Cadiz.) J.-Y. Monnat. 1978. *Penn Ar Bed,* **11**(2): 339–360. (In French.)—After the shipwreck of the Amoco Cadiz in March 1978, the people of Brittany reactivated a network of treatment centers for oiled birds that had been established during two of three earlier oilspills on the Brittany coast from: the Torrey Canyon in 1967, the Olympic Bravery in January 1976, and the Bohlen in October 1976. Headquartered at Brest, the network included 11 additional centers in locations hardest hit by the spill and nine other facilities along the northern coast. For the first time during this spill, it was decided to concentrate not only on the treatment and release of oiled birds but upon recording the numbers, species, and age composition of all beached birds, living or dead. The records gathered in this fashion form the data for the present preliminary report.

More than 3,600 birds of 47 species were found beached on the Brittany coast from 19 March–26 May 1978. Another 1,600 oiled birds were found in areas *not* affected by this spill indicating other sources of seaborne oil, most likely resulting from other ship captains in the area opportunistically rinsing their ships' fuel tanks under cover of the major disaster. Most of the oiled birds died. Monnat estimates that recoveries constituted perhaps 20% of mortality, based in part upon an experiment in which marked, oiled carcasses were released at sea at known distances from the coast. Low recovery rates result from the difficulty of finding birds in the heavy oil coating on the shore, problems involved in adequately searching rocky coastlines, and, importantly, winds that blew away from the coastline for about two weeks in late March and early April.

Although substantial, losses were relatively slight by comparison with the enormous volume of oil spilled. The author advances two hypotheses for this finding. First, the fact that the oil stayed close to the coast may have resulted in lower losses than might otherwise have been sustained. Second, the oil itself contained a large proportion of volatile compounds; perhaps 70,000 tons of the oil evaporated, leaving a suffocating stench in the air. Difficulties in breathing possibly prompted birds to flee, thus preventing their becoming oiled. Observers noted that even terrestrial birds left the coastal area, and visible migration in the region of the spill was almost non-existent.

Four species accounted for 80% of the losses: Common Puffin (*Fratercula arctica*), Razorbill (*Alca torda*), Common Murre (*Uria aalge*), and Shag (*Phalacrocorax aristotelis*). Puffins alone represented 36% of the total, an unprecedented proportion for these birds after an oilspill; many of them were molting birds unable to fly away from the spill, and apparently a substantial portion were birds killed by storms or some other agency at sea and oiled *post mortem.* As far as could be determined, major mortality of all species was suffered by wintering individuals; where data exist, seabird colonies in Brittany comprised approximately the same number of birds after the disaster as before. However, the effects were not negligible, the spill mortality having an unknown and possibly severe impact upon alcid rookeries in the British Isles, from which most of the birds apparently derived. Likewise, the 90 Common Loons (*Gavia immer*) killed in the disaster were not a large number but may constitute a significant portion of the 100–300 pairs in the only European nesting population in Iceland. In Brittany, the largest Little Tern (*Sterna albifrons*) colony failed to reproduce in 1978 because erosion caused by the oilspill destroyed the nesting beach. The data presented in this report, although sketchy, provide a useful baseline for future examination of the long-term effects of this disaster.—Paul B. Hamel.

47. Moult and moult migration of waterfowl in Estonia. E. Kumari. 1979. *Wildfowl,* **30:** 90–98.—**The moulting of Tufted Duck and Pochard on the IJsselmeer in relation to moult concentrations in Europe.** R. J. Van Der Wal and P. J. Zomerdijk. 1979. *Wildfowl,* **30:** 99–108.—**Moulting Eiders in Orkney and Shetland.** P. H. Jones and P. K. Kinnear. 1979. *Wildfowl,* **30:** 109–113.—These three contributions focus on a period of the year that has received little attention by waterfowl researchers. Indeed, postbreeding biology has not been studied very well for most groups of birds. A common theme is that identification of important molting aggregation areas will lead to better conservation measures for the future. Kumari is able to draw on records that go back into the 19th century for his analysis. The second two papers identify clear threats to the integrity of the molting areas: the IJsselmeer with reclamation and increased recreation, the Orkney and Shetland birds with oil exploration on the North Sea oilfields. The data presented by the authors were collected in large measure by an army of birdwatchers, freely contributing their time and energy. North Americans could learn a great deal from the Europeans in this respect.—Bruce D. J. Batt.

PHYSIOLOGY

(See also 65, 68, 73, 79)

48. Thermal energetics of chicks of arctic-breeding shorebirds. M. A. Chappell. 1980. *Comp. Biochem. Physiol.,* **65A:** 311–317.—Small chicks of shorebirds generally are poorly insulated and must be periodically brooded until they are half grown. Analyses of four species of shorebirds indicate heat transfer coefficients are high in small chicks but decrease rapidly with age (and increased size). Thermolability of chicks may enhance the efficiency of brooding-activity cycles. This paper is an interesting application of physical analyses, including equivalent environmental temperatures, to the study of brooding strategy and chick physiology.—C. R. Blem.

