RECENT LITERATURE

Edited by Bertram G. Murray, Jr.

BANDING AND LONGEVITY

1. Report of the ornithological station in Gorki Wschodnie for 1958-1963. (Sprawozdanie z dzialno sci Stacji w Gorkach Wschodnich za lata 1958–1962.) J. Szczepski. 1976. *Acta Ornithologica,* **25**(4): 145-276. (In Polish with English and Russian summaries.)—Relocated in the Vistula river delta, Gulf of Gdansk, the station banded 148,974 birds of 195 species in the above period. There were 1,432 recoveries: 762 birds banded at the station, 670 banded elsewhere. The station's grand total from 1931 to 1962 is 392, 484 of 230 species. This shows clearly the scale to which the cause of bird-banding has graduated. Listed, in systematic order with Latin and Polish names, are all the species banded at the station with totals to 1962. The bulk of this work is occupied by a list of numerous long-distance recoveries, amply annotated by use of international symbols.—Leon Kelso.

MIGRATION, ORIENTATION, AND HOMING

2. The interaction of stars and magnetic field in the orientation system of night migrating birds. II. Spring experiments with European robins (*Erithacus rubecula*)- W. Wiltschko and R. Wiltschko. 1975. *Z. Tierpsychol.,* **39**: 265-282.—This paper is a sequel to the autumn experiments with warblers reviewed previously (*Z. Tierpsychol.,* **37**: 337-355, 1975; see *Bird-Banding,* **47**: 77, 1976, review no. 6). The experimental set-up was as described in the first paper. The birds consisted of 45 robins (24 experimentals, 21 controls) captured and tested in Spain. Most were believed to winter in the capture site area. Data were analyzed according to the usual Wiltschko procedures (i.e., conclusions rest primarily on means of means).

The combined analysis of all control birds (64 clear sky bird-nights) yielded a significant northward orientation (27°). Data from the experimental tests did not show a statistically significant directionality when all the data were combined. However, when the same data were divided into a series of early tests (first 2-3 nights) and later tests, a difference emerged. Birds in early tests oriented significantly NW (magnetic SW), whereas later tests gave a significant ESE orientation (magnetic N). These data parallel the fall results with warblers and suggest the magnetic compass cues override stellar cues when information from the two is conflicting. Unlike the fall results, the shift was not immediate.

Birds from both the experimental and control groups were periodically tested under "Condition 3" (clear skies with an artificial magnetic field lacking a horizontal component and with a vertical component of 90° inclination). Birds from the control group gave a significant N orientation, i.e., they maintained the direction they showed under the natural field. Birds placed in Condition 3 during early tests in the shifted magnetic field showed northward orientation; those placed in Condition 3 during later tests showed an ESE trend that was not significant by a Rayleigh test although it is the predicted direction (V-test significant). The orientation in condition 3 appeared to correspond to the directions of their immediately prior experience.

The results of these experiments basically support the conclusions of the fall study with warblers. The major difference is that the robins did not respond immediately to the altered magnetic field. They needed about three test nights (on the average, about 15 days in captivity) to adjust their directional selections to correspond with the new magnetic field. Like the fall data, these results point to the primacy of the magnetic compass. Based on the results in Condition 3, the Wiltschkos concluded that magnetic information is translated onto the stars so that appropriate magnetic directions were maintained when the horizontal component was turned off. I do not believe this conclusion is justified because it rests on the ESE direction of late test birds in Condition 3 (3 T1 in Wiltschkos' notation). That direction was not statistically significant unless a predicted direction was assumed. The main difference between these results and those obtained in fall was that the robins seemed to use stars to a greater extent than warblers—the latter shifted direction immediately when the magnetic field was shifted. The difference may be related to phylogeny, age, or distance of migration.

In the fall studies, the failure of the warblers to orient in the absence of magnetic information when stars were visible provided the primary support for the authors' strong conclusion that an independent star compass did not exist. The data from the robins are not so clear-cut (especially group 3 Te), and the interpretation appears to have changed somewhat. The star compass is now viewed as dependent on the transfer of information from the magnetic compass—the two are not alternative compass systems but are integrated components of a single complex system.

In my review of Part I of this paper I pointed to several problems with the data and interpretations. Most of them apply here as well. The Wiltschkos point out that planetarium reversals may not be inconsistent with their data if, like robins, the species used (primarily Indigo Buntings) require several nights to re-establish the magnetic direction. On the other hand, planetarium sky directions rarely correspond with magnetic directions, yet birds orient in appropriate stellar directions. In Emlen's experiments on the role of the axis of apparent stellar rotation in the development of orientation in young Indigo Buntings, the planetarium sky was not coincident with magnetic directions and was changed repeatedly during the experiments (Emlen, pers. comm).). It is hard to see how the transfer of magnetic information could have been responsible for the results of those experiments. Robins are not trans-equatorial migrants, but the change in magnetic cues as the equator is crossed still remains a problem for the warblers. But the most peculiar aspect of the picture that emerges from these experiments is that a cue system from which birds are not known to be able to derive more than the crudest directional orientation is proposed to drive stellar orientation which consistently produces better directionality in cage experiments. This may only mean that we have not yet devised an appropriate way to assess the magnetic compass, but there are many puzzling questions to be answered. Not the least of these is whether every possibility of experimental or analysis artifact has been eliminated.—Kenneth P. Able.

3. Pigeon navigation: effects of wind deflection at home cage on homing behavior. N. E. Baldaccini, S. Benvenuti, V. Fiaschi, and F. Papi. 1975. *J. Comp. Physiol.*, **99**: 177-186.—Undaunted by the attacks from the western flank, the workers at Pisa continue to provide ever more ingenious experimental tests of their olfactory navigation hypothesis. In the experiments reported here they used wind deflectors on the loft cages of the pigeons to shift the apparent direction of the wind in a manner somewhat analogous to Kramer's sun-shift experiments with mirrors. Three cubic cages (2.1 m on a side) were used: two were equipped with wind deflectors, the third lacked them and served as a control. One of the deflector cages was designed to deflect the wind in a clockwise (CW) direction, the other counterclockwise (CCW). On the average, the deflectors effected a 70° shift in wind direction, but their effect varied spatially within the cages and depending on outside wind direction. The pigeons were bought from breeders in the Valle Padana at fledging. They were kept together in a large room from 18 or 24 April until 24 May when they were divided into the three loft cages by lots. Initially there were 31 CW-birds, 32 CCW-birds, and 30 controls. The birds were allowed to leave the cages during three two-day periods, and three training releases up to 550 m were made. On these occasions, the birds all wore masks (gently pressed against their nostrils) applied to their beaks. Losses during these forays reduced the groups to 19 CW, 22 CCW, and 20 control birds.

Three releases were made under sky conditions in which sun position was visible. Birds were taken to the release sites (9.0 km NNE, 23.5 km W, and 105.3 km NNW of the loft) in baskets inside a van. They could not see outside but were ventilated with outside air via two pipes. The same birds were used for the three consecutive releases from increasing distance (12, 13 August 1974; 14, 16 August; 2, 6, 9 September). Vanishing bearings were significantly oriented in every experimental and control group. Control mean vanishing bearings were deflected 3°, 28°, and 34° CCW. The mean vectors of the experimental releases were all deflected in the expected directions both with respect to controls and home direction. Deflections from control means were: CW-birds, 59°, 45°, and 102°; CCW-birds, 83°, 36°, and 121°. In every case, both experimental groups differed significantly from one another and from the control. All comparisons were made between experimentals and controls rather than between experimentals and the true home direction. This is reasonable because it brings site bias under control, but it should be noted that in one case (2nd experiment) the CW-birds were deflected only 17° CW from the homeward bearing, closer than the controls in the same release (28° CCW). There were no significant differences between experimentals and controls with respect to vanishing times, but in the first and second releases experimentals tended to have longer homing times than controls.

The authors state their conclusion cautiously: "These results show that information acquired at home during the first months of life is utilised by pigeons in determining flight direction. . . . This acquisition of information is based, in part at least, on perception of stimuli which are propagated horizontally and can be reflected by sheets of wood and/or glass." Coupling these results with those of previous experiments, they conclude that odors are probably the information involved. They do not propose that the birds use odors carried 100 km by the wind. Rather, they presume that the birds are using information from odors detected during the first part of the outward journey.

I find the data and interpretation convincing to the extent that the initial orientation of the pigeons was affected by the experimental treatment. However, like every other treatment to which homing pigeons have been subjected, the birds were not rendered unable to home. Whatever decrement in ability they may have suffered upon release was apparently overcome rather rapidly because the differences in homing time between treated birds and controls were not significant in every case and were slight at best.—Kenneth P. Able.

4. The orientation of night-migrating passerines without the directional influence of the starry sky and/or the earth magnetic field. J. Rabol. 1975. *Z. Tierpsychol.*, **78**: 251-266. —The purpose of the experiments reported in this paper was to examine the cage orientation of nocturnal passerine tmigrants in ᵗhe absence of both stellar and magnetic cue information. Indeed, the paper does contain some data pertinent to this question, but it is difficult to extract and interpret. Most of the 598 orientation tests involved manipulation of several (often three or more) variables simultaneously, and many were tests of artifically displaced birds. Changes in orientation direction or concentration of activity could have been due to any one or more of several factors, and it is impossible to draw any convincing conclusions as to their cause, although Rabol is quick to do so.

The birds were tested for 1 to 2 hr in Emlen funnel cages for one to several days immediately following capture. The orientation cages were apparently not equipped with shields to block horizon glow. No details are given on the daytime housing of the birds. They were usually placed in the orintation cages two hr after sunset, but it is not clear whether they were allowed to see the sunset position. Artificially displaced birds were tested in orientation cages on the nights immediately preceding and following transport. My own experience and that of others indicate that this amount of handling trauma so soon after capture is not conducive to good orientation cage results. In fact, Rabol casually mentions stress and attributes some reversed orientation to it.

Data from four seasons (spring, 1972, 1973; fall, 1972, 1973) are reported in chronological sequence. The most clear-cut results pertinent to the initial question posed in the paper came from fall, 1972, when Blackcaps (*Sylvia atricapilla*) and Robins (*Erithacus rubecula*) were tested at Christianso, Denmark, the point of capture. There were four groups of birds in the experiment: (1) birds tested under clear skies; (2) birds tested under clear skies with a bar magnet attached to the underside of the funnel. These magnets enhanced the field inside the cages to 2 to 2.5 Gauss and also deflected the horizontal component by about 85° in the center of the funnel; (3) birds tested in cages covered with opaque plastic to simulate overcast; (4) birds tested in covered cages with magnets attached as in (2). Some data obtained under natural solid overcast were apparently lumped with those under "artificial overcast" produced by the plastic covers. Tests with a large number of birds were conducted on 10 nights. The mean directions of all individuals under each condition were pooled and a sample mean computed; thus the sample means were probably generated in part from individual records that were not in themselves statistically significant (no statistics are given on individual vectors).

No significant differences were found in the sample mean directions or their concentrations among the four groups. These results suggest that the birds oriented just as well when deprived of stars, magnetic cues, or both, as when these cues were available to them. This would be a surprising result, but things are not as clear as they seem. In each series of tests, overcast and clear runs were made on different nights. In one series (13-14 October) only the birds in Condition 3 produced a significant mean vector, and in another (5-11 October) Condition 3 did not yield significance. Because the treatments were the same in all three series of dates it would seem reasonable to lump the data. This was apparently not done because of a slight seasonal shift in orientation over the weeks of the experiments, and there is not enough detail to permit a re-analysis of the data.

In spring, 1972, tests of 22 and 27 Redstarts (*Phoenicurus phoenicurus*) were conducted under starry and "artificial overcast" conditions on four nights. No difference existed in the directions of the two sample mean vectors, but the concentration of the sample means was slightly, but significantly, greater under clear sky. In this experiment and several others reported here the total activity of the birds was significantly greater under starry skies.

Most of the birds were tested at the site of capture and then transported to one or more of three sites to the west and northwest of Christianso. The orientation of the displaced birds was highly variable, and a diverse series of convoluted explanations is offered to account for the observations. Some reactions were considered continuations of the orientation seen at the capture site, others were said to be compensatory toward the capture site or Rabol's nebulous moving goal area, and some were said to be reversed compensatory orientation. The hypothesis is so broad as to cover almost any observed direction. As with his previous experiments of this sort, I find them unconvincing and will cite only one example here. Eleven robins were tested under solid and partial overcast at Christianso on two nights. They showed significant orientation toward 281° (a rather peculiar direction attributed to wind drift prior to capture). The birds were transported to Blävand, some 400 km W of Christianso, the next day and tested the next two nights. Thirteen birds gave a significant sample mean of 108° under "artificial overcast" with a magnet attached to the cage. The second night the overcast/magnet birds showed a very weak directionality (161°), but clear sky birds were not oriented. These data are claimed to demonstrate "clear compensation . . . in the absence of the stars and in a disturbed magnetic field." Inertial orientation is suggested as responsible for the orientation. The orientation on the second night hardly qualifies as compensatory toward Christianso, almost due east of Blävand and if the birds can compensate effectively with no visual or magnetic cues, why did they fail to do so when both cues were available? It is also peculiar that on these same nights, robins back at Christianso also oriented east and southeast. The conclusions the author draws from these experiments are too important to be based on data so ambiguous.—Kenneth P. Able.

5. Homing behavior of pigeons not disturbed by application of an olfactory stimulus. W. T. Keeton and A. I. Brown. 1976. *J. Comp. Physiol.*, **105**: 259-266.—This paper reports the results of a second attempt by Keeton's group to repeat some of the experiments supporting the use of olfactory cues in pigeon homing by Papi and his colleagues at Pisa. In this case, the experiments were those of Benvenuti et al (*Mont. Zool. Ital.*, N.S., **7**: 117-128, 1973; see *Bird-Banding*, **45**(1), 1974, review no. 8) in which strongly odorous substances painted on or near the birds' nostrils reportedly caused a decrement in homing performance. Those experiments were among the least convincing of the series emanating from Papi's lab, and Keeton and Brown found no consistent differences between experimental and control birds in any of the three variables used by Benvenuti et al. (vanishing bearing, vanishing interval, or homing speed). Fifteen releases were made from points 60 to 143 km to the north and south of the loft. The odorous substance (only α-pinene was used) was applied directly to the beak and nostrils. Releases were made with old and young birds familiar to the site, yearlings new to release sites, young birds new to sites, and a group of new-to-site birds to which α-pinene was applied at the loft. Vanishing bearings were significantly oriented in all but five of 31 release groups (3 control groups and 2 experimental groups). In no case did the mean vanishing bearings differ between experimentals and controls. Nor were there any consistent or even subtle differences between experimentals, and controls in terms of homeward component, vanishing intervals, or homing speed. Interestingly, the treated birds showed the same clockwise bias that controls and other pigeons consistently show when released at Castor Hill, New York (see *Bird-Banding*, **45**(3), 1974, review no. 1). Kenneth P. Able.

6. **The audibility of frog choruses to migrating birds.** D. R. Griffin. 1976. *Anim. Behav.*, **24**: 421-427.—Are migrating birds using sounds from the ground as a navigational aid? Griffin's answer is a resounding "maybe." Since the idea was originally suggested (D'Arms and Griffin, *Auk*, **89**: 269-279, 1972), Griffin has advanced convincing evidence on the potential of ground noise as an aid to migrating birds (Griffin, *Proc. Am. Phil. Soc.*, **117**: 117-141, 1973; Griffin and Hopkins., *Anim. Behav.*, **22**: 762-678, 1974). This is the most quantitatively convincing paper yet. Choruses of *Hyla crucifer*, *H. versicolor*, *Bufo americanus*, and *Raba clamatans* are audible at 400 m and may be audible as high as 2,000 m. As Griffin points out the problem is that we know the sound cue exists, but do migrating birds make use of noise from the ground?—Edward H. Burtt, Jr.

7. **Migration reversal: a regular phenomenon of Canada Geese.** D. G. Raveling. 1976. *Science*, **193**: 153-154. Primarily, 1-year old, nonbreeding birds living outside family groups have been found to return in fall from the normal wintering ground of the population in Minnesota to the area of banding in Manitoba. These birds were marked with neck rings.—C. H. Blake.

POPULATION DYNAMICS

(See 8 and 9)

NESTING AND REPRODUCTION

(See also 23, 24, 31 and 32)

8. **The breeding biology of Frigatebirds—a comparative review.** J. B. Nelson. 1975. *Living Bird*, **14**: 113-155.—Although this lengthy paper is largely a comparative review of five species' breeding activities, it is firmly based upon the author's personal studies of three species, these residing in the Galapagos Is. (*Fregata minor*), on Christmas Is. (*F. andrewsi*), and on Aldabra (*F. ariel*). Subjects covered in the present paper include species'plumage differences, population densities, breeding biology (habitat, eggs, nestlings, breeding success, mortality), breeding regimes, courtship displays, food and feeding. I was somewhat surprised to learn that kleptoparasitism is apparently not a major method of obtaining food. Highlights of the paper, in my opinion, are: (1) an absence of precise nest fidelity (from year to year some colonies may shift breeding sites from one locality to another), (2) breeding restriction of two species populations to single island (*andrewsi* and *aquila*), whereas the other species are widespread and some, pantropical, (3) first breeding apparently at age seven, (4) high egg and nestling mortality, resulting from interference by conspecifics, and (5) the belief that "none of the frigatebirds have an annual cycle." On the last point, Nelson elaborates: "They probably breed once every two years but possibly once every 18 months in some areas. They molt between breeding cycles. However, since the failure rate of breeding attempts is so high, possibly more than three-quarters of the adult frigatebird population begins a breeding cycle each year." Some of the assertions on breeding phenology, especially as regards intrapopulational variations, could be clarified if someone would undertake a longrange study of a marked population on a single island.

I am mystified as to why Nelson either did not know about or totally ignored the stimulating article on *Fregata magnificens* by Harrington, Schreiber, and Woolfenden (*Amer. Birds*, **26**(6): 927-931, 1972). These authors give weights of males and females, data essentially lacking in Nelson's account. Of greater importance, however, was the discussion by Harrington et al. leading to the tentative conclusion that ". . . flying behavior of males, and especially females, is influenced by wind-speeds . . . the world distribution of the entire family may be determined in part by wind conditions." Although Nelson's paper is a valuable review, it would have been strengthened had he considered the aforementioned article.—David W. Johnston.

9. The social system of the Green Jay in Colombia. Humberto Alvarez. 1975. *Living Bird*, **14**: 5-44.—Thanks to the research endeavors of Brown, Hardy, Woolfenden, and others, we know that corvids such as the New World jays have interesting and sometimes elaborate social systems. Now Alvarez has clearly documented similar situations in *Cyanocorax yncas* in Colombia. He noted that "juvenile Green Jays apparently do not disperse from their parental flocks; they stay to serve as helpers at the nest for at least the following breeding season. Sexual maturity is probably delayed until their second year of age.—David W. Johnston.

10. The Ussurian Crane on Khanka Lake. (Ussuriiskii zhuravl, *Grus japonensis* (Mull.) na ozere Khanka.) N. Polivanova, V. Polivanov, and U. Shibaev. 1975. *Byull. Mosk. Obshch. Isp. Prirody, Biol. Div.*, **80**(6): 49-58. (In Russian with English summary.)—Equally familiar in literature as the Japanese Crane and the Manchurian Crane, this species has a comparatively limited range, and the authors consider it a "relict species" on the decline. Interesting fragments are added to what remains an incomplete account. Most of the details pertain to its plant environment, which is preferentially Reedgrass (*Calamagrostis*) rather than the taller more conspicuous Water Reed (*Phragmites*). Much of the activity at the few nests observed comprised building, rebuilding, and rearranging the Reedgrass used as nest material and even scattering it about. Marshy flats with unobstructed view of 2 to 3 km seemed imperative for nest site acceptance. Both adults of a pair incubated alternately even through the night. They warily warded off crows, Marsh Harriers, and other individuals of their own species.—Leon Kelso.

11. On nesting of the Solitary Snipe in Altai. (O gnezdovanii bekasa-otshelnika (*Gallinago solitaria* Hodgs.) na Altae.) V. Zubarovskii. 1976. *Vestnik Z.*, **1976**(1): 28-32. (In Russian.)—Details of nest site, color pattern of eggs, and plumage of young are noted. Field observations of this species have been sparse and confined to high montane localities. The species apparently exists as scattered small populations of a few pairs each with nests about 450 m apart. If various accounts of the nuptial flights and vocal displays of the six Eurasian species of *Gallinago* strike readers as more specifically distinctive than their plumage color patterns, that impression has also been remarked by Dolgushin ("Birds of Kazakhstan," **2**: 223, 1962). This species' performance features an earthward plunge from a towering height with wings half spread and tail spread, taking sharp turns in an apparently discontinuous descent. Observers differ on whether the three syllable "*chok, chok, chaa*" call is emitted at the start or at the finish of the plunge. The full performance was actually witnessed clearly but once. During the breeding season calling was heard from sunset to daybreak, even during rains and snowfall.—Leon Kelso.

12. Bird nests occupied by Sphecidae wasps in Brazil. Y. Oniki· 1975. *Acta Amazonica*, **5**(3): 301-303.—As recently as 1970, Oniki (*Auk*, **87**(4): 720-728) reported wasp (*Pison* sp.) nest cells in occupied nests of the Reddish Hermit (*Phaethornis ruber*) near Belem, Brazil. This additional instance is compared with a similar occurrence in a nest of the Yellow-breasted Flycatcher (*Tolmomyias flaviventris*) that harbored 20 wasp cells rather than 3 to 7. The wasp larvae matured after the departure of the hummingibrd young.—Leon Kelso.

BEHAVIOR

(See also 6, 8, 9, 28, 29, 31 and 32)

13. Sir Thomas More on imprinting: observations from the sixteenth century. P. G. Kevan. 1976. *Anim. Behav.*, **24:** 16-17.—In March 1518, Sir Thomas More published the book *Utopia* in which he makes the following statement: "They rear a very large number of chicks, by an amazing device. For the hens do not sit on the eggs. Instead they keep a great number of eggs warm with even heat, and so hatch them. As soon as the chicks come out of the eggs, they follow the men and recognize them as if they were their mothers." The translation is by Marshall ("Utopia: Sir Thomas More," New York, Washington Square Press, Inc., 1965). The explicit description of imprinting precedes Spaulding's (*Macmillans Mag.*, **27:** 282-293, 1873) more detailed work by 355 years.—Edward H. Burtt, Jr.

14. The interpretation of the function of avian display. S. J. J. F. Davies. 1974. *Emu*, **74:** 1-4.—Davies stresses the need for detailed behavioral studies by pointing out that ecology, the study of behavior of populations, is closely tied to ethology, the study of behavior of individuals, which are the units of populations. He discusses the search for functions of displays concluding that Tinbergen is the only researcher to demonstrate the survival value of specific displays. In conclusion, Davies discusses some of the problems that must be faced in searching for function and gives some examples of displays and their function.—Edward H. Burtt, Jr.

15. Behavior of petrels in relation to the moon and artificial lights. M. Imber. 1975. *Notornis*, 22(4): 302-306.—In the literature "Innummerable references" note a marked tendency for petrels that visit nest sites mainly at night to be less active over the colonies on moonlit nights. The author checked this in *Pterodroma macroptera gouldi* and *P. cooki.* Logic would suggest that it is because prey do not surface well on nights of the full moon. "But what do birds do when feeding conditions are poor? Do they continue to try to find food or do they wait for better conditions?" Anthropomorphically interpreted they should save energy and wait for a better moment. Here he notes that juvenile petrels recently fledged are attracted by artificial lights around yards and beaches. This has been recorded for 7 species. He regards any relation to illumination and incidental mortality as not proved. Rather: "I have found that between 80-100% of their prey are bioluminescent and I have suggested that they detect many of such prey by the light emissions." In general traditional lunar lore has held that biorhythms are more firmly linked to "the dark of the moon" than to the more radiant phases whatever the season or locality.—Leon Kelso.

16. A behavioural comparison of domestic and mallard ducks. Habituation and flight reactions. M. F. Desforges and D. G. M. Wood-Gush. 1975. *Anim. Behav.*, **23:** 692-697.—Domesticated Aylesbury ducks habituate to novel stimuli more rapidly than their progenitor species, the wild Mallard (*Anas platyrhynchos.*) I have no quarrel with the stated conclusion, but two of the four experiments reported in the paper are unnecessarily complex. Food, water, and novel stimuli are presented to the ducks in different combinations without explanation of the reasons for the different combinations or the simultaneous use of varied stimuli. In one case the food and water are placed in different enclosures, and the ducks must pass the novel stimulus, a hen, to get from one to the other. In the other case food is at one end of the enclosure, water and the hen at the other. If the hen is the novel stimulus why confound the experiment by placing food and water in different relationships to the hen?—Edward H. Burtt, Jr.

17. A behavioural comparison of domestic and mallard ducks. Spatial relationships in small flocks. M. F. Desforges and D. G. M. Wood-Gush. 1975. *Anim. Behav.*, **23:** 698-705.—The distance between individuals during feeding and resting was measured in domesticated Aylesbury and wild Mallard (*Anas platyrhynchos*) ducks. The distance is influenced by time of day, sex of the bird, and individuality. During feeding mallard drakes maintained 45.7 cm between each other, mallard females maintained 30.5 cm. and mixed pairs maintained 17.8 cm. Mates often fed in contact with each other. During feeding domestic drakes maintain 30.5 cm between each other, domestic females and mixed pairs showed no individual distance. During resting mallards maintained 129.5 cm between birds whereas domestic birds maintained only 77.5 cm. The results are suspect in that the domestic Aylesbury ducks were kept under slightly more crowded conditions. Furthermore the excessive use of the Chi-square statistic unnecessarily increases the chance of rejecting the hypothesis that the different individual distances are due to chance rather to than domestication.—Edward H. Burtt, Jr.

18. Behavioural comparison of Aylesbury and Mallard ducks: sexual behaviour. M. F. Desforges and D. G. M. Wood-Gush. 1976. *Anim. Behav.*, **24**: 391-397.—Social displays of the wild Mallard (*Anas platyrhynchos*) function both as a method of intraspecific sexual selection and as an interspecific ethological isolating mechanism. Domestication removes the need for an isolating mechanism. What effect has domestication had on social behavior? Social displays of the Aylesbury duck lack the attention getting features of the Mallard's displays. For example, nod-swimming of the Aylesbury duck lacks the pronounced forward thrust seen in the Mallard. Social displays are also less frequent in the Aylesbury duck than in the Mallard. These changes are correlated with a tendency toward promiscuity in the domestic Aylesbury duck. In terms of animal husbandry, promiscuity is a desirable trait if the increased number of copulations by a male and the increased number of males accepted by the female lead to more fertile eggs.—Edward H. Burtt, Jr.

19. Flocking as an anti-predator strategy in doves. W. R. Siegfried and L. G. Underhill. 1975. *Anim. Behav.*, **23**: 504-508.—From the opening sentence onward the authors are eager to demonstrate that large flocks detect predators more quickly than small flocks. Flocks of four are slow to detect an approaching predator and detection improves as flock size increases until an optimum is reached by flocks of 15. That is interesting, but more interesting is the rapid detection of an approaching predator by flocks of two or three and the slow detection of predators by flocks of more than 15. These results suggest an optimum flock size for predator detection, not the simple relationship of more individuals, more eyes, and quicker predator detection, suggested by Lack ("The Natural Regulation of Animal Numbers," Oxford University Press. 1954).

The authors intend the experiment to imitate the flock behavior of doves at a water hole, but one wonders why they did not use a water hole. The statistical procedures used in the paper are complex and poorly explained, and the bizarre sentence structure often clouds the message.—Edward H. Burtt, Jr.

20. Socially induced flight reactions in pigeons. J. Michael Davis. 1975. *Anim. Behav.*, **23**: 597-601.—The behavioral context preceding the flight of one pigeon determines whether or not that one pigeon's flight elicits alarmed flight in conspecifics.—Edward H. Burtt, Jr.

21. Rodent familiarity with territory relative to Long-eared and Barn Owl predation success. (Znakomstvo gryzunov s territoriei i uspeshnost okhoty na nikh ushastoi sovy i sipukhi.) Yu. Smirin. 1975. *Byull. Mosk. Obshch. Ispyt. Prirody, Biol. Div.*, **80**(6): 14-21. (In Russian with English summary.)—To test environmental familiarity as related to predator susceptibility various numbers of rodents (*Clethrionomys glareolus* and *Apodemus sylvaticus*) were released in enclosures provided with recesses and shelters. Various periods of familiarity with these latter enabled them to escape pursuit by *Asio otus* and *Tyto alba* for a longer time, in some instances indefinitely. In the same situations with no previous acquaintance, they were soon caught.—Leon Kelso.

22. A brief radio-telemetry study on Moreporks. C. Imboden. 1975. *Notornis*, **22**(3): 221-230.—Two pairs of *Ninox novaeseelandiae* in podocarp and open beech forests of New Zealand were radio-tracked for three months, July to October. Each owl was equipped with neck and back suspended transmitters (described in detail) and followed by a hand-held loop aerial. In the previous 7 years 20 individuals of the species had been mistnetