RECENT LITERATURE

Edited by Bertram G. Murray, Jr.

MIGRATION, ORIENTATION, AND HOMING

1. The effect of olfactory deprivation by nasal tubes upon homing behavior in pigeons. R. Hartwick, A. Foa, and F. Papi. 1977. *Behav. Ecol. Sociobiol.*, **2**(1): 81–89.—As a test of olfaction in homing pigeon navigation, a means of smell deprivation by plastic tube insertion through the nostrils was devised. Pigeons wearing nasal tubes and untreated controls were released singly from a familiar site west of the loft and one unfamiliar site south of the loft. From the unfamiliar site "anosomatic" birds showed drastically impaired homing ability, both in terms of vanishing bearings and homing success (only 6 of 33 homing on day of release vs. 33 of 36 for controls). From the familiar site, tube-equipped birds showed homing performance only marginally poorer than that of controls. The experiment shows that the effect of olfactory deprival is not a general behavioral influence on homing motivation but a consequence of olfactory cues in determining "home" direction from unfamiliar territory. "The results accord well with expectation and with prior experiments showing that elimination of olfactory ability greatly impairs pigeon homing from unfamiliar localities, whether by neural severance, plugging nostrils, or inserting plastic tubes. Suggestions that this effect is due to interference in homing behavior, e.g., homing drive, seems improbable in light of success from familiar release sites. . . . In summary, it would appear that yet another method of olfactory impairment has confirmed the central role of olfaction in the navigational system of homing pigeons. Such multiplication of techniques reduces to a vanishingly small value the likelihood of an indirect effect due to artifact. At the same time, the homing success from the familiar site again supports the existence of auxiliary, non-olfactory strategies for finding the loft, but these must lack the qualities inherent to true navigation."—Leon Kelso.

NESTING AND REPRODUCTION

2. Distribution of summer birds along a forest moisture gradient in an Ozark watershed. K. G. Smith. 1977. *Ecology*, **58:** 810–819.—Singing males of eight bird species were studied on adjacent moist and dry Ozark slopes. Principal component analysis indicated that moisture gradient variables were important in separating respective species habitats. Independent measurement of the moisture gradient was used to ordinate species using linear discriminant function analysis. Hooded Warblers, Ovenbirds, and Acadian Flycatchers were found to be "obligatory" moist forest species. Downy Woodpeckers and Tufted Titmice were found in dry forest areas. Habitats for White-breasted Nuthatches, Blue-gray Gnatcatchers, and Red-eyed Vireos were intermediate on the moisture gradient. All species were found more often in moist forest areas, except the Tufted Titmouse, which was found equally in both forest types. Dry post oak habitats were occupied by relatively fewer species. Smith proposes that this may be due to the recent origin of this community since the disappearance of extensive prairies in the area.

This multivariate study shows general trends in species distributions but still leaves unexplained the mechanisms for habitat selection. Supposedly the moisture gradient reflects actual requirements of the species, such as food or nest sites in different microhabitats.—Doris J. Watt.

3. On biology and behavior of the Black Crane in the nesting period, Primor District, Bikin River Basin. (K. biologii i provedeniyu chernogo zhuravlya v period gnezdovaniya. Primorskii krai, Bassein Reki Bikin.) Yu. Pukinskii and I. Ilinskii. 1977. *Byull. Mosk. Obshchest. Ispyt. Prir., Otd. Biol.*, **82**(1): 5–17. (In Russian with English summary.)

The Black Crane in Primor. (Chernyi Zhuravl v Primore.) Yu. Pukinskii. 1977. *Okhota i Okhotniche Khoz.*, **1977**(1): 28–30. (In Russian.)—In these papers are irreplaceable photos and important information obtained during what may be the twilight of the existence of *Grus monachus*, well supplementing Walkinshaw's "Cranes of the World." The limited biotope of the few known breeding pairs is larch-timber-sheltered peat bogs. There are 14 to 16 pairs on 6,000 sq km area. A detailed botanical account of the nest sites is given. From 1969 to 1975 calls of adults and young were tape recorded. Nests, sometimes near those of the Common Crane (*Grus grus*), are described: clutches of 2 eggs only, laid between 15 and 20 April. Eggs measured 92 to 93 × 56 mm and weighed between 127 and 132 g. Hatching interval was 48 to 64 hr with young lingering at nests about 5 days. Chicks were covered with dense brownish-yellow down of 4 to 8 mm depth, and they weighed 85 to 93 g. Food of both adults and young was almost entirely vegetable, mostly of berries, with a few frogs and salamanders. Incubation was mainly by the female, the male standing guard. Total protection, alertly administered, is urged for this species.—Leon Kelso.

4. **Observations on Takahe nesting behaviour at Mount Bruce.** R. Morris. 1977. *Notornis*, **24**(1): 54–58.—This note on *Notornis mantelli* with the author's concurrent notes on *Strigops* pairs two New Zealand species which are endangered, conspicuously vegetarian, and nearly or actually flightless. "Prior to egg-laying the female grazed about continuously throughout the day. The male's grazing was not as intensive as this mate's, and he spent considerable time standing about preening or pacing the barrier between his pen and the enclosure next door which also contained Takahe." They bathe frequently and in all weathers, and this is usually followed by prolonged bouts of preening.—Leon Kelso.

5. **The Mediterranean Gull.** (Chernogolovaya chaika.) T. Ardamatskaya. 1977. *Okhota i okhotniche Khozyaistvo*, **1977**(2): 18–19. (In Russian.)—Since 1960 the range of *Larus melanocephalus* has extended far into central Europe, but about 90% of this species nests in sites around Tendrov on the Black Sea. General arrival at nesting colonies occurs in the latter half of March. They forage in open fields by day and return home in the evening. Large colonies contain 15,000 to 25,000 nests. Incubation occupies 25–26 days. Non-disturbance by humans is a dominant requirement. The young hatch in early June. Some fledglings are on the wing by early July. About 95% of the diet consists of insect pests. Young are fed by regurgitation. Dispersal of the nesting colonies commences in late July. Known wintering areas include the Black Sea coast, Caucasus, Crimea, lower Egypt, Greece, Tunis, Mediterranean coast of France, Spain, and Morocco. In spring the juveniles persist at the wintering sites. From 1929 to 1974, 109,972 were banded, with 1,693 returns. Most mortality occurs in the first year of life. The maximum age of banded survivors was 15 years.—Leon Kelso.