49. Climatic adaptation in avian standard metabolic rate. W. W. Weathers. 1979. *Oecologia,* **42:** 81–89.—An analysis of the values for standard metabolic rate (SMR) in the literature reveals a statistically significant increase in SMR with latitude. Within each habitat, however, considerable variation exists, raising questions concerning the importance of such a correlation. For example, SMR of tropical birds that forage in the sun are about 25% lower than predicted, whereas those of species foraging in the shade tend to approximate predicted values. The author engages in some philosophizing concerning the adaptive nature of the relation between SMR and latitude and habitat. However, the actual significance of variation in SMR as an "adaptation" to climate will become clear only when SMR can be correlated with detailed information on heat flow, thermoregulation, and energy budgets of the species involved. These data are needed to verify that variation in SMR actually confers energetic benefits, as implied by the author.—Cynthia Carey.

50. Embryonic metabolism of the Fork-tailed Storm Petrel: physiological patterns during prolonged and interrupted incubation. C. M. Vleck and G. J. Kenagy. 1980. *Physiol. Zool.,* **53:** 32–42.—Eggs of the Fork-tailed Petrel (*Oceanodroma furcata*) may remain untended by the adults for days at a time. Embryos are tolerant of periodic chilling to 10°C. Although the optimum incubation temperature may be 34°C, embryos develop to hatching at 30°C (hatching success is impaired, however). Low metabolism of embryos at burrow temperatures, a slow developmental rate, and low conductance of the eggshell to water vapor are adaptations that permit survival of prolonged neglect.—C. R. Blem.

51. The use of standard operative temperature in the study of the thermal energetics of birds. G. S. Bakken. 1980. *Physiol. Zool.,* **53:** 108–119.—One of the major weaknesses of laboratory analyses of energy utilization by birds is the difficulty involved in extrapolating to natural habitats. This paper demonstrates the ability of standard operative temperatures (generated from measurements of the physical environment, avian body temperature, and the physics of heat transfer) to bridge the gap between lab and field. The analyses, too complicated to be described here, should be examined by serious students of avian energetics.—C. R. Blem.

52. Hummingbirds see near ultraviolet light. T. H. Goldsmith. 1980. *Science,* **207:** 786–788.—The subjects were wild local populations of *Archilochus alexandri, Lampornis clemenciae,* and *Eugenes fulgens,* which fed at four feeders in hoods with lighted glass behind the feeding tubes. The birds distinguished by taste between 30% sucrose and 0.5 M NaCl. The birds learned to go to the feeders whose light contained UV with a maximum at about 370 nm. The addition of UV was imperceptible to a human observer. The ability to see into the UV appears to be mediated by special sorts of oil droplets in the retina. Birds may have been originally diurnal and with color vision.—C. H. Blake.

53. Animal anorexias. N. Mrosovsky and D. F. Sherry. 1980. *Science,* **207:** 837–842.—Many vertebrates and a few invertebrates lose appetite in situations where finding food would be impossible or maladaptive. In mammals anorexia is normal during hibernation, less frequently during migration or breeding (e.g., male sea lions). In birds anorexia is rather frequent during incubation and less usual during the molt. It is emphasized that a programmed "set-point" or normal level of body fat obtains. Excess food intake on the one hand or over-expenditure of energy or forced food deprivation will modify the food intake to bring body fat (or weights) back to the appropriate level. The effect of food deprivation was examined in Red Jungle Fowl (*Gallus gallus*) [not domestic chickens, fide Dr. Mrosovsky]. The weight returned to that proper to the stage of incubation at the end of the period of recouping weight loss. Anorexia during incubation may usually make possible either more uniform egg temperature or protection against predators or both. Penguins cannot seek food during molt and so must fast. I believe that anorexia might also be helpful to land birds that make very long over-water flights.—C. H. Blake.

54. Localization of lysyl oxidase in hen oviduct: implications in egg shell membrane formation and composition. E. D. Harris, J. E. Blount, and R. M. Leach, Jr. 1980. *Science,* **208:** 55–56.—Lysyl oxidase activity localized in the isthmus of the hen oviduct is necessary for formation of cross-links in the elastin of the shell membrane. The major cross-links are in desmosine and isodesmosine. The peak of copper concentration in the oviduct coincides with that of lysyl oxidase. Copper deficiency results in defective shell membrane.—C. H. Blake.

MORPHOLOGY AND ANATOMY

(See also 1, 16, 52, 73)

55. Sexual dimorphism in two Savannah Sparrow populations. P. J. Weatherhead. 1980. *Can. J. Zool.,* **58**(3): 412–415.—Sexual dimorphism in birds, as in other animals, can result from sexual selection, selection for competitive avoidance, or some combination of these two. If sexual selection is important, dimorphism should be greater in polygynous populations of a species than monogamous populations. If avoidance of intraspecific competition is important, dimorphism should be greater in insular populations of a species than mainland populations as interspecific competition is reduced on islands. Given a monogamous mainland population of Savannah Sparrows (*Passerculus sandwichensis*) and a bigamous insular population of Ipswich Sparrow (*P. s. princeps*) to analyze, theory would put Weatherhead in a no-lose situation: Ipswich Sparrows from Sable Island should be more sexually dimorphic than mainland Savannah Sparrows. So much for theory. Of 8 features of the bill, wing, tail, and limb measured, 4 showed greater dimorphism in the insular population and the other 4 varied more between sexes in the mainland population. Overall, discriminant analysis showed the mainland population to be slightly more dimorphic. Although Weatherhead discusses several possible reasons for his unexpected results, one general possibility that he did not mention concerns me. To wit, the mainland population came from so geographically removed a site (Manitoba) from the sparrows of Sable Island, Nova Scotia, that many confounding selective forces could be operating, these serving to obscure differences that might have been seen if, for instance, Savannah Sparrows from mainland Nova Scotia had been used in the comparison. As for the sexual selection, perhaps 19.2% bigamy in Ipswich Sparrows is too low a level of polygyny to influence significantly dimorphism.—A. John Gatz, Jr.

56. Origin of cushion tissue in the developing chick heart—cinematographic recordings of *in situ* formation. M. G. Kinsella and T. P. Fitzharris. 1980. *Science,* **207:** 1359–1360.—Cushion tissue is composed of cells that migrate into specific regions of the cardiac jelly which is situated between the myocardium and the endothelium of the heart lumen. Time lapse photography using differential interference optics showed that these migrating cells are of endocardial origin.—C. H. Blake.

PLUMAGES AND MOLT

(See also 22, 47)

57. Seasonal incidence of breeding, moult and local dispersal of Red-billed Firefinches *Lagonostica senegala* in Zambia. R. B. Payne. 1980. *Ibis,* **122:** 43–56.—This species is a sedentary, seasonal breeder in open, tropical woodlands. The seasonality of its habitat is correlated with well-defined periods of breeding, molt, and dispersal. Populations reproduce and molt between March and September, although no individual was found to be reproducing and molting simultaneously. The molting period (3.5–4 months) is longer than that of most temperate species and molt may be temporarily suspended during breeding. Local dispersal is greatest in the dry season. These birds do not occur in locally differentiated populations that correspond to the dialect populations of their brood parasite, the Village Indigobird (*Vidua chalybeata*). The data on seasonal phenology presented here will be useful for comparison with those of species breeding in the non-seasonal tropical forests of Africa.—Cynthia Carey.

58. Notes on Rustic Bunting (*Emberiza rustica*) ecology in the Leningrad region. (Materialy po ekologii ovsyanka remeza (*Emberiza rustica* Pall.) v leningradskoi oblasti.) T. Ryumkevich. 1979. *Vest. Leningradskogo Univ., Div. Biol.,* **1979**(3): 37–47. (In Russian.)—The notes were on growth and development of 11 nestlings from three nests, banded at 6–9 days old. The author also trapped 437 buntings between 1962–1974. Rustic Buntings usually frequented wetlands. Of 374 trapped during migration, only 11 were in adult plumage. Postjuvenal molt coincided with fall migration. Most adults replaced all their plumage postnuptially. In captivity molt lasted 50–70 days from early July to late September.—Leon Kelso.

ZOOGEOGRAPHY AND DISTRIBUTION

(See also 14, 36, 41, 43, 77)

59. Special Irish Issue. R. Goodwillie, J. S. Furphy, K. Preston, C. D. Hutchinson, O. J. Merne, and R. J. O'Connor. 1980. *Brit. Birds,* **73**(2): 58–94.—The major part of the entire issue is devoted to the birds and ornithology of Ireland. The separate papers, "Topography and habitats of Ireland," "Irish bird sites," "Ireland's winter visitors and passage migrants," "Irish seabird islands," and "Ornithology in Ireland" represent a valuable summary of the land and birds for non-Irish ornithologists. Despite the generally recognized depauperate avifauna of the island, Ireland has important bird populations—breeding seabirds and many migrant and wintering waterfowl—which are often overlooked by local as well as international birdwatchers. Although I have never watched birds in Ireland, I feel confident that this summary would be an excellent guide, and I recommend it to anyone interested in Ireland's birds.—Patricia Adair Gowaty.

60. A review of factors influencing extralimital occurrences of Clark's Nutcracker in Canada. R. M. Fisher and M. T. Myres. 1980. *Can. Field-Nat.,* **94:** 43–51.—When conifer seeds are plentiful Clark's Nutcracker (*Nucifraga columbiana*) accumulates large stores of seeds that enable it to feed larger than average broods during the following spring. The large population that results is usually faced with a poor seed crop the following autumn. Because adults forage more efficiently than juveniles, the juveniles disperse in search of food creating an irruption of Clark's Nutcrackers much to the delight of birdwatchers outside the nutcracker's usual range. The above model based on records from 1904 to 1976 is not only reasonable, but predictive. The authors suggest that their model can be tested by systematic collection of data on the annual production of conifer seeds and the extralimital occurrences of Clark's Nutcracker. The article suffers somewhat from confusion in the terms irruptive and eruptive.—Edward H. Burtt, Jr.

61. Great numbers of bird species found in China. C. Tso-hsin. 1979. *Tori,* **28**(1): 59–62. (In English.)—The total number of species is 1,166, whereas the total in the Soviet Union is about 40% less, and that of North America about 34% less. "China stretches over both Palearctic and Oriental zoogeographic realms. Mexico is the only other country in the world which covers two of the world's six different zoogeographical realms. While China covers 7% of the world's land area, its bird species account for 13% of the world's total; and its 420 mammal species, 11%."—Leon Kelso.

SYSTEMATICS AND PALEONTOLOGY

(See also 26, 76)

62. On the habits and relationships of the Common and Arctic Redpolls in Kamchatka. (K biologii i vzaimootnozheniyami obyknovennoi (*Acanthis flammea*) i tundryanoi (*Acanthis hornemanni*) chechetok na Kamchatke.) E. Lobkov. 1979. *Biol. Nauki,* **1979**(11): 64–68. (In Russian.)—The broad belt of intergradation between Common and Arctic redpolls expands during invasion years, although overlap was less than expected based on the number of hybrids and hybrid pairs. Details of behavior lead to the belief that the Common and Arctic redpolls are distinct but closely related species whose isolating mechanisms are incomplete. Three hundred specimens of each species were examined. Lobkov poses the question of the species ranges in the Arctic, how did they originate, the geographical extent of the overlap and its evolutionary duration.—Leon Kelso.

63. Electron spin resonance dating of animal and human bones. M. Ikeya and T. Miki. 1980. *Science,* **207:** 979–981.—The method measures effects caused by exposure to natural radiation. Effects on samples of known age from the environment are needed to establish a base rate of acquisition of radiation. The main advantage of the method is that the specimen need not be ground or heated.—C. H. Blake.

64. Possible generic affinities of the Ibisbill and remarks on the history of family Haematopodidae. (Vozmozhnie rodstvennye svyazi serpoklyuva (*Ibidorhyncha struthersii*) i zamechaniya po istorii semeistva Haematopodidae (Aves).) L. Stepanyan. 1979. *Zool. Zhurn.,* **58**(11): 1671–1679. (In Russian with English summary.)—It is said that "Some resent instability of nomenclature but may we not have allowance for progress?" Refuge is found in the thought: no progress without "breaking a few eggs." This thought may occur in reasoning for or against recognition of the generic individuality of the Ibisbill in the subfamily Ibidorhynchinae. Its fusion with the Oystercatchers is suggested there. In an elaborate review covering 30 cited titles, the habits, features and distribution of both groups are discussed.—Leon Kelso.

EVOLUTION AND GENETICS

(See also 55, 70, 75)

65. Mendelian units of inheritance control color preferences in quail chicks (*Coturnix coturniz japonica*). J. K. Kovach. 1980. *Science,* **207:** 549–551.—Japanese quail chicks tend to approach conspicuously colored objects but have individual color preferences. It was possible to produce pure strains with distinct preferences, in the present case, red versus blue. It was concluded that from four to eight pairs of alleles were involved. The preferences could be modified by external stimuli. Kovach considers that these modifiable preferences may yield data on the physiology of processing visual events by the brain.—C. H. Blake.

FOOD AND FEEDING

(See also 17, 21, 31, 35, 36, 38, 53, 60)

66. Composition of food of Starlings' nestlings, *Sturnus vulgaris* L., in Zulawy Wislane. J. Gromadzka and M. Gromadzki. 1978. *Acta Ornithol.,* **16**(14): 335–364. (In Polish with Russian and English summaries.)—In volume and number it is claimed current ornithological articles dealing with food average about 70%. This is an example. Four nest box colonies from the breeding seasons of 1971 and 1972 were involved. Food analyzed was collected by the neck-ringing method. Ratios of prey in the food of the nestlings were determined by frequency and weight, based on dry mass of a food ration. About 97% of the food fed to the young by adults was gathered in late May and early June. Insects constituted the basic food, with liberal amounts of earthworms, spiders, and snails. Among the most frequent species of prey were, *Cantharis fusca, Chareas graminis,* and *Hadena* sp. The insect species identified were numerous and grouped in the more commonly available families, Pentatomidae, Cantharidae, Elateridae, Curculionidae, Noctuidae, Bibionidae, and Tipulidae. But no one species totaled over 5% by either of the coefficients. No distinct relationship was found between food composition and the age of the nestlings.—Leon Kelso.

67. Food of the Barn Owl, *Tyto alba guttata,* from Kujawy. A. Ruprecht. 1979. *Acta Ornithol.,* **16**(19): 493–511. (In English with Polish and Russian summaries.)—From pellets collected in 29 localities near the city of Kujawy, bones of 16,944 small vertebrates were identified. These included frogs, 1.9%; birds 13% (19 species); and small mammals, 85%

(25 species, largely *Mus musculus* and *Microtus* spp.). Detailed skull analysis showed that predation on the House Sparrow (*Passer domesticus*) was nonselective with respect to age. The relatively small individual territory of the Barn Owl and incomplete digestion of skeletal elements of the prey make it an ideal species for investigations of the distribution and age structure of populations of small vertebrates. Among incidental prey were nine species of bats. Church attics and garrets were the preferred nesting sites, except where they were blocked to inhibit Jackdaws (*Corvus monedula*).—Leon Kelso.

68. Energetic investigations on a tropical hummingbird (*Amazilia tzacatl*). (Energetische Untersuchungen bei einer tropischer Kolibriart (*Amazilia tzacatl*).) K.-L. Schuchmann, D. Schmidt-Marloh, and H. Bell. 1979. *J. Ornithol.*, **120**(1): 78–85.—The time-energy budget of *Amazilia tzacatl* was studied in enclosed cages. Given a choice, individuals showed a preference for solutions having a higher sugar concentration. The length of a foraging bout was correlated to the time interval to the next foraging bout. The excess energy accumulated during a 12-hr day was 4,070 cal, enough theoretically to allow the bird to pass the night without going into torpor. Energy expenditure was minimized during the day by long periods of inactivity.—Robert C. Beason.

69. Winter food habits of the Yezo Ural Owl *Strix uralensis japonica* in a wind shelter-belt. M. Yoneda, H. Abe, and H. Nakao. 1979. *J. Yamashina Inst. Ornithol.*, **11**(1): 49–53. (In Japanese with English summary.)—According to a long-developed and continuing owl bibliography 60–70% of the literature deals with food. This article does not reverse the trend. In 111 pellets collected through four seasons in eastern Hokkaido small mammals predominated. There were seven species of rodents, two shrews, a flying squirrel, and a weasel. Of birds there was but a trace of poultry, while a Pygmy Woodpecker (*Dendrocopos kizuki*) and a Brown-eared Bulbul (*Hypsipetes amaurotis*) were added to the list. In general the food represented the prey's abundance and local habits of the owl.—Leon Kelso.

70. Differential avoidance of mimetic salamanders by free-ranging birds. E. D. Brodie, Jr. and E. D. Brodie, III. 1980. *Science,* **208:** 181–182.—The efts of *Notophthalmus viridescens* are red and toxic to birds. Those of *Desmognathus ochrophaeus* and *Plethodon cinereus* are not toxic. The last species has two morphs, one striped (80%) and the other red (20%) (a mimic of *N. viridescens,* percentages approximate). Appropriate proportions of the four forms were exposed with a few leaves in trays in a pine planting. In two-hr trials nearly all *N. viridescens* survived. In similar two-hr trials less than 50% of *D. orchrophaeus* and striped *P. cinereus* survived whereas more than 50% of the red *P. cinereus* survived the trials. The authors infer that predators include the American Robin (*Turdus migratorius*) and Gray Catbird (*Dumetella carolinensis*). The Blue Jay (*Cyanocita cristata*) is not mentioned. Predation ceased when birds had apparently left the woods.—C. H. Blake.

SONGS AND VOCALIZATIONS

(See also 26)

71. Acoustic signaling and shorebird behavior at early ontogenesis. (Akusticheskaya signalizatsiya i povedenie kulikov v rannei ontogeneze. 1. Prenatalnye statsii razvitiya.) A. Tikhonov and S. Fokhin. 1979. *Biol. Nauki,* **1979**(10): 33–40. (In Russian.)—Sonographs were made of the sounds of the embryos of 20 species of shorebirds during incubation and hatching. Sounds by the embryos occurred during 89–92% of their hatching time. Arhythmic and low amplitude sounds, clicks and chirps, were emitted during incubation and at hatching. During respiratory movements of embryos clicks and chirps were recorded as "discomfort" sounds. Hatching was signaled by emission of "comfort" signals. The importance and mechanisms of prenatal sound are discussed.—Leon Kelso.

72. Initiative mechanisms of acoustic orientation in precocial birds. (Puskovoi mekhanizm akusticheskoi orientatsii vydvodkovykh ptits.) B. Zvonov. 1980. *Izvest. Akad. Nauk, SSSR,* Ser. Biol., **1980**(1): 131–133. (In Russian.)—Control of spatial orientation of precocial birds in early stages of posthatching was investigated. Localization of a sound could be established if the embryo was subjected to a control signal during the final days of incubation. Spatial disorientation could be effected by severance of syringeal nerves. It is presumed that there is an afferent nerve linkage of sound emission involved in control mechanisms of orientation acoustics. Only the common fowl, *Gallus gallus* (55 chicks), was subjected to these operations.—Leon Kelso.

73. Frequency selectivity in the Parakeet (*Melopsittacus undulatus*) studied with narrow-band noise masking. J. Saunders, G. Bock, and S. Fahrbach. 1978. *Sensory Processes*, **2**(2): 80–89.—Saunders et al. found pronounced differences between mammals and birds in the masking effects of narrow-band noise. These are evidently relevant to the differences in their middle and inner ears and auditory structures in their central nervous systems. When differences between the avian and mammalian systems are compared in detail (the parakeet basilar papilla is 3.7 mm long, that of man is 33 mm) it is significant that the parakeets modifying curves are the more efficient. The authors found that the "traveling wave" on the avian basilar papilla is more symmetrical than that found on the mammalian basilar membrane. The present "behavioral tuning curves" suggest that frequency selectivity in birds is indeed superior to frequency selectivity in mammals. The mechanism of avian frequency selectivity is not yet fully understood, however.—Leon Kelso.

74. Voice in the behavior of the Bee-eater (*Merops apiaster*). (Golos v povedenii zolotistoi shchurki, *Merops apiaster* (Coraciiformes, Meropidae).) I. Nikolskii. 1979. *Zool. Zhurn.*, **58**(10): 1511–1517. (In Russian with English summary.)—Two plates of sonograms and one plate of 11 oscillograms portray the extent of this study. In the Voronezh District during the nesting season it was found that voice controlled intrafamilial responses. All sounds emitted, including the "disaster call," were of the "tonal type." Four types of sound patterns occurred more frequently, as shown by their sonograms and oscillograms. Defense calls sounded outside the nesting season attracted Bee-eaters which showed an "orientation-investigation motor reaction." The "disaster call" repelled them. The flight capacity along with coloniality and ground nesting in this species is quite in contrast to the abilities, or lack of them, in granivorous birds.—Leon Kelso.

MISCELLANEOUS

75. Some remarks on "classical" and "non-classical" biology. (Neskolko zamechanii o "klassicheskoi" i "neklassicheskoi" biologii.) A. Skvortsov. 1979. *Byull. Mosk. Obshch. Ispyt. Prirody, Biol. Div.*, **84**(1): 106–117. (In Russian.)—A botanist, specialist on willows, waxes controversial on a controversial topic. "Personally Lyubishev is unique and his individuality is engaging and also attractive. His work serves varied ends, and offers pertinent observations. While contemporary Darwinism affords logical objectives and covers all biology, yet the idea of Lyubishev offers a shelf or outcrop of details, but no conclusions amounting to anything structural or constructive. There is no challenging the author's stand in this paper. From a logical viewpoint this is understood; it is difficult to rest a positive concept on a negative basis. And in this case the basis accentuates the negative: unacceptable to the functional sense of the structural and adaptive nature of evolution. It would have been better to accentuate the positive of the alternate hypothesis which would offer a definite explanation for the initiation of organic initiative and functional integration at all levels of life even to ecosystems at the highest level. But such a hypothesis is so far not forthcoming.

"While Darwinian biology in the current century has advanced fantastically, the orthogenesis hypothesis lingers at the level of the Eimer epoch. This indicates that the evolution of science as a whole goes according to Darwin.

"However oft repeated, the emergence of the same mutations, if they reduce the species' vitality, natural selection will sustain it. However frequently the same scientific idea is advanced, if it is less subject to or for such facts as the competitive idea, or if it contains logical absurdities, it may have some little success in acceptance in the basic framework of science."

However, the authors of this paper evidently realize that adequate and sufficient explanations of the concepts they advance do not suffice. Thus, at the conclusion of the paper they assert interest only in initial methodologic premises which they (in Lyubishev's opinion) have introduced into biology. In enumerating these premises the authors call them "conceptual premises of non-classical science" (p. 113). But essentially this is only the usual elementary general science, a premise which science actually accepted even in the 18th and 19th centuries (if not before). As such they encounter no opposition. However, as applied to biology they perhaps are no better formulated. For example, for biology it is more expedient to take a stand not on the law of conclusions and not on freedom of choice of postulates (which really no one opposes) but on requisite adequacy of empirical facts and proof of hypotheses, on concordant facts and in logical sequence."—Leon Kelso.

76. William Brewster's exploration of the southern Appalachian Mountains: the journal of 1885. M. C. Simpson, Jr. 1980. *N. C. Hist. Review,* **57**(1): 43–77.—The editor of Brewster's journal of his visit to the Appalachians of North Carolina in 1885 points out that the botany of the area had been studied for almost a century before anyone looked seriously at its zoology. There were rumors that northern birds bred in the southern Appalachians. E. D. Cope visited the area in the fall, but late enough so that he could have encountered northern migrants. Brewster's visit was in late May or early June and he was careful to find nests when he could or otherwise report evidence for breeding. It was on this trip that he collected the types of the Carolina (Dark-eyed) Junco (*Junco hyemalis*) and the Mountain Solitary Vireo (*Vireo solitarius*). Simpson provides elaborate notes on all of the persons mentioned with references to biographical material and also at each point gives the current scientific and vernacular names of the birds mentioned in the journal. Brewster never met J. S. Cairns, but by correspondence encouraged the latter in his studies of the region.—C. H. Blake.

BOOKS AND MONOGRAPHS

77. The Birds of Zanzibar and Pemba. R. H. W. Pakenham. 1979. British Ornithologists Union Checklist No. 1. 134 p. £4—Zanzibar and Pemba are islands off the East African coast. Political troubles have precluded extensive ornithological study of these areas, but limited tourism is now encouraged by the government. This book updates several previous checklists and should stimulate further attempts to study the avifauna of these islands.

Zanzibar lies about 40 km off the East African coast, 6° S of the equator. Pemba is about 40 km northeast of Zanzibar, 5°S, and slightly more distant from the mainland. Sizes of Zanzibar and Pemba are 1,650 km^2, and 1,014 km^2, respectively. The geological history of Pemba is uncertain, but it may be 4–5 million years older than Zanzibar. Zanzibar has been separated from the mainland since the Pleistocene.

The islands are richly vegetated and well wooded except in urban and agricultural areas. Two rainy seasons occur each year and average daily temperatures do not vary much. While food availability, especially fruits and insects, may be coupled to the rainy seasons, the effect of fluctuating food supplies on breeding is unclear. Many species breed year-round, while others breed in one or both intervals between the rainy seasons.

The book describes 120 species breeding on the islands, 62 on both, 44 on Zanzibar alone, and 14 on Pemba alone. Zanzibar has nearly 50% more regularly breeding species than does Pemba, but only three more families. The most striking aspect of the avifauna is the complete absence from Pemba of families found both on Zanzibar and on the mainland. Certain families found on the mainland are also lacking on Zanzibar. Zanzibar has three endemic species and Pemba has one. Nine instances occur in which species on one island are replaced by another species or subspecies on the other.

The detailed systematic checklist is supplemented with extensive maps and excellent tables listing climatic data, diets, breeding times, and vagrant species. Not only should this book prove invaluable to visitors on the islands, but also it provides data that will allow further testing of current models of island biogeography.—Cynthia Carey.

78. The North American Birder's Library Lifelist. S. R. Drennan (ed.). 1979. Garden City, N.Y., Doubleday & Co., Inc. 630 p. $24.95.—This overpriced book contains 18 pages of textual material (introduction, list of references, and indices) and 613 pages of blank data forms with names of 821 bird species recorded in North America. Drennan designed the data form to include ". . . every aspect of methodological enumeration that I have ever found worth remembering." The result is a copious volume (21.5 × 31.5 × 5.5 cm) in which space for recording localities at which each species was first encountered is limited to 3.25 cm^2, the same amount of space as is allocated for number seen. Drennan would have better served the cause of providing a useful form for recording lifelist information by publishing a sample form which observers could modify to suit their needs. Instead, she has produced a monolith of dubious worth, any review of which must be short.—Paul B. Hamel.

79. The Spatial Orientation of Birds. (Prostranstvennaya orientatsiya ptits.) V. D. Ilyichev and E. K. Vilks. 1978. "Nauka" Press. Moscow. 286 p. 69 figs. (In Russian.)—The publication by "Nauka" of this book by Ilyichev and Vilks is of especial moment. Combining vast literary and personal experience, the authors avidly review the history of the progress of knowledge of the spatial orientation of birds. On introduction they state that since orientation is a function of analyzers, one must work from structure and function in consideration of all sensory systems. This invites combined efforts of ecology, morphology, physiology, and ethology. This monograph shows current progress along such lines and marks out further solutions to these problems.

In Chapter 1, Bird orientation as an adaptive phenomenon, by Ilyichev, the historic antecedents and general approaches to the problem are the main sources of information for integrated analysis of analyzers. These cover field observations, data from experiments, and structures and functions of analyzers. The author criticizes the former prevalent urge to find a special "organ of orientation" and to find a single mechanism to explain orientation for all birds. A precisely defined terminology is proffered. There is elaborated a concept of "orientation" in the broad sense: in terms of migratory "homing," "direct" orientation, categories of orientors, and others. The author notes a particular avian capacity for perception with a belief in fortuitiveness. Bird migration is regarded as definitely adaptive. Migration routes have undergone historic alterations, but there is no way to elaborate geographic conditions of the past. On this last point the authors disagree. Flight routes and species ranges were altered. However, current belief finds that the general trend of seasonal movements is linked to the species history of dispersion, and this should be considered in light of the "Menzbier" principle.

Chapter 2, Analyzers and bird orientation study, also by Ilyichev, turns to morphological and functional features of the auditory, visual, and olfactory analyzers. Detailed descriptions at various levels are given. Special attention is directed to behavioral details affording more integral evaluation than electrophysiological methods. Through all analyzer features flows the thought of inequity of comprehensive capacity of birds and mammals, without preliminary study of their finer morphological structure and function. Of interest are recent accounts of olfactory orienters by scientists at Moscow University. They invite less persistent talk of the absence of avian olfaction. As for the puzzle of spatial orientation as a whole, a different approach is invited. Especially pertinent is the thought expressed in the section: ecological correlates as a phenomenon and as a method of orientation research. As a socialist in auditory analysis and acoustic behavior, the author notes a method of "ecological parallelisms." The section is saturated with comparative notes of structures and functional features distinguishing analyzers by features of auditory, visual, and olfactory analyzers. There are detailed descriptions of structures analyzed at various levels. Special attention is directed to behavioral accounts, of features of ecology and behavior. There is special note of analyzers relative to their ontogenesis. Obviously this requires ample knowledge of avian ecology, within which Ilyichev attributes primary significance to advances in ecological classification (p. 104). Classification of "life forms," however, as for any artificial system, may associate the comparatively inequitable with the externally similar. Within the limits of ecological groups it is necessary to distinguish species according to origin.

Chapters 3 and 4, Behavior in analysis of bird orientation, and Hypotheses of orientation and their basics (obosnovanie) by Vilks, a vast literature on orientation during migration and "homing" is analyzed. There is a critical review of essentials of current hypotheses. Especially pertinent is the section on orientational behavior in the wild, on the effects of humidity, winds, and other factors. Vilks compares the Moscow findings to those of Leningrad observers. This section acquaints the reader to inertial orientation, orientation by landscape features, and by possible infrared radiation. He adds new notes on olfactory orientation by pigeons, discusses the role of biological clocks, and elaborates the history of magnetic orientation hypotheses. Astro-orientation draws definite concern in view of the many experiments on prospective roles of the sun, moon, and stars. Vilks concludes the stellar maps may serve for "compass direction," but not for "bi-coordinate orientation." There is inevitably less attention to orientation in nature and by landscape features. One might consider here the influence of memory and contact experience (i.e., experienced predecessors) in choice of routes followed to destination. Of roles of contacts between juveniles and elders during dispersal we know little although research here is of real concern.

Chapter 5, Orientation and behavior control, is by Ilyichev. In it are detailed experiments on application of various repellents to remove birds from certain sites, acoustic repellents in particular. Deserving of attention and original in classification are types of repellents in nature of strength and action. In Chapter 5 he adds many new notes on effects of sonar media. Sonic controls as applied to aviation and poultry husbandry are evaluated. Surveyed are English and Soviet researches on synchronization and acceleration of hatching chicks by imitation of "clicking" sounds of the embryos.

The monograph is clear and easily read. The literature cited as mentioned before is vast, about 28 pages. As a whole let it be said that this text is an engaging and original book and is regarded there as a necessity for each ornithologist and physiologist occupied on higher nerve responses. It has been greeted at home as a valuable text and manual, a model in presentation of original research.—Leon Kelso.

80. Studies on a population of Eagle Owls, *Bubo bubo* (L.), in southeast Sweden. V. Olsson. 1979. *Viltrevy,* **11**(1): 1–99.—The single-minded devotion that birds of prey attract from their willing admirers is evident here. There are 31 topics in the outline, the major headings being Habitat choice, Food ecology, Breeding biology, Age and death, Poisoning from pesticides and other noxious agents and Conservation aspects. A summary in Swedish follows the English Summary and a bibliography of 66 titles. The usual Nordic excellence of the printing job is again displayed.

Let me summarize the salient points. By the middle of the 20th century the Swedish population of Eagle Owls had been fragmented into scattered survivors with "vast empty spaces between." The remaining population was studied for many years, particularly 1953–1978. In a sample of 20 territories, timber covered 55%, wetlands 29%, and cultivated land 16% of the area. The central site was usually a cliff 10–50 m high. The distribution of the population over many years "indicates a territory radius of about 4–5 km" with a lower limit of 2.5 km. There were 7,013 prey items analyzed mainly from March to August. Mammals predominated only slightly over birds, whereas weights of birds were considerably more. Prey was predominantly from wetland and cultivated land, less often from forest. Poor rodent years were compensated for by increased use of avian prey, particularly the larger birds (coots, grebes and anatids). The last 10 days of March were the favored egg-laying period. Egg-laying depended most significantly on temperature, whereas snow depth and abundance of rodents were less significant. Mean number of eggs per clutch was 2.3 while mean young fledged was 1.7. Reproductive success was about 60%. The major causes of nest failure were water filling the nest hollow, human disturbance, and predation by foxes and badgers. Banding results were unsuitable for longevity/mortality calculation. "The oldest known Eagle Owl ringed has reached an age of at least 21 years." The type of ring was changed several times as some types were found to be too weak (i.e., lost during first and second years). Human factors were the dominant cause of death. Electrical installations, traffic, hunting, and mercury poisoning accounted for half the 101 known deaths. Mercury seed-dressing, recently reduced or eliminated, accounted for great losses in the 1960's. The poison reached victims mainly through consumption of other predators and of granivorous birds. The collection and analysis of feathers, addled eggs, and dead owls are recommended as a means of developing measures to control contamination by poison. Regular censuses of known Eagle Owl populations are imperative. "The death risks in man-made constructional works could be reduced in many ways."—Leon Kelso.