

RECENT LITERATURE

Edited by Bertram G. Murray, Jr.

BANDING AND LONGEVITY

(See 43)

MIGRATION, ORIENTATION, AND HOMING

1. **Shorebirds at Long Point, Lake Erie, 1966–1971: Seasonal occurrence, habitat preference, and variation in abundance.** M. S. Bradstreet, G. W. Page, and W. G. Johnston. 1977. *Can. Field-Nat.*, **91**: 225–236.—Between 1967 and 1971 the water level in Lake Erie rose 0.5 m, inundating formerly isolated beach pools. Destruction of the beach pools appears to be the reason for a decline in the number and diversity of migrant shorebirds stopping at Long Point.—Edward H. Burt, Jr.

POPULATION DYNAMICS

(See also 7, 22, 23)

2. **Population limitation in diurnal raptors.** I. Newton, 1976. *Can. Field-Nat.*, **90**: 274–300.—That the breeding population of solitary raptors is density-limited is suggested by (a) the stability in number and distribution of undisturbed populations, (b) the rapid replacement of territorial birds that die while nesting, (c) the reestablishment of populations at their former population levels and nest sites following removal by man, and (d) the regular spacing of nest-sites in areas with abundant resources. Nest sites are one limiting factor, but where nest sites are sufficient breeding density is regulated by food. Species that depend on stable prey populations have stable densities that differ between regions with differing prey abundance. Species that depend on fluctuating prey populations show fluctuating densities. Unusual concentrations of breeding raptors occur only where prey is unusually abundant.

In some respects hawks offer unusual opportunities for population studies. Most are large animals that can be tracked visually or by radio. They are long lived animals that return to the same territory year after year, often for generations. Prey species are large and can be censused accurately. Certainly Newton's fine review should encourage further research into the population dynamics of raptors.—Edward H. Burt, Jr.

NESTING AND REPRODUCTION

(See also 13, 14, 27)

3. **Nesting and brood ecology of Lesser Scaup At Waterhen Marsh, Saskatchewan.** J. E. Hines. 1977. *Can. Field-Nat.*, **91**: 248–255.—Unlike puddle ducks, most Lesser Scaups (*Aythya affinis*) build their nests only 5–10 m from the water's edge in grasses up to 1.5 m high. Clutch-size varies from 7 to 14 with clutches larger than 14 representing the contributions of two or more females. Over 75% of all Lesser Scaup nests hatched at least one egg, and hatching throughout Waterhen Marsh was highly synchronized.

Scaup eggs were found in about 10% of the Gadwall (*Anas strepera*) nests, and three scaup nests contained 6–8 Gadwall eggs, suggesting not only that scaup parasitize other ducks, but also that scaup seize and use the nests of other species for their own clutches. The existence of nest piracy and brood parasitism suggests the same evolutionary sequence advocated by Brown ("The Evolution of Behavior," W. W. Norton, New York, 1975) for cowbirds, a progression from complete reproductive independence, to appropriating other species' nests occasionally with eggs, to laying an egg in the clutch of another species.

Lesser Scaup and Redhead (*Aythya americana*) ducklings form crèches watched over by a few female Lesser Scaup. The data on crèches are disappointingly few. The discussion stresses the advantage of crèches to the ducklings and to the females that abandon their young to the crèche. What of the females that remain with the crèche? What advantage do they gain by remaining with the ducklings, attacking potential predators, delaying their premigratory molt? The few females that remain with the crèche pose an intriguing and neglected problem.—Edward H. Burt, Jr.

4. **On ecology of the European Honey Buzzard in Armenia.** (K ekologii evropeiskogo osoeda (*Pernis apivorus* L.) v Armyanskoi S.S.R.). A. Unyanan. 1976. *Biol. Zhurn. Armenii*, **29**(12): 77–83. (In Russian with Armenian summary.)—In Khosrov Reserve, Armenia, in 1972–1974 the breeding density was about 15 km² per pair or 90 km² per pair for the general territory. Nestlings were fed mainly larvae from nests of terrestrial wasps, supplemented by Caucasian and lacustrine frogs. Of concern in this study was their mode of food capture and transfer as well as manipulation of the hymenopterous prey which was accomplished by feet and claws as well as by the bill. The nestlings could manipulate food individually at 3–4 days of age. Food was brought mostly by the female, at the rate of 12–14 visits per day. The average daily nestling ration was 120–140 g. The usual brood of two nestlings fledged at 40–50 days of age.—Leon Kelso.

5. **Experimental analysis of incubation rhythm in the Pied Flycatcher.** (Eksperimentalnyi analiz ritmiki nasizhavaniya u mykholovki pestrushki (*Ficedula hypoleuca*). K. Blagosklonov. 1977. *Ekologiya*, **1977**(4): 66–71. (In Russian.)—The total calories the incubating bird imparts to the clutch should correspond to the number of eggs in it, so suggests the author. Thus the length of incubation should be affected not only by air temperature but by clutch size. Artificially controlled egg clutches in nine nests of *Ficedula hypoleuca* were separated in three groups of 4, 8, and 12-egg clutches. For the small 4-egg clutches incubation time totaled 40% of the 10-hour day, with average period of brooding 5.5 minutes; with 8 eggs 65% of the time and 11-min periods; for 12-egg clutches, 87% of the time and 31-min periods. Periods of individual female absence varied very little, 4.5–6.6 min in all cases and conditions. With 4-egg clutches no feeding of the female by the male occurred, although such was the habit for sets of 8–12. On clutches of 8 eggs the female was assisted about three times/hr, and with additional eggs, five times. It was also reported that males of *Parus major* did not feed sitters on clutches of 5, but did so for sitters on 8–12 eggs. It is remarked that cavity nesters incubate more persistently along with a trend to larger clutches.—Leon Kelso.

BEHAVIOR

(See also 3, 4, 20, 27, 40, 41)

6. **Territoriality: a fitness set-adaptive function approach.** J. M. Emlen. 1978. *Amer. Nat.*, **112**: 234–241.—Emlen was stimulated to indulge in mathematical modeling as a result of I. A. MacLaren's hypothesis (*Trans. Conn. Acad. Arts Sci.*, **44**: 191–210, 1972) that territories have evolved strictly as a vehicle for the acquisition of a second mate. Obviously, that hypothesis implies that polygyny is much commoner than appears from present knowledge, and it turns out that Emlen's model cannot really evaluate MacLaren's hypothesis because the critical data are lacking. The model does make the non-obvious prediction that territoriality is likely to be more common among older than younger males.—Jack P. Hailman.

7. **Horned Grebe breeding habitat in Saskatchewan Parklands.** L. G. Sugden. 1977. *Can. Field-Nat.*, **91**: 372–376.—Horned Grebes (*Podiceps auritus*) prefer large, permanent ponds with open areas free from emergent and floating vegetation. Tree growth around the ponds was an insignificant factor in habitat selection by grebes. Equally insignificant was the agricultural use or disuse of the surrounding land.—Edward H. Burtt, Jr.

8. **Yearly and daily distribution of comfort, maintenance and aggressive behaviour in juvenile and adult Bar-headed Geese.** (Jahres- und tageszeitliche Verteilung von Schlaf, Komfortverhalten, Lokomotion, Nahrungsaufnahme und aggressivem Verhalten bei juvenilen und adulten Streifengänsen (*Anser indicus* vorm. *Eulabeia indica*.) I. Würdinger. 1978. *Z. Tierpsychol.*, **46**: 306–323. (In German with English summary.)—This is a straightforward charting of the occurrence of sleep, preening, locomotion, grazing, and aggressive behavior in captive geese. There are no real surprises, but useful descriptive data are included.—Jack P. Hailman.

9. **Marabou Storks wash dung beetles.** U. Seibt and W. Wickler. 1978. *Z. Tierpsychol.*, **46**: 324–327.—The bird is *Leptoptilos cruminiferus*, the insect *Helicopris* sp. The former eats the latter after the titular behavior.—Jack P. Hailman.

10. Localization of passerine seet and mobbing calls by Goshawks and Pygmy Owls. M. D. Shalter. 1978. *Z. Tierpsychol.*, **46**: 260–267.—Although the author states that his results “cast considerable doubt on the validity of the generally accepted non-localizability hypothesis” (p. 265), one may wonder how he reached that curious conclusion. The hypothesis referred to is Marler’s suggestion that pure-tone alarm calls are more difficult for relevant predators to locate than broad-spectrum calls providing localizing cues of arrival time, phase, and amplitude differences at the two ears. The choice of animals is also curious: recordings of the alarm of the Blackbird (*Turdus merula*) and the mobbing call of the Chaffinch (*Fringilla coelebs*), both European passerines, were played to three species of predators. One of the “pygmy” owls was the Ferruginous Owl (*Glaucidium brasilianum*), which occurs from Mexico southward, and another was the Pearl Spotted Owllet (*G. perlatum*) of Africa south of the Sahara. The third captive predator was the Goshawk (*Accipiter gentilis*), which does occur in Europe and might prey upon the Blackbird, although no evidence for such predation is cited. The experimental design is further curious: in a room with two speakers the alarm call was always played first and then the mobbing call from the same speaker; then on the next trial the alarm call was played first again followed by the mobbing call from the other speaker (why not a random design of calls and speakers?). “The playbacks were begun only when the bird was looking in other than the direction of the speaker about to be activated” (p. 262), which means it could be looking at the other speaker. A positive response was head movement toward the playback and a negative response was movement “away from the activated speaker” (p. 263). Not surprisingly, then, no negative responses were recorded. The Goshawks turned toward all but two mobbing calls, but failed to turn toward 21 of the alarm calls. This result, consistent with Marler’s hypothesis, is apparently not what the author wanted to find, so he concludes that localization has nothing to do with the call structure, and that alarm and mobbing calls are evolved simply to be different under Darwin’s antithesis principle.—Jack P. Hailman.

11. Gyrfalcon nest site selection and winter activity in the Western Canadian Arctic. J. B. Platt. 1976. *Can. Field-Nat.*, **90**: 338–345.—Adult Gyrfalcons (*Falco rusticolus*) overwinter in the Yukon Territory north of 68°00’N. Falcons frequent two types of perches at the nest cliff: open perches that command a 180°–360° view of the surrounding terrain and protected perches, often in crevices, that command 90°–130° of view. Pellets and quantities of excrement were found at the protected perches but not at the open perches, indicating that Gyrfalcons roosted at the protected perches. Willow Ptarmigan (*Lagopus lagopus*) were the primary prey with *Microtus* sp. comprising the rest of the diet. The scanty data suggest that males are more common at the nesting cliffs in January, that females appear near the nesting cliffs in February, and that pairs occupy aeries in February. Gyrfalcons may overwinter on the tundra in order to be first on the nesting cliffs where they use the scrapes of other species.—Edward H. Burt, Jr.

12. Notes on the behaviour of the New Zealand Shore Plover. R. E. Phillips. 1976. *Emu*, **76**: 23–27.—The New Zealand Shore Plover (*Thinornis novaezelandiae*) is the rarest of four species of plovers endemic to New Zealand. The 82 adults and juveniles that comprise the world’s Shore Plover population are confined to a narrow zone of wave-splashed rocks and sparsely vegetated land just above the high tide on South East Island of the Chatham Island group. Phillips’s visit in March followed the breeding season, but he found that males and females remained paired and that many pairs were accompanied by a juvenile. The pairs defended feeding territories.

The article is a tantalizing peek at the behavior of a rare shorebird. Unfortunately the behavioral descriptions are vague, unquantified, and unaccompanied by illustrations. Perhaps the article will excite someone to compile a detailed, quantitative account of the Shore Plover’s behavior before the species belongs to the ages.—Edward H. Burt, Jr.

13. The robbing behaviour of terns and gulls. K. Hulsman. 1976. *Emu*, **76**: 143–149.—Intra- and interspecific piracy are described for Silver Gulls (*Larus novaehollandiae*), Crested Terns (*Sterna bergii*), Lesser Crested Terns (*S. bengalensis*), Bridled Terns (*S. anaethetus*), Roseate Terns (*S. dougalli*), and Black-naped Terns (*S. sumatrana*). Different piratic tactics are described, and the use and success of each tactic in each species is

quantified. Intraspecific and interspecific piracy among terns have an insignificant effect on their nesting success. However, piracy by Silver Gulls was a serious problem for Lesser Crested and Crested terns. Not only did Silver Gulls steal significant numbers of fish from these two species, but they also delayed feedings of Crested Tern chicks by up to 45 min, thereby reducing the feeding rate and perhaps the survival of tern chicks.—Edward H. Burt, Jr.

14. Distribution, status and breeding of Black-throated Finches *Poephila cincta* in northern Queensland. R. Zann. 1976. *Emu*, **76**: 201–206.—Social and reproductive behavior of *P. c. atropygialis* are described briefly, but many interesting details (e.g., the ontogeny of begging postures of nestlings) are included. *P. c. atropygialis* is displacing *P. c. cincta* in the area studied by Zann, who suggests that this is the result of pasture improvement and the development of large-scale irrigation systems. Perhaps this is true, but no data in the article justify the conclusion, which comes as a *non sequitur* at the close of an otherwise impeccable paper.—Edward H. Burt, Jr.

15. Differential aggression in genetically different morphs of the White-throated Sparrow (*Zonotrichia albicollis*). R. W. Ficken, M. S. Ficken, and J. P. Hailman. 1978. *Z. Tierpsychol.*, **46**: 43–57.—Authors' abstract: "To see if genetic differences correlate with differences in agonistic behavior, 225 encounters within and between color morphs . . . were observed in feeding groups of different sizes and morphic compositions. Tan morphs lack the M chromosome that replaces either of two chromosomes in the white morph. The data were analyzed using quantitative models accounting for the proportions of morphs present, and the principal finding was that morphs are equally frequent recipients of aggression but the white morph was the aggressor more frequently than by chance expectation—regardless of the morph of the recipient, the size of the group or the morphic composition of the group." The label for equation (1) is missing (p. 47) and the "l" in equation (6b) should be "i" (p. 50). The results are consistent with qualitative studies on the breeding grounds suggesting that white morphs are more aggressive than tan birds.—Jack P. Hailman.

16. Division of labour by Song Sparrows feeding fledged young. J. N. M. Smith. 1978. *Can. J. Zool.*, **56**: 187–191.—The conclusion that each parent *Melospiza melodia* feeds different fledged young of the brood is fascinating. The question is whether the conclusion follows from the data. The author reports that "68 broods of fledged young were each observed twice: for about 2 h between the 12th and 15th day . . . and for about 1 h between the 22nd and 25th day." Furthermore, "Although most young were hidden from the observer, feeding was usually accompanied by begging calls," and "it was usually possible to observe food loads in the parents' beaks, which allowed feeding to be inferred when young could not be heard." From these methods, producing data on an admittedly large sample of different broods, we are asked to believe that the parents divide up the brood and each feeds only the fledglings "assigned" to it. I am quite willing to believe that a parent feeds one or two particular offspring for an hour or so until they are satiated, but it takes much better evidence to establish some permanent division of labor—even over the period of a single day. This is one of those cases in which a single brood studied intensively and continuously would yield more useful results than cursory sampling of 68 broods.—Jack P. Hailman.

ECOLOGY

(See also 2, 4, 7, 12)

17. Feeding strategies and population size in tropical seabirds. A. W. Diamond. 1978. *Amer. Nat.*, **112**: 215–223.—If population size is dependent upon food supply, Diamond reasons that pelagic seabirds should be more numerous than inshore feeders because offshore prey is the more abundant. Furthermore, migrants should be more numerous than residents because by migrating the seabirds are effectively increasing the prey available to them. Data from tropical oceanic islands are consistent with both predictions.—Jack P. Hailman.

18. Density anomalies and regulatory mechanisms in land bird populations on the Florida peninsula. J. T. Emlen. 1978. *Amer. Nat.*, **112**: 265–286.—The density of breeding birds (and apparently also winter residents) decreases on a southward gradient through Florida, yet it is incredibly high by comparison with populations in the Bahamas. Emlen shows that this gradient is uncorrelated with food supply; in pine-foilage gleaners, for example, the foraging-biomass-to-food-supply ratio was four times as great in the Bahamas as in southern Florida. Emlen's bold hypothesis is that south Florida birds cannot adapt to special conditions because of introgressive gene flow from the north. He may be correct but I would like to see some figures on predation pressure in various localities before entertaining his hypothesis more seriously.—Jack P. Hailman.

19. Summer habitat use by White-tailed Ptarmigan in southwestern Alberta. P. W. Herzog. 1977. *Can. Field-Nat.*, **91**: 367–371.—The White-tailed Ptarmigan (*Lagopus leucurus*) occupies alpine habitats with an abundance of boulders or rock slides that provide cover and where snowfields, streams, or lakes provide sufficient moisture to support fresh vegetation. Males and females without broods move to higher elevations in mid-summer, whereas females with broods remain along stream courses, frequently moving downstream below the treeline. The percent cover of the summer habitat by rocks, water, and various species of plants adds up to 191%, which tends to undermine the readers' confidence in conclusions about habitat characteristics.—Edward H. Burttt, Jr.

20. A field study of the Australian Dotterel. G. L. Maclean. 1976. *Emu*, **76**: 207–215.—Behavioral, ecological, and selected physiological aspects of the Australian Dotterel's (*Peltodyas australis*) biology are briefly discussed. The author is most intrigued by the Dotterel's largely nocturnal activity cycle and its eclipse plumage, facts previously unknown. I am intrigued by the extreme development of the salt gland in this desert dweller, an adaptation to obtaining its water from succulent but salty, desert plants.—Edward H. Burttt, Jr.

21. A distribution and census analysis of the Tawny Owl by a sonar direction tracking method. (Izuchenie raspredeleniya i uchet chislennosti obyknovЕННОЙ neyacyti metodom pelengatsii.) A. Zolotarev. 1978. *Zool. Zhurn.*, **57**(3): 464–466. (In Russian with English summary.)—This paper suggests and describes a method for nocturnal censusing of woodland populations of *Strix aluco* by sonar sound tracking of the calls of the males as perceived by simple direction-finding equipment, which is described in brief detail. However, this experimental operation as described is only a suggested procedure. The areas of territories, the distance separating them, and the number occupied per section of timber are not given. Clearly, observers working in pairs may follow movements of the owls after sunset by recording direction of the calls as perceived. This experiment was accompanied by a daytime survey of owl roosts, which were then mapped for the Khopre area in April 1975 and 1976. Further details and additional surveying would be appropriate. *Strix aluco* was present in substantial numbers and calling by the males was most frequent during the 3–4 hours after sunset. The author suggests that the possibilities of this method are more favorable than was at first realized, and he recommends its use for spatial structure analysis of diurnal species.—Leon Kelso.

CONSERVATION AND ENVIRONMENTAL QUALITY

22. Osprey and Bald Eagle populations in Labrador and Northeastern Quebec, 1969–1973. S. P. Wetmore and D. I. Gillespie. 1976. *Can. Field-Nat.*, **90**: 330–337.—Understandably sketchy data for the vast wilderness areas of Labrador and northeastern Quebec suggest that the Osprey (*Pandion haliaetus*) population is declining at 4–8% annually whereas the Bald Eagle (*Haliaeetus leucocephalus*) is maintaining a stable population. Pesticides appear to be less of a problem than the destruction of habitat by hydroelectric dams.—Edward H. Burttt, Jr.

23. The 1975 North American Peregrine Falcon survey. R. W. Fyfe, S. A. Temple, and T. J. Cade. 1976. *Can. Field-Nat.*, **90**: 228–273.—The North American population of Peregrine Falcons (*Falco peregrinus*) continues to decrease. The population breeding on the North American tundra has declined 50–60% between 1970 and 1975. The decline

has been less severe with more local variation in forested regions of Alaska, Alberta, and Saskatchewan. Boreal populations in the Campbell Hills of the Mackenzie District, Northwest Territories, have declined less than 50%, but show a drastic rise in the level of pesticide residue present in eggs. The Aleutian Islands harbor a large stable breeding population (375–580 pairs) of Peregrine Falcons. The Queen Charlotte Islands also harbor a substantial, stable breeding population. However, south of the boreal forest the Peregrine is either close to or locally extinct. With the exception of the Aleutian and Queen Charlotte islands, the picture is bleak. Pesticide residues remain a persistent threat to the reproductive success of the Peregrine Falcon.—Edward H. Burtt, Jr.

24. Rationale and success of the Canadian Wildlife Service Peregrine Breeding Project. R. W. Fyfe. 1976. *Can. Field-Nat.*, **90**: 308–319.—Fyfe, Cade, and others are to be congratulated not only for their dedicated and innovative work, but also for the success of their programs, 18 young Peregrine Falcons (17 *Falco peregrinus anatum*, 1 *F. p. pealei*) fledged in 1975 by the Canadian program. Fyfe discusses the problems and solutions that led to the first successful reproduction of captive Peregrine Falcons at the Canadian facility in spring 1972. He discusses release of captive-bred young falcons by fostering (substituting young falcons for eggs or adding them to broods of wild Peregrines), cross-fostering (substituting young for eggs or adding them to broods of Prairie Falcons (*F. mexicanus*) or infrequently other species), or hacking (the gradual release of fully grown young by supplying them with food until they achieve full independence).

Despite the evident success of the Canadian and Cornell programs, no one knows if captive-bred Peregrines will successfully enter the breeding population. Beyond that problem, which Fyfe discusses, is the small number of captive Peregrines, hence small gene pool, parenting a disproportionate number of the species' population, a problem that concerns Fyfe. Finally usage of DDT has not declined in Central and South America (see review 26), the Peregrine's winter quarters, and therefore release of pesticide-free, captive-bred falcons may be futile. By the time the Peregrines breed at 2 to 3 years of age they have migrated 4 or 6 times, spent up to 18 months in Central and South America, and may have picked up enough pesticides to prevent successful reproduction.—Edward H. Burtt, Jr.

25. Behavioral aspects of egg breakage in Peregrine Falcons. R. W. Nelson. 1976. *Can. Field-Nat.*, **90**: 320–329.—Peregrines heavily contaminated with DDE lay abnormally thin-shelled eggs and suffer abnormally high losses from broken eggs. Falcon eggs may be broken by (1) deliberate, biocide-induced parental destruction, (2) by biocide-induced, clumsy, parental behavior, or (3) accidental breakage because the thin shells are too weak to withstand normal incubation. The available evidence favors the last explanation, but it is incomplete. Detailed studies are needed before any of the possibilities can be ruled out.—Edward H. Burtt, Jr.

26. The Peregrine Falcon (*Falco peregrinus*) and pesticides. D. B. Peakall. 1976. *Can. Field-Nat.*, **90**: 301–307.—The evidence discussed by Peakall shows that DDE contamination of adult Peregrine Falcons (*Falco peregrinus*) is a major cause of eggshell thinning and that eggshell thinning has been and continues to be a major cause of reproductive failure and the subsequent decline in the Peregrine Falcon's population.

The Peregrine's future is bleak. DDE is a metabolite of DDT, an insecticide little used in North America but widely used in Central and South America where the Peregrine winters. Furthermore, DDE is not the only environmental contaminant that affects the Peregrine. Dieldrin and polychlorinated biphenyls are more embryo-toxic than DDE and are major factors in the reproductive failure of the Peregrine in the British Isles. Behavioral abnormalities of contaminated adults are suggested by the fact that such adults are unable to raise captive-bred young substituted for the adults' own cracked eggs. What can be done? We must seek biological controls. Until that halcyon time we can only hope that the breeding of captive Peregrines will preserve the species.—Edward H. Burtt, Jr.

27. Pollutant effects on the reproduction of the Prairie Falcons and Merlins of the Canadian Provinces. R. W. Fyfe, R. W. Risebrough, and W. Walker, II. 1976. *Can. Field-Nat.*, **90**: 346–355.—Thin eggshells significantly reduce the reproductive success of Prairie Falcons (*Falco mexicanus*) and Richardson's Merlins (*F. columbarius richardsonii*). However,

reproductive success is not correlated with the concentration of DDE in the egg despite a tendency for more successful clutches to have lower concentrations of DDE than less successful clutches. Fyfe suggests that larger samples are needed to achieve statistical significance, but the samples are already large (161 eggs of the Prairie Falcon, 128 eggs of the Richardson's Merlin) and samples that are too large may show statistical significance of a biologically meaningless difference. Fyfe is pushing one hypothesis, DDE as the root cause of reproductive failure, to the exclusion of other possibilities, for example, a synergistic effect among two or more pollutants, or a combination of thin eggshells and aberrant parental behavior (see review 25). There is abundant evidence that high concentrations of DDE significantly reduce the reproductive success of some raptors, but Fyfe's narrow focus on the connection between DDE and reproductive success opens him to justified criticism from those who believe that DDE is a harmless chemical.

Reproductive success was not correlated with the concentration of dieldrin, heptachlor epoxide, PCB, or mercury. The intensity of territorial defense was significantly correlated with DDE concentration in Merlins but not in Prairie Falcons, suggesting that the species have different tolerance levels to DDE.—Edward H. Burt, Jr.

PHYSIOLOGY

(See also 20)

28. Humidity in bird nests of arid areas under natural incubation. (Vlazhnost v gnezhdakh pits aridnykh raionov pri estestvennoi inkubatsii.) A. Grazhdankin. 1978. *Zool. Zhurn.*, **57**(1): 100–104. (In Russian with English summary.)—The author could find only two papers treating nest humidity during incubation, and these were based on data obtained without modern techniques and instrumentation. Instrumented by refined microthermistors and electrothermometers, relative humidity at nests of 11 bird species in steppe and desert areas (Repetek in Turkmen and Ust-Donets in Rostov region) was recorded. Relative humidity in nests varied according to presence or absence of the sitter and a confusing complex of other factors. The relative humidity exceeded that of the surrounding air by 20% in desert and by 26% in steppe areas. Both the eggs and the incubating bird served as a source of humidity to maintain the microclimate at the nest. Under domestic fowl, for example, nest humidity was 81%, but after departure of the sitter, 62%. For the 11 species as a whole the nest humidity fluctuated from 54 to 57%, at 35°C surrounding air temperature, on departure of the sitter from the nest. Further thought evokes many complications arising in such studies, including, for example, the momentary hourly fluctuations in light intensity and air currents.—Leon Kelso.

29. The visual pigments, oil droplets and spectral sensitivity of the pigeon. J. K. Bowmaker. 1977. *Vision Res.*, **17**: 1129–1138.—This study parallels that of Bowmaker and Knowles on the chicken retina (see review 23 in *Bird-Banding*, **49**: 195–196, 1978), but the pigeon's retina is more complicated. By microspectrophotometry (MSP), Bowmaker has identified five kinds of cone oil droplets and three visual pigments in the cones. The oil droplets filter incoming light by passing wavelengths longer than a certain cutoff value, and in order from short to long wavelength these types are "clear," *A*, *B*, *C* and a fifth type *I* will call *D* (the "red" droplet of Bowmaker). The *B*-type oil droplets are considerably more variable than others. The light-absorbing photosensitive pigments may be designated by their wavelength of maximum absorption, these being 567 (yellow-absorbing), 514 (green) and 460 (blue) in the pigeon. (The oil droplet-less rods have a different photopigment.) There are three morphological types of cones: accessory (oil droplet-less) and principal (droplet-bearing) double cones, and single cones. To complicate matters further, the pigeon's retina has two distinct areas: a dorsoposterior "red" field where *C* and *D* droplets predominate, and the remaining retina ("yellow" sector) where these oil droplets are rarer.

These four aspects fit together in a nonrandom but complicated fashion. Double cones always have the 567 pigment, the principal cone having a *B* droplet. Single cones with the 567 pigment have either an *A* or *B* droplet. Single cones with the 514 pigment have the *C* droplet, and some in the yellow sector only have the *A* droplet. The cones with the 461 pigment occur only in the red sector and always have an *A* droplet. Cones

with clear droplets are so small that their visual pigment is difficult to measure by MSP, and the one successful measurement yielded a 567 pigment. Furthermore, the cutoff wavelengths of oil droplets in the yellow sector are shifted slightly but consistently to shorter wavelengths than the same type in the red sector.

This complicated pattern of oil droplet-filters and visual pigments yields many receptor-types with different spectral sensitivity functions. In the red sector are five main types plus a possible sixth and a variation that could be considered a seventh distinct type. In the yellow sector are four distinct types, one having three variants for a possible total of six types. Assuming the best estimates for relative proportions of these cone types, Bowmaker shows their combination yields theoretical spectral sensitivities of the eye that are in good agreement with behavioral and electrophysiological experiments on both red and yellow sectors.

This study supercedes everything previously written about the pigeon's photoreceptors and charts out a situation far more complicated than that of the chicken, or any other bird studied to date (maybe any other vertebrate). The pigeon obviously has good sensitivity throughout the visual spectrum and an impressive array of receptors to mediate color vision, although Bowmaker does not attempt to model spectral-discrimination functions from the receptor types. One hopes that his studies will not end with the domestic chicken and pigeon, but continue to explore species differences among many species of birds.—Jack P. Hailman.

30. Response of movement detecting cells in the optic tectum of pigeons to change of wavelength. D. Jassik-Gerschenfeld, R. V. Lange, and N. Ropert. 1977. *Vision Res.*, **17**: 1139–1146.—Anatomical studies have revealed not one but several "visual systems" in the avian brain, a principal one involving the optic tectum, which receives input from the retina and has a massive projection to the nucleus rotundus. (The avian optic tectum may be homologous with the mammalian lateral geniculate body, a primary seat of processing color information.) Cells in the pigeon's optic tectum that are highly responsive to movement of a light-dark border or to changes in intensity were studied for color sensitivity in this report. The results are complicated, and the report itself should be consulted for details, but in general these microelectrode recordings show high sensitivity to changing the color of stimulating light. The spectral sensitivity of these cells was similar to that of the pigeon's eye, suggesting multiple input from different kinds of photoreceptors (see review **29** of Bowmaker's study). If this flurry of recent studies on the pigeon continues, we will know more about the mechanisms of vision in this species than any other vertebrate.—Jack P. Hailman.

31. Velocity discrimination by pigeons. P. Mulvanny. 1978. *Vision Res.*, **18**: 531–536.—Pigeons had to peck a key when detecting movement of a spot of light travelling horizontally across an oscilloscope screen behind the transparent key. They were trained to peck at the fastest stimulus (about 24 mm/sec), and then the probability of response was measured at various slower speeds down to 6 mm/sec. From fast to slow the response curve is sigmoid, near 100% detection at the training stimulus and about 10% detection at the slowest speed for two of three birds. (The other bird could not be trained properly to respond to movement per se.) Expressed in terms of the classical human psychophysical indexes, the "difference threshold" of discriminating velocity is about 10–12 degrees of visual arc per second, and the standard deviation index yielded about 5 degrees/sec. Human experiments produce *much* better discrimination values, and one wonders whether this represents a true difference between species or alternatively pigeons might show greater velocity discrimination if given a different kind of visual task.—Jack P. Hailman.

32. Mechanism of pellet egestion in Great Horned Owls (*Bubo virginianus*). G. Duke, O. Evanson, P. Redig, and D. Rhoades. 1976. *Amer. J. Physiol.*, **231**(6): 1824–1829.—For observation of oral pellet egestion in six live *Bubo virginianus*, bipolar electrodes and strain-gauge transducers were inserted in the esophagus, muscular stomach, and duodenum. Simultaneous radiographic recording revealed characteristic gastrointestinal motility operations associated with egestion. Starting about 12 min before egestion, gastric contractions shaped the pellet and moved it into the lower esophagus. Then antiperistaltic action by the esophagus during about 8–12 sec extruded the pellet into the mouth. Con-

tractions of abdominal muscles were not detected during pellet egestion. This process appears to be unlike either vomiting in nonruminant mammals or regurgitation in ruminants. Esophageal action and lack of abdominal muscle contraction in mammals are similar in mechanism to pellet egestion in owls. Likewise gastric action without abdominal or diaphragmatic contractions during infant vomiting is similar to pellet egestion. "Pellet egestion, therefore, appears to be a process distinct from vomiting and regurgitation. The distinctiveness of egestion may be primarily due to the solid nature of the pellet itself and to the absence of a muscular diaphragm separating the thoracic and abdominal cavities in birds."—Leon Kelso.

MORPHOLOGY AND ANATOMY

33. Ecolo-morphological features of terminal rostral organs of four anatic species. (Ekologo- morfologicheskie osobennosti konechnogo organa klyuva chetirekh vidov gu-seobraznykh.) K. Avilova. 1977. *Vestn. Mosk. Univ. Ser. Biol.*, 1977(3): 44–49. (In Russian with English summary.)—By light and scanning electron microscopy the terminal sensory features of the bills of four species of anatids (*Anas platyrhynchos*, *Aythya ferina*, *Tadorna tadorna*, and *Mergus albellus*) were examined. The sensory areas featured corneal papillae located at the tips of the upper and lower mandibles. They were more developed in the upper (60–250) than on the lower (25–35) bill tips. Each papilla had 3–10 Herbst and 13–14 Gandry bodies, respectively. They were much better developed in *Anas* and *Aythya* than in *Mergus*. The bodies' size was unrelated to the bulk of the birds, but in *Tadorna* the Gandry were larger, whereas in tactile sensitivity *Mergus* is apparently weaker.—Leon Kelso.

PLUMAGES AND MOLTS

(See 20)

ZOOGEOGRAPHY AND DISTRIBUTION

34. Origin of the New Hebridean avifauna. J. M. Diamond and A. G. Marshall. 1976. *Emu*, 76: 187–200.—Among the islands east of New Caledonia, the New Hebrides possess an avifauna whose diversity is matched only by the avifauna of Fiji. Eighteen species have colonized the New Hebrides from Australia, possibly via New Caledonia. Thirteen species have arrived from New Guinea via the Bismarck and Solomon islands, and 11 species from Australia or New Guinea or both have reached the New Hebrides. One to five species have invaded from Fiji, and there remain, on the New Hebrides, 13 species of uncertain origin. No species has invaded the New Hebrides from Micronesia to the north or from New Zealand to the south.

Some New Hebridean species have reached New Caledonia, the Solomons, Bismarcks, and Fiji, but invasion from the New Hebrides is strikingly asymmetrical. More New Hebridean species have invaded Fiji than have invaded from Fiji, fewer New Hebridean species have invaded the Solomons, Bismarcks, or New Caledonia than have been received from those islands, and no New Hebridean species have successfully invaded New Guinea or Australia. Such asymmetrical faunal exchange has often been noted and involves dominance of species from a richer fauna (intense competition) on a larger land mass over species from a poor fauna (reduced competition) on a smaller land mass.

Detailed notes on the distribution of New Hebridean species are contained in an appendix to this important contribution to avian zoogeography.—Edward H. Burtt, Jr.

SYSTEMATICS AND PALEONTOLOGY

35. The morphism phenomenon in the Common Dipper and its taxonomic evaluation. (Yavlenie morfizma u obyknovennoi olyapki (*Cinclus cinclus*) i ego taksonomicheskaya otsenka.) L. Stepanyan. 1971. *Zool. Zhurn.*, 56(12): 1834–1838. (In Russian with English summary.)—Certain populations of the Dipper manifest geographic color variation (as the morph phenomenon means here). The most clearly defined forms occur in north-central Siberia and southward in northcentral Asia. Taxonomic evaluation of these presents persistent difficulties. A review of 130 adult skins in the Moscow State University collection, taken at all seasons of the year, finds six color variants distinguishable in the

above areas. Taxonomic analysis here favors formal recognition of the south Siberian population as *Cinclus cinclus baicalensis* Dresser 1892.—Leon Kelso.

36. Some aspects of adaptation and evolution in Australian Fantailed Flycatchers. C. J. O. Harrison. 1976. *Emu*, **76**: 115–120.—Based on osteological, behavioral, and ecological evidence, Harrison suggests that the Willie Wagtail (*Rhipidura leucophrys*) should be returned to its own monotypic genus, *Lencocirca* Swainson 1838. Less convincing osteological and behavioral evidence suggests that the Northern Fantail (*R. rufiventris*) also belongs in a genus (*Setosura* Mathews 1913) separate from other fantail flycatchers. Most interesting to ethologists is Harrison's discussion of the Willie Wagtail's wing-flashing behavior, which closely resembles the wing-flashing of the Mockingbird (*Mimus polyglottos*), a striking example of convergent evolution.—Edward H. Burt, Jr.

EVOLUTION AND GENETICS

(See also 3)

37. Are populations characterized by their genes or by their genotypes? P. A. DeBenedictis. 1978. *Amer. Nat.*, **112**: 155–175.—Although the author does not link his study to current theories of "sociobiology," the conclusions have great relevance. Much of sociobiological theory stems from theory in population genetics, which in turn is based on analyzing the frequency of different alleles in a population. A simple example will make the point at issue clearer than a recounting of the author's actual data.

Most animals have two sets of chromosomes so that alleles at a specific locus can be the same or can be different. Call one allele *A* and the other *B* (dominance is irrelevant to the present issue). If one half the animals in a population have two *A* alleles and the other half two *B* alleles (such animals are homozygotes), then the allelic frequencies are the same. Suppose only one quarter of the population is homozygous for *A*, another quarter for *B*, and the remaining one half of the animals have one *A* and one *B* each (such animals are heterozygotes). In the second case, the allelic frequencies of the population are the same as in the first case, but the two alleles are distributed differently among the individual animals. Theory in population genetics does not distinguish the two cases because their allelic frequencies are the same, but DeBenedictis shows that the action of natural selection on the two populations produces different results. In short, classical population genetics theory is not adequate to the task of clarifying evolution, and hence (my extrapolation) the sociobiological theory derived from genetical theory must also be inadequate. Sociobiological theory is presently suffering many setbacks from empirical evidence, but this paper appears to raise a fundamental question about the basis of the theory itself.—Jack P. Hailman.

38. Interbreeding of Little and Fairy terns. J. B. Cox and D. H. Close. 1977. *Emu*, **77**: 28–32.—Two formerly allopatric species, the Fairy Tern (*Sterna nereis*) and the Little Tern (*S. albifrons*), have interbred in a zone of sympatry on the northwestern shore of Gulf St. Vincent, South Australia. An *albifrons* and *nereis* pair hatched two chicks and an *albifrons* × *nereis* hybrid and *albifrons* pair hatched one chick. Both nests were on the periphery of a colony of *S. nereis* at Price Saltfields. Will the Little Tern (*S. albifrons*), now extending its range into that of the Fairy Tern (*S. nereis*), merge with the Fairy Tern, drive it to extinction through competition, or will the behavior and ecology of both species diverge now that they are sympatric?

The paper would profit from more data and less speculation. For example, on page 32 the authors suppose that "In the region of overlap there has probably been little interbreeding . . ." but in the preceding sentence the authors "believe that interbreeding has occurred before our reported occurrence but has gone unnoticed or undocumented." Unfortunately no careful censuses were taken on which to base an estimate of the frequency of hybridization. In another example the authors point out that the primaries of *S. nereis* are pale gray (low concentration of melanin) and the species migrates short distances. The primaries of *S. albifrons* are black (high concentration of melanin) and it is a transequatorial migrant. Therefore, "When *S. albifrons sinensis* and *S. nereis* evolved from a common ancestor, the latter became the more sedentary and correspondingly produced less pigmentation . . ." Such *post hoc* speculation can be misleading. In species

that forage on the wing and forage when migrating, there is no *a priori* reason why a long-distance migrant must fly more between molts than a short-distance migrant. Contrary to the author's implication, there is no evidence that different concentrations of melanin affect the abrasion-resistance of feathers, only that the presence or absence of melanin affects abrasion-resistance (Averill, *Condor*, **25**: 57-59, 1923; Burt, "The Coloration of Wood Warblers," *Nuttall Ornithol. Monogr.*, in press).—Edward H. Burt, Jr.

FOOD AND FEEDING

(See also 4, 9, 16)

39. The diet of Honey Buzzards, *Pernis apivorus*, in Finland. J. Itamies and H. Mikkola. 1972. *Ornis Fenn.*, **49**(1): 7-10. (In English with Finnish summary.)—The stomachs of nine adults taken outside the breeding season contained over 900 items, mostly wasps (Vespidae, 583 larvae, 209 pupae, 128 imagos). Frogs and passerine bird remnants littered nine nests in token numbers. The adults brought "wasp combs" to the nestlings every 1 to 1.5 hr. "When the nestlings are small the parent itself eats the main contents of the comb, placing the larva in the mouth of the young. The young also try to remove larvae from the comb . . . with varying success. Later on, as the nestlings grow rapidly, they eat a whole comb themselves, and both parents hunt continuously." Of stomach contents' bulk, "close to 100% were wasps." Adults alternated in food foraging, the female infrequently brooding the young.—Leon Kelso.

SONG AND VOCALIZATIONS

40. Variation in the songs of three species of estrildine grassfinches. R. A. Zann. 1976. *Emu*, **76**: 97-108.—The contact songs of three species of grassfinches (*Poephila*) vary specifically, subspecifically, geographically, and individually. The conclusion rests on sonographic analysis with no evidence that the birds detect or use the differences found by the author. Some of the differences between songs are statistically significant, some are not, and many differences are discussed without benefit of statistical analysis.

The discussion vastly oversteps the limited scope of the data. Sonograms may indicate differences in the songs of species, races, or individuals, but sonograms alone cannot demonstrate that individuals use those differences for species or individual recognition. Zann states that allopatric species have similar songs because species specificity is unnecessary. Although true, allopatric species that occupy similar habitats might have similar songs because the particular combination of frequency, intensity, and duration best meets the constraints of the habitat. Zann asserts that vocal variation among grassfinches has evolved by a similar process to that which caused variation in the advertising songs of other passerines. However, he also concludes that grassfinch song is not used for individual recognition as are the songs of many other passerines. His perplexity over the function of variation in the songs of grassfinches might be resolved by observing birds instead of sonograms.—Edward H. Burt, Jr.

41. Relationship between song repertoire and age in the Canary, *Serinus canarius*. F. Nottebohm and M. E. Nottebohm. 1978. *Z. Tierpsychol.*, **46**: 298-305.—In the second year all birds dropped some syllables used as part of songs in the first year and added others not sung before, each of the six males showing a net increase in the number of different syllables. The length, minimum and maximum frequencies of syllables remained the same. And ". . . it is tempting to speculate that simpler songs . . . may have less sex appeal than the more varied ones of older individuals!" A fine little study.—Jack P. Hailman.

BOOKS AND MONOGRAPHS

42. Birds: Their Life, Their Ways, Their World. Illustrations by Ad Cameron and text by Christopher Perrins. 1976. New York. Harry N. Abrams, 160 p. \$21.50.—This excellent contribution to popular ornithology is more than just another "pretty" bird book. With wonderful illustrations and classy text, it bridges the gap between pure science and the modern day coffee table presentations. The author presents the biology of birds in a novel format with chapters on evolution and classification; anatomy, locomotion, and

behavior; feeding habits; social behavior; breeding; migration; bird populations; and bird study. The text is lively and accurate, presents considerable information in simplified but not condescending manner, and reflects well the expertise of Dr. Perrins in ornithology and writing style. The index to common and scientific names is useful. The layout is excellent. I found no typographical errors, and the book seems to be sturdily produced. The highlight of the book for me is the illustrations, which are extremely useful in depicting the function and variety of birds. Some picky comments are that the drawings of the Curlew Sandpiper on page 27 are stretching the wing and leg and not "preening" as noted in the legend (see J. W. Hardy, *Auk*, **94**: 403-404, 1977, for other comments on this figure); and I find the gular pouches of the frigatebirds on page 98 oversized for the bodies. Camerons's illustrations perhaps depict prey items in too alive-like form, especially the mice on pages 85 and 133. However, these comments are minor compared with the general excellence of the biology imparted so readily in the many drawings. This book is proving very useful in my planning of an exhibition gallery devoted to biology of birds at the Los Angeles County Museum of Natural History. It would serve well as a textbook for beginning classes in ornithology and as illustrative material in any level course. This book is a refreshing combination of accurate information and effective presentation. I unhesitatingly recommend it for all persons interested in birds.—Ralph W. Schreiber.

43. Statistical Inference from Band Recovery Data—A Handbook. C. Brownie, D. R. Anderson, K. P. Burnham, and D. S. Robson. 1978. U.S. Dept. Interior, Fish and Wildlife Service Resource Publication No. 131, Washington, D.C. ix + 212 p.—This handbook presents quantitative models for assessing the results of banding, along with computer programs (in FORTRAN) for processing data. The approaches and models themselves cannot be summarized in a review, but a recounting of the contents provides potential users with a guide to topics found in the work. After an introductory chapter—which, by the way, would make a useful separate pamphlet—there are chapters presenting models for birds banded as adults (chapter 2, three models), as young and adults (chapter 3, five models), and as young, subadults and adults (chapter 4, three models). Chapter 5 concerns the pooling of data-sets, chapter 6 discusses the computer programs, and chapter 7 presents two models for analysis of experiments where banding is done twice yearly. Chapter 8 then follows with discussion of miscellaneous issues, and chapter 9 concerns planning of a banding study, with special emphasis on the sample size required. This is not a manual for backyard banders, and it is likely to be used only by those familiar with statistics (particularly analysis of covariance) and computing (which is really indispensable because hand-processing of data is effectively impossible under the models presented). Even those readers who can handle the statistical concepts may find the necessarily extensive notational system overwhelming. Yet for those whose profession requires reasoning about population dynamics from empirical banding data, the "Handbook" is indispensable. Its carefully explained models and presentation of examples showing tabulated results from computer printout render the "Handbook" intelligible for those who are willing to work through it, and this volume will undoubtedly show its worth in subsequent studies for years to come.—Jack P. Hailman.