6. **Ecological notes on the Wryneck in mid-Dneiper gardens.** (Materialy k ekologii vertisheiki, *Jynx torquilla*, k sadakh srednego pridneprovya.) N. Kovshar. 1976. *Vest. Zool.*, **1976**(4): 87–90. (In Russian with English summary.)—The famed preference of the Wryneck for ants and their "eggs" (larvae and pupae) was well confirmed by these observations. From hatching onward the food brought to broods in 68 nests was almost 100% ants by occurrence but not by volume. Only trace or incidental amounts of Coleoptera, Lepidoptera, and other insects were consumed. Visits by adults carrying food to young varied from 4 to 16 per hour, from the 3rd to 19th day of age. Breeding success over 5 years' observation was an estimated 75%. Incubation period of the 6- to 12-egg clutches was 12 to 13 days. Broods usually totalled 10 or more and stayed in the nest hollow for 18 to 19 days. Just after hatching of eggs, the male fed both female and brood, but later both adults shared the burden. The broods lingered in home territories 6 to 8 days after fledging.—Leon Kelso.

7. **Natural selection and clutch size in the European Starling.** K. A. Crossner. 1977. *Ecology*, **58:** 885–892.—Two fundamental components of Lack's clutch-size model (optimal size for maximal reproductive rate and limitation by food availability) have rested largely on correlative data. In an experimental test, Crossner manipulated the two key variables, clutch size and food supply, in a box-nesting population of 117 Starling pairs. Clutch size was artifically adjusted by transferring young nestlings between nests: thus broods of 1 to 10 were created. Maximum chick weight (a strong predictor of future survivorship) averaged highest in broods of 3 and declined only slightly through 6. In broods of 7 or more mean weights dropped precipitously to total starvation in broods of 10. The lower weights in broods of 1 and 2 may be attributable to higher thermoregulatory costs in the absence of huddling nest-mates. Broods of 5 or 6 are probably optimal and are slightly higher than the population average of 4.68.

In the second part of the experiment, supplemental food was provided *ad libitum* for some of the largest broods. In supplemented broods of 6 to 10, nestling weights were virtually as high as unsupplemented broods of 3! These results constitute interesting and important support for Lack's model.—Douglas W. Mock.

8. Notes on growth and development of Tree Sparrow nestlings in the Leningrad area. (Materialy po rostu i razvitiyu gnezdovykh ptentsov polevogo vorobya v leningradskoi oblasti.) S. Fetisov. 1977. *Vest. Leningr. Univ., Ser. Biol.,* **1977**(15): 14–21. (In Russian with English summary.)—This study of *Passer montanus*, based on examination of 84 first and 46 second broods discussed changes in plumage growth, including wings and tail, beak, and weight. Most of the young leave the nest at 14 to 15 days, or earlier if disturbed. On normal departures the oldest go first, to a distance of 50 m or more. They alight high in trees or shrubbery and set up a monotonous chirping, thus maintaining contact with adults and other young. The later young may actually "fall out" of the nest, whereafter they hide in weed or brush and suffer more danger from ground predators. However, those delayed may be fed in the nest by the parents for about eight days after departure of the rest of the brood. Ten other authors (cited) have found the growth rate of Tree Sparrows dependent on local climatic events, brood size, and food availability. Weight at hatching here was 1.94 g. Weight increased during the first 12 days, more rapidly between 4th and 10th, and reached 22 g. Weight decreased shortly before departure. By the 6th day fat deposits were visible through the skin. Sibling weight differences were usually equalized by 3rd to 4th days. With cool spells, long rains, and delayed feeding, the young may suffer delayed growth and death (as it was in 1974 for 48% of first broods and 15% of the second).—Leon Kelso.

BEHAVIOR

9. A mixed colony of egrets and Magnificent Frigatebirds in Venezuela. M. N. de Visscher. 1977. *Le Gerfaut,* **67**: 203–223. (In English with Flemish and French summaries.)—During 1975 and 1976, 160 egret nests and 90 frigatebird nests were located in a mangrove swamp in Morrocoy National Park. Breeding in the colony were Magnificent Frigatebirds (*Fregata magnificens*), Great Egret (*Casmerodius albus*), Cattle Egret (*Bubulcus ibis*), Tricolored Heron (Louisiana) (*Hydranassa tricolor*), and Snowy Egret (*Egretta thula*). The small egrets nested together at mid-elevations in the mangrove trees, whereas Great Egrets clustered in the tops of trees among the frigatebird nests. The colony was not truly mixed because the small egrets bred in one area and the frigatebrids in another.

The colony was visited for eight days every five weeks, when the author recorded the age and sex of each individual of each species. The author then computed a rate of population change as a function of (a) the number of fledglings of a given species (s) at an instant in time multiplied by (b) the total number of fledglings of all species divided by (c) the total number of fledglings of species s. Data are for each category by month. Individual birds and nests were not marked or followed during the study. The colony was asynchronous with birds present all year.

Three forms of periodic breeding cycles were observed at the colony. The Cattle Egret was annual, synchronous, and showed two peaks in reproduction each year. The other egrets were less synchronous and were annual. Frigatebirds seemed to the author to be annual (males) or biennial (females), with a variable rate of intraspecific synchronism. She presents approximate times for the various reproductive stages of frigatebirds. Parental investment is similar for both parents *except* that females remain with their chicks on the breeding grounds for 120 days during the postfledging stage after the males leave. Females thus require 17 months for a cycle, whereas males require 12 to 13 months. She further suggests that males breed every year and females breed every two years. This is, of course, conjecture because both sexes could breed every two years. The presence of breeding males every year might only mean that there are two overlapping populations using the same breeding site. It is provocative, however, and suggests that a banding study might be fruitful.

Territorial defense and aggressive behavior were high in the small egrets colony, whereas territorial fights were rare in the frigatebird colony. Piracy was observed among the egrets.—Joanna Burger.

10. An interterritorial hierarchy: an advantage for a subordinate in a communal territory. J. L. Craig. 1976. *Z. Tierpsychol.*, **42:** 200–205.—The Pukeko (*Porphyrio p. melanotus*) is a New Zealand gallinule that lives in groups of three to nine birds, presumably families, on a territory. Birds of two adjacent groups were rated as to "status," which unfortunately is not defined. It turns out that each group had two adult males, two adult females, one juvenile male, and one juvenile female, of "status" in that order. Convincing data of large sample sizes show that birds of higher status penetrate farther toward the other group's territory than do birds of lower status. Furthermore, the penetration is deeper when the opponent confronting the bird is of low status in its own group than when it is of high status. The author also claims that low status birds can penetrate farther when in the company of high status birds, but no data are presented. His interpretation contains the common reasoning error that "it follows that if there is an inter-territorial hierarchy, there must be individual recognition." A soldier knows his place in the hierarchy by looking at badges, not by knowing all captains or generals individually; birds could be cueing on behavioral badges.—Jack P. Hailman.

11. Comments on plumages and behavior of Scoresby's Gull. P. Devillers. 1977. *Le Gerfaut*, **67:** 254–265. (In English with Flemish and French summaries.)—Several colonies of Scoresby's Gulls (*Larus scoresbii*) were visited during the austral spring of 1975 in Argentina. The most striking feature of the adult plumage is the gray tinge that suffuses the head, neck, and underparts. The downy chick is boldly patterned, and the juvenile plumage is uniform, a unique trait among larids. The author felt that its wing pattern, gray shading, whiter hood, immature plumage, and heavy bill tie it more closely with Belcher's Gull (*Larus belcheri*) than with any other species. Given their close geographical proximity, the similarities may reflect a true relationship.

The five colonies examined were all densely packed and were located on bare shingle, on boulders on a beach, and on a steep, bare beach. Their "long call" performance resembled that of the *Larus ridibundus* group rather than that of the large white-headed gulls. Alarmed adults mobbed humans, but did not use "swoops." Adults did not seem to peck displaced chicks, and no cannibalism was observed. Instead, adults seemed to herd the chicks to safety. This paper describes breeding cycles, habitats, and behavior, but details are lacking because of infrequent visits and unmarked birds.—Joanna Burger.

12. Behavioral adaptations of young Guillemots (*Uria aalge aalge* Pont.) to cliff and colony nesting. (Verhaltensanpassungen junger Trottellummen ans Felsklippen- und Koloniebrüten.) J. Wehrlin. 1977. *Z. Tierpsychol.*, **44:** 45–79. (In German with English summary.)—Experiments show that chicks seek tactile contact, warmth, and darkness and that they avoid drop-offs (visual cliff response). These tendencies combine to keep them under the parent where chances of falling off the nestling cliff are minimized.—Jack P. Hailman.

13. Odd couples in manakins: a study of social organization and cooperative breeding in *Chiroxiphia linearis*. M. S. Foster. 1977. *Amer. Nat.*, **111:** 845–853.—Two or three male Long-tailed Manakins display together at a site. Beyond that fact, which seems established, this "study" is a house of cards. When actual data are mentioned they are disguised in various forms that make the conclusions reached seem far more substantial than is justified. Take, for example, the assertion that these "associations persist through an entire breeding season or from year to year." At first the paper says that birds were color-banded in a 19-month study, but later careful reading reveals what this means. Five pairs and a trio were actually watched, an unstated number of birds being "distinguishable by some peculiarity of plumage or voice" instead of being color-banded. Only one pair was observed over any significant length of time (29 March to 3 July, about three months), but the breeding season seems to be from February to September. Why, then, is one asked to believe in the persistent associations of these males? Or consider the statement that "one male is dominant in the association and responsible for all copulations." Disregard the problem of dominance and focus on copulations. Of the 22 "copulations" seen, 14 are actually observations of precopulatory display only, so there are eight actual copulations spread among the five pairs and the trio. In one instance, one of the two males of a pair copulated with two females present together, and in another case with three females in quick succession. That accounts for five of the eight copulations, leaving three observed copulations among the six groups watched to support the conclusion that from February to September one male of a pair always did the copulating! It seems to me a moot question as to how the male-male pairing behavior evolved when we do not even know what it is we are trying to explain.—Jack P. Hailman.

14. On plumage care of the Tree Sparrow. (Ob ukhode polevogo vorobya, *Passer montanus* L.) S. Fetisov. 1976. *Vestn. Leningrad. Univ., Ser. Biol.*. **1976**(21): 53–60. (In Russian.)—Detailed descriptions of avian preening, sun bathing, water, dust, snow and other bathing as part of plumage care are rare. This account is replete with diagrams and discussion of such. Plumage function rests wholly on what condition it may be in. Cleanliness and good order must be maintained. Simple care (scratching, stretching, and shaking), then sunning, water bathing, and dust bathing are given attention. Plumage control of "wetting" rests primarily not on the amount but on the quality of the preen gland secretion and on the structure of the feather itself. During plumage development, along with growth and expansion of the sheaths, small keratinous scales are constantly shed. During height of molt both adults and young are literally pouring off scales, reminiscent of the "powder" of pigeons and herons. During sunning Tree Sparrows seemed to assume some "torpor." Water bathing was noted year-round in all weather. Plumage care is usually performed in groups. The sparrows appear responsive to fluctuating forces of the environment: moisture, soilage, and irritation by feather lice and feather mites. One of the essential qualities of feathers is capacity to restore distorted shape. After drawing it through the bill the bird may pinch the spreading feather barbs and bite it at the base as if setting it in place. Cleansing the plumage of mud by water is quite logical. Less so is how this is accomplished by a dust bath. According to some observers thrashing on a substrate is probably stimulated by ectoparasites. The sparrows thrash oftener and longer than they bathe. This would hint that removal of parasites requires more time and energy than soil cleansing. In thrashing, the urge is to rub a substrate or cast it under the feathers. In the former case this may soothe skin irritation; in the latter, conditions favoring the lice and mites are removed, at least in theory. Known proof of feather lice killing by dust clogging of respiration is cited.—Leon Kelso.

ECOLOGY

15. Effect of fire on Lark Sparrow nesting densities. J. Renwald. 1977. *J. Range Manage.*, **30**(4): 283–285.—Nest censuses in central Texas for *Chondestes grammacus* at seven stages of burn ages in Honey Mesquite (*Prosopis glandulosa*) and Tobosagrass (*Hilaria mutica*) communities showed the latter highly favored. Of 79 nests, 65 (82.3%) were built in Tobosagrass, and 12 (15%) were in Buffalo and other grasses. Clutch size averaged 3.7 eggs. "Breeding densities were highest in the most recent burns and declined with increasing litter build-up." Early spring burnovers are suggested if flourishing populations of Lark Sparrows are desired.—Leon Kelso.

PHYSIOLOGY

16. Seasonal cyclic mechanisms of bird reproduction. V. Mechanisms of light effect on the avian reproductive function. (Mekhanizmy sezonnoi tsikliklichnosti razmnozheniya ptits. V. Mekhanizmy deistviya sveta na funktsiyu razmnozheniya ptits.) B. Novikov. 1977. *Vest. Zool.*, **1977**(4): 19–26. (In Russian with English summary.)—As intriguing to participants of avian research as spatial navigation and homing are the modes and routes of photic influence leading to photoperiodic effects. Combined Slavic and Western accounts (53 titles) of research on prospective receptors and conductors for the hypothalamo-hypophysis responses are here surveyed. No general conclusions are unreservedly accepted. These follow the headings: Effect of light on the gonadotropic function of the hypophysis; Effect of light on the functional state of the hypothalamus; Light receptors activating the gonad function; Routes of penetration of light stimuli to the hypophysis. Among more trenchant results: by intraoptic injection radioactive proline and lysine were traced from optic ganglia along their processes. Thereby three zones of optic terminal fibrils were found leading to the hypothalamus. Summation of the various experimental accounts indicates a connective link of the retina to the supraoptic nuclei, which regulates gonad functions. Less certain are retinal connections to arcuate nuclei. Some indication of these was found in the hypothalamus of *Coturnix coturnix* wherein gonads were not reactivated by light. "Some authors have assumed that initiated neural impulses act upon the mediobasal area of the hypothalamus. They may lead from supraoptic to arcuate nuclei by neural juncture."—Leon Kelso.

17. Bioenergetics of the Nutcracker (*Nucifraga caryocatactes*) under extremely low temperatures. (Bioenergetika kedrovki, *Nucifraga caryocatactes*, v usloviyakx kraine nizkikh temperatur.) A. Andreev. 1977. *Zool. Zhurn.*, **56**(10): 1578–1581. (In Russian with English summary.)—The Nutcracker's winter food recovery routine allows calculation of energy metabolism in the wild. Standard metabolism (food consumption) for one individual of 152 g weight at −44°C air temperature totaled 1.68 to 2.05 cal/hr. The total value of daily existence energy calculated as above was 56.9 cal/day. This was found to be much lower than the theroretical predictable level of energy consumption for a passerine species of this size at this temperature (at Omolonsk, northeastern Siberia, Kolyma basin, 66° north latitude). This lower existence energy value is attributed to a not thoroughly understood inherent "hypothermy," a nocturnal decrease of energy metabolism, This situation enables the bird to survive −40° temperature during a 20-hr night on a limited food supply.—Leon Kelso.

18. Energetics of the Starling (*Sturnus vulgaris*) in a pine woods. M. P. Kelty and S. I. Lustick. 1977. *Ecology*, **58:** 1181–1185.—The possible energetic advantages of roosting in a large (0.5 to 1.0 million) winter roost were studied in an Ohio pine woods. Microclimate data from inside and outside the roost (in a nearby open field) were compared. Neither temperature nor water vapor pressure differed significantly between the two locations, but wind velocity was considerably lower inside the roost. Observations in the woods showed that Starlings select perch heights that afford the greatest reduction in wind velocity but do not huddle. Laboratory experiments, in which 30 Starlings were exposed to comparable wind velocities at low temperatures, showed that the roost microclimate could reduce daily existence metabolism by 12 to 38% through savings in convective heat loss. Although the authors conclude that ". . .the protection afforded would be as great for 1 bird as for a flock of millions," they have not actually distinguished between the sheltering effects of the vegetation and those of the other birds.—Douglas W. Mock.

19. Attachment of Arctic Tern chicks (*Sterna paradisaea*) to their parents by means of imprinting, and their ability to recognize the parents by voice. (Prägungsbedingte Bindung von Küstenseeschwalbenküken an die Eltern und ihre Fähigkeit, sie an der Stimme zu erkennen.) K. and K. Busse. 1977. *Z. Tierpsychol.*, **43:** 287–294. (In German with English summary.)—It is no longer surprising to find that chicks learn individual characteristics of their parents within the first couple of days after hatching, but a clever testing apparatus in this study is worthy of special note. Chicks were placed in an opaque running wheel, the axis of which was normal to a line connecting their own nest and the nest of a neighboring pair and placed midway between the nests. In this way the nest toward which the chick runs when hearing calls can be recorded automatically.—Jack P. Hailman.

20. Near-field visual acuity of pigeons: effects of scotopic adaptation and wavelength. W. Hodos and R. W. Leibowitz. 1977. *Vision Res.*, **17:** 463–467.—The ability to resolve two small things close together in the visual field, such as two lines on a grating, is acuity, measured by the reciprocal of the smallest resolvable visual angle. (That is, if you can see two dots as separate and lines are drawn from each dot to your eye, the angle formed by those lines is the visual angle.) This paper not only reports new data for the domestic pigeon (*Columba livia*) but "summarizes the currently avilable data on acuity-luminance functions for birds." Actually, it falls at least a little short of that goal because the older work of K. O. Donner on several European passerines is not cited. Visual acuity depends upon the light intensity (technically, luminance) among other things, and it turns out that at high intensities when cones are primarily mediating vision, the pigeon's acuity is better than that of the only owl measured (Tawny Owl, *Strix aluco*), but at low levels of rod vision the pigeon's acuity is worse than that of a different species of owl measured

(Great Horned Owl, *Bubo virginianus*). At high intensities the American Kestrel (*Falco sparverius*) has much better acuity than the pigeon, however; indeed, the falcon's acuity is better than man's. Other details in this paper are of interest to students of avian vision.—Jack P. Hailman.

21. Concentric receptive fields of pigeon ganglion cells. A. L. Holden. 1977. *Vision Res.*, **17:** 545–554.—This report lays to rest the notion that the pigeon's retinal organization to geometry of light is fundamentally different from that of the well-studied cat. Specifically, this is the first cogent report of avian "bullseye-like" receptive fields, which may be explained as follows. The receptive field of a cell is its visual field: the angle in which light stimuli cause it to respond electrically. In cats, and subsequently other mammals, it was found that the receptive field was not homogeneous; some cells, for example, respond to the onset of light at the center of their receptive fields and the offset of light at their peripheries. (Others are just the reverse, and more complicated responses also exist.) This receptive field organization is probably a basic step in form-vision. In this study the author recorded concentric receptive fields from the ganglion cells of the pigeon, the ganglion cells making up the third *major* cell layer of the eye (after the rod and cone photoreceptors themselves and the intermediate bipolar cells). The processes of the ganglion cells make up the optic nerve, which runs to centers in the brain itself. Years ago I had shown that certain aspects of vision in gull chicks corresponded remarkably well to receptive-field properties of cats (*Anim. Behav.*, **18:** 328–335, 1971), so I find it pleasing that this concentric receptive field organization has finally been established in a bird.—Jack P. Hailman.

22. Visual pigments of chicken and pigeon. V. I. Goverdovskii and L. V. Zueva. 1977. *Vision Res.*, **17:** 537–543.—The receptor-basis for color vision in birds has long been debated. In mammals such as man, and also in fishes, the evidence is good that color vision is mediated by three kinds of light-absorbing pigments in the cone cells, each pigment having maximum absorption in a different part of the spectrum. The colored oil droplets of avian cones, however, could act as filters to a single kind of pigment yielding several classes of cone receptors with different spectral sensitivities. These authors used a powerful flash of light to record with microelectrodes a small electrical potential in the retina known as the early receptor potential (ERP). By two ingenious techniques they separated out contributions of different kinds of cones using the ERP. By taking into account the filtering properties of the cornea, lens, vitreous body, and oil droplets through which light must pass before striking the visual pigment, they conclude that there must be at least four classes of visual pigments in the chicken and pigeon, one being similar to or identical with the pigment found in rod cells. These results would seem to relegate the importance of oil droplet filters to merely sharpening the sensitivity peaks of the pigments. The results contradict a study in 1962 of Bridges in which a pigment of the pigeon peaking at 544 nm of wavelength was reported—a result that has proved consistently troublesome to all attempts to link behaviorally measured spectral sensitivity to visual pigments. Finally, the results suggest that there is no reason these birds cannot see into the near ultraviolet part of the spectrum, a fact recently established by Kreithen and Keeton for homing pigeons. This is a very important study, and these Russian researchers indicate that they have other results on avian vision forthcoming.—Jack P. Hailman.

23. The visual pigments and oil droplets of the chicken retina. J. K. Bowmaker and A. Knowles. 1977. *Vision Res.*, **17:** 755–764.—Our understanding of avian vision is advancing very rapidly, as evidenced by this study of *Gallus gallus*. Color vision is based on receptors having different spectral sensitivities, these receptors being cone cells in vertebrates. In mammals and fishes there appear to be three types of cones, each having a different visual pigment with maximum light-absorption in different parts of the spectrum, but in birds (and probably turtles) the situation is far more complicated because the cones each contain an oil droplet through which light passes before striking the visual pigment. Two theories predominated: either there was one kind of visual pigment in avian cones, light to it being filtered differently by colored oil droplets, or alternatively there were several visual pigments (as in mammals), each cone-type having its own color of oil droplet. Both theories now appear to be wrong, but the truth is a little closer to the first than the second. In the chicken, the situation seems to be thus: (1) two kinds of cone pigments exist, with a third kind in the rods; (2) the cone pigment absorbing maximally at 487 nm (wavelength) always occurs in single cones that contain one kind of oil droplet (type C), which has a cutoff spectrum at 520 nm (passing all longer wavelengths); (3) the other cone pigment, absorbing maximally at 569 nm, is also found in single cones, but occurs as well in both the principal and accessory members of the double-cone system; (4) the accessory cone always has a particular kind of oil droplet (type B_2), which has a complex transmission spectrum; (5) the principal cone always has another kind of oil droplet (type B_1), which has an average cutoff wavelength of 497 nm, but is variable in transmission spectrum; and (6) the single cones of the 569-type pigment may have any of three types of oil droplets with different spectra (clear, transmitting all light; A, cutoff at 455 nm; or red, 585 nm). The authors indicate they also have results on the pigeon (*Columba livia*), which, alas, shows a different pattern!—Jack P. Hailman.

MORPHOLOGY AND ANATOMY

24. Sex, age and seasonal variation in size and weight of *Calidris maritima maritima*. (Polovye, vozrastnye i sezonnye razlichiya v razmerakh i vese *Calidris maritima maritima*.) I. Tatarinkova. 1977. *Zool. Zhurn.*, **56**(11): 1735–1736. (In Russian with English summary.)—For Purple Sandipers the average beak length of 28 males captured on Ainov Islands, Murmansk area, was less than 31.5 mm; of 20 females, more than 31.5 mm. Seasonal and age variation in size and weight was slight: 77 to 78 g for 183 males; 85 to 86 g for 203 females.—Leon Kelso.

25. On geographic variation of winglength in the House Martin. (Zur geographischen Variation der Flugellange bei der Mehlschwalbe (*Delichon urbica*)). D. Gruner. 1977. *Bonn. zool. Beitr.*, **28**(1–2): 77–81. (In German with English summary.)—The winglengths of 200 House Martins from Hamburg compared with those from other localities in Germany and elsewhere reveal a statistically verifiable increase from south to north in conformity to Bergmann's rule. There is no difference in male and female winglengths (112 versus 111 mm).—Leon Kelso.

SYSTEMATICS AND PALEONTOLOGY

26. On relations of biological and typological species concepts. (O sootnozhenie biologicheskoi i tipologicheskoi kontseptsii vida.) Y. Starobogatov. 1977. *Zhurn. Obshchei Biol.*, **38**(2): 157–165. (In Russian with English summary.)—While the biological species concept is accepted among zoologists, the typological is still in general use. The reasons to be considered include the facility of the typologic approach for analysis of systematic groups in general, the lesser definiteness of the biological for establishing a species' status, the difficulty through the biological to prove the conspecificity of two or more forms, and the necessity to analyze the facts observed relative to the requirements of the biological species concept. In many instances this is declared impossible. The new methods of taxonomic analysis, such as the mathematical, do not bridge the gap between the two concepts because the data involved may be interpreted from either position. Yet, adequate interpretation of data enhances the advantages of the biological concept.—Leon Kelso.

EVOLUTION AND GENETICS

27. Were the Pterosaurs Homoiothermal? (Byli li letayushchie yashchery gomoiotermnymi?) I. Shilov and B. Stephan. 1976. *Zool. Zhurn.*, **55**(7): 1038–1044. (In Russian with English summary.)—Does the discovery that Pterosaurs had hairy integument invite the question, how avian were the extinct flying reptiles? Or could they fly at all? Speculation derived from about 29 sources by as many authors indicates that Pterosaurs might have been homoiothermic and might have achieved gliding flight by climbing up to and jumping off some suitable elevated sites. The conclusion of these authors is that such speculations are premature.—Leon Kelso.

28. Stabilizing selection in Field Sparrows–a retraction. S. D. Fretwell. 1977. *Amer. Nat.*, **111**: 1209–1210.—In his book "Populations in a Seasonal Environment" (1972), Fretwell concluded that overwinter survival of *Spizella pusilla* was independent of winglength. Reanalysis of the data, suggested by Richard Lewontin, showed that birds with close to the mean winglength survived slightly more frequently (not quite statistically significant) than those with longer or shorter wings, a result consistent with the notion of stabilizing selection that differentially trims deviants from the population. Despite the title—which seems to imply that it is stabilizing selection that is being retracted rather than the lack of it—Fretwell is to be commended for clarifying the import of his data. And I like his conclusion that "real-world descriptive biologists will have to use their expertise to gather data to test the theories of model builders."—Jack P. Hailman.

FOOD AND FEEDING

29. Stomach contents of the Great Indian Bustard, *Chlorotis nigriceps* (Vigors). P. Gupta. 1974. *J. Bombay Nat. Hist. Soc.*, **71**(2): 303–304.—Undetermined number totaling 107 g volume in August 1970 included chiefly beetles, mostly *Uromastix hardwickii*, and some scorpion and spider remnants and Capparis fruits.—Leon Kelso.

30. Seasonal food habits of the Barn Owl (*Tyto alba*) in an area of central Italy. F. Petretti. 1977. *Le Gerfaut*, **67:** 225–234. (In English with Flemish and French summaries.)—150 Barn Owl pellets were collected from one roost in a farmland area near Rome, Italy, for one year. For the entire sample, 441 prey were identified; 147 were identified from winter pellets, 146 from spring pellets, 78 from summer pellets, and 70 from autumn pellets. Summer pellets were smaller and contained fewer prey per pellet (mean, 2.3) than winter pellets (mean, 3.3).

The diet of the Barn Owl was mostly rodents and other small mammals, secondly birds, whereas insects and amphibians were poorly represented. Voles (*Pitymys savii*) accounted for 32% (summer) to 44% (winter) of the prey, the Wood Mouse (*Apodemus* sp.) accounted for 20% (summer) to 31% (winter), and shrews (*Sorex araneus, Suncus etruscus, Crocidura levcodon*) accounted for 12% (summer) to 16% (spring). Birds accounted for 2.7% (winter), 7.5% (spring), 23% (summer), and 5.2% (autumn) of the Barn Owl's diet. Most of the birds taken by owls were Italian Sparrows (*Passer italiae*).—Joanna Burger.

SONG AND VOCALIZATIONS

31. On the occurrence and significance of motivation-structural rules in some bird and mammal sounds. E. S. Morton. 1977. *Amer. Nat.*, **111:** 855–869.—The first 10 pages of this inexcusably wordy paper document a rough generalization that almost everyone acknowledges already: threat sounds tend to be harsh and low-pitched, whereas appeasing (or "friendly") calls tend to be pure-tone-like and high-pitched. The interesting part is on pages 864–5, where Morton suggests that threat sounds are low-pitched because of selection for larger "sounding" animals, and appeasing sounds are high-pitched because small, young animals produce higher sounds that elicit parental behavior. Harshness is correlated with low pitch by physical considerations, and hence pure-toneness is correlated with high pitch. It is a shame that the basic ideas are clouded with the non-operational "motivational" claptrap that ethology is showing healthy signs of outgrowing, but the straightforward hypotheses do show through for consideration. It seems curious that Marler's hypothesis about non-localizability of pure-tone calls is not considered, and a possible reference to Darwin's antithesis principle (p. 856) brushes it off in eight words. This paper has the potential for causing mischief through encouraging facile pseudoexplanations for subtly complex phenomena, but also may encourage thoughtful evaluation of hypotheses proposed here and elsewhere to explain the physical characteristics of acoustic signals.—Jack P. Hailman.

32. Species-specific parameters underlying song recognition in Goldcrest and Firecrest (*Regulus regulus, R. ignicapillus*). (Artkennzeichnende Gesangsmerkmale bei Winter- und Sommergoldhännchen.) P. H. Becker. 1976. *Z. Tierpsychol.*, **42:** 411–437. (In German with English summary.)—The songs of these two kinglets are similar but differ consistently in a number of subtle ways. Becker played back various experimental songs to assess the reactions of males and found that perhaps the most important variable was the changes in pitch of notes in the Goldcrest versus the constancy of pitch in notes of the Firecrest.

This is an extensive study, the details of which will interest students of avian song.—Jack P. Hailman.

33. Constitution-dependent characteristics of songs and calls in European warblers (genus *Sylvia*). (Konstitutionsbedingte Merkmale in Gesängen und Rufen europäischer Grasmücken.) H-H. Bergmann. 1976. *Z. Tierpsychol.*, **42:** 315–329. (In German with English summary.)—One expects larger birds of the same shape to have deeper voices because of resonance properties of larger cavities, but in my recollection this is the first truly comparative paper surveying parameters of vocalizations that covary with body weight in closely related birds (112 individuals of 11 species, to be precise). I calculated the square of the correlation coefficient because it expresses the percentage of variation that is explained by the covariance. Three statistically significant correlations were found: the principal frequency of pure tone elements (r^2 = 77%), the repetition-rate of songs (67%), and the duration of short elements in alarm calls (58%). The first two correlations are negative, the third positive. (Figure 6 must be in error because an r value greater than unity is impossible; I have assumed that −8.2 was supposed to be −0.82.) Other durational elements showed no significant variation with body weight.—Jack P. Hailman.

34. Temporal and sequential organization of song in the Sedge Warbler (*Acrocephalus shoenobaenus*). C. K. Catchpole. 1976. *Behaviour*, **59:** 226–246.—This European passerine has one of the longest, most complex, and variable songs among all birds. The beginning part consists of repeated or alternated notes of two types, switching abruptly to a middle section in which five to ten new syllable-types are introduced in quick succession, and the ending resembles the beginning with the two syllable-types selected from the middle portion. Sequential analysis revealed so little predictability that it is doubtful that a given song is ever repeated exactly.—Jack P. Hailman.

BOOKS AND MONOGRAPHS

35. The Life of Birds. Jean Dorst. 1974. (trans., I. C. J. Galbraith) New York, Columbia University Press. 718 p.—Dorst has written a comprehensive, well-organized, ornithological text in two volumes. He intends his work to be "an essay on the ecology of birds, written not so much for the specialist as for the well-informed public." His emphasis on adaptations to specific environments is the focus and great strength of these volumes. Nonetheless the first volume is devoted entirely to general avian biology. Only in his second volume does Dorst turn to ecology. The broad coverage makes Dorst's two-volume work a text that merits comparison with other more widely used texts. Hence I have adapted Bock's (*Auk*, **94:** 396–399, 1977) comparison of texts by Van Tyne and Berger ("Fundamentals of Ornithology" (2nd. ed.), John Wiley, 1976), Wallace and Mahan ("An Introduction to Ornithology" (3rd. ed.), MacMillan, 1975), and Welty ("The Life of Birds" (2nd. ed.), W. B. Saunders, 1975) for comparison with Dorst's work (Table 1).

Dorst follows a brief discussion of taxonomic characters used to classify birds with a list of orders and families of birds. Van Tyne and Berger provide a far more authoritative account, but none of the texts discusses phylogenetic relationships among avian families.

Archaeopteryx, *Ichthyornis*, and more recent fossil birds are described by Dorst, but not pictured. The evolutionary origin of *Archaeopteryx* is not adequately discussed. The origin of flight is mentioned, but the cursorial theory is dismissed without explanation and the aboreal theory is not explained clearly. References are not provided, so the reader must turn to another text for explanations and references. Van Tyne and Berger offer an exciting, well-written, well-referenced, and clear account of avian paleontology.

Dorst mentions the process of speciation in his discussion of island avifaunas, but he never explains the concept. His presentation of evolution is vague and confusing, and his idea of natural selection will surprise most readers. Welty offers a far superior discussion of these concepts, although Welty's phraseology is occasionally teleological.

Descriptive ecology is Dorst's forte, and the strength of these volumes is the 11 chapters of descriptive ecology, each devoted to one major environment and the behavioral, ecological, and physiological adaptations of birds that inhabit that environment. The material is interesting, excellently organized, and clearly presented. The presentation by habitats

TABLE 1
Comparative emphases, by percent of contents, of four ornithological texts.

Subject area	Wallace & Mahan	Van Tyne & Berger	Welty	Dorst
Classification	3	23[1]	2	1
Taxonomic characters	1	7[1]	1	1
Paleontology	1	4[1]	2	2
Speciation	1	0	3[1]	(discussed with biogeography)
Ecology and biogeography	8	7	15[1]	40
Behavior	7	6[1]	7[1]	3
Vocalizations	(included in behavior)	6	4[1]	4
		6	4[1]	4
Migration and orientation	7	6	6	9
Life history	21	14	24[1]	12
Locomotion	4	2	4[1]	4
Foods and feeding	4	3	3	4
Plumage and molt	6	7[1]	5	3
Anatomy and physiology	12	13	18[1]	11
Conservation and man	14[1]	0	4	6
History of ornithology	5[1]	0	0	0

[1] Bock considers that the book gives superior treatment to the particular subject.

cuts across phylogenetic relationships and emphasizes adaptations to particular demands of particular environments. Nothing in the other texts compares with these chapters.

Dorst discusses behavior only anecdotally with no mention of important behavioral concepts (e.g., imprinting). Van Tyne and Berger offer the best treatment of behavior.

Dorst devotes an entire chapter to vocalizations, but he glosses over variations in syringeal anatomy and location. The anatomical descriptions are accompanied by illustrations, but these are inadequately labelled. Several pages are devoted to Marler's (p. 150–206 in "Darwin's Biological Work," P. R. Bell (ed.), Cambridge Univ. Press, 1959) study of alarm calls of passerines, but Marler's name is never mentioned nor is Marler's paper included in the bibliography. The beauty of Marler's study is the correlation between the physical structure of the different calls and their respective functions. Dorst mentions the correlation but fails to explain the important physical characteristics of the calls. Welty provides a far superior treatment of the same material.

Migratory patterns are described at length, and many important studies of navigation and orientation are mentioned. However, hypotheses (e.g., sun-arc hypothesis) are not well explained, references are lacking, J. T. and S. T. Emlen are confused, and none of the exciting papers from the mid- and late 1960's is cited.

All aspects of life history are discussed, but Dorst's peculiar view of evolution causes grave difficulties. For example, he argues that predation pressure determines clutch-size. The evolution of brood parasitism is dismissed in the following remarkable sentence, "Parasitism can only be favorable to a species if it is already almost 'perfect'—that is if it has passed beyond the preliminary stages, as it will have done very rapidly during evolution." The discussion of territory reaches a high point of confusion on p. 189 where Dorst confuses territories of individual Song Sparrows with ranges of different subspecies of the Song Sparrow. However, the chapters on courtship and nest-building are well organized, clear, and informative. Nonetheless, Welty's treatment of the same material is vastly superior.

Flight is poorly explained, and the lack of diagrams makes comprehension extremely difficult. Happily for the reader very little space is allotted to the explanation of flight. Climbing receives an outstanding explanation, but Bock and Miller's (*Amer. Mus. Nov.*, **1931**: 1–44, 1959) article, although cited in Chapter 3, is listed in the bibliography for

Chapter 5. Again, I recommend Welty's treatment of locomotion despite Dorst's excellent discussion of climbing.

Many, many facts about diet and feeding habits are showered on the reader who must also wade through a torrent of European bird names, most of them unfamiliar to non-European readers. Scientific names are mentioned only occasionally.

An otherwise fascinating chapter on coloration suffers from a lack of references. Otherwise plumage and molt receive scanty treatment. There is not even a diagram that illustrates feather structure. Van Tyne and Berger provide excellent coverage of these subjects.

Anatomy is discussed here and there throughout the text leaving the reader with a somewhat disjointed view of avian anatomy. Dorst considers most anatomical characters to be adaptations for flight, but fails to entertain the possibility that they are preadaptations found in the reptilian ancestors of birds. Dorst's discussion of physiology, especially respiratory physiology, is entirely inadequate. Anatomy and physiology are among Welty's greatest strengths.

Although the history of ornithology is not mentioned (only Wallace and Mahan cover ornithological history) Dorst closes with a fine discussion of man's effect on birds and the need for worldwide conservation.

These books suffer from a lack of illustrations, about one illustration per seven pages compared with one illustration per two pages for Van Tyne and Berger and Welty. The text is often awkwardly phrased, very likely the translator's fault, and the flow of facts unrelieved by anecdotes or syntheses. The lack of references to original research is inexcusable. The books are quite useless to anyone who might wish to read the original research papers. Whatever their faults, Welty and Van Tyne and Berger provided many references for their readers. Dorst's second volume, with its emphasis on environments and conservation, offers a valuable viewpoint not available in other texts, but the volumes cannot be purchased separately. The lack of illustrations, lack of references, nonevolutionary approach, and lack of clarity are disadvantages that outweigh the second volume's novel viewpoint.—Edward H. Burtt, Jr.

36. Bird Hazards to Aircraft. Hans Blokpoel. 1976. Clarke, Irwin and Company Limited. (Available from Books Canada Inc., 33 East Tupper Street, Buffalo, NY 14203.) 236 p. $6.50 (paperback).—After I had spent 22 straight hours in the air returning from South Africa to Los Angeles, reading this book was both enlightening and most sobering. It is a well-written, informative book of interest to all who are interested in birds, both the feathered and mechanical types, and especially to those of us who, by desire, study the former and, by necessity, fly in the latter. As one might expect, the ornithology is somewhat simplified, but the presentation is excellent for the intended audience and the information is accurate, with well-executed tables and figures and good illustrations.

This book is a clear summary of the available data regarding all aspects of bird/aircraft interactions including the aerodynamic, engineering, habitat management, and economic problems involved. The format, presenting data, summaries, and conclusions, is easily readable. For those of us interested in how an aircraft works, that section is effective. The author points out the need for additional data on bird strikes and indicates many needed studies, especially of a local nature around all airports, which could be carried out by birders and amateur ornithologists. Here is a useful application of birdwatching. This book clearly shows how ornithologists could relate their studies more effectively to society by providing data that would save both money and human lives, instead of simply studying birds for their own sake.

I believe the lasting significance of this book will best be realized if it is read and digested by birders. Then they should somehow make all managers of both commercial and private airports aware of the data contained therein, with the offer of assistance to help solve the local bird/aircraft hazards. This will make it safer for all of us, including the feathered birds, to fly.—Ralph W. Schreiber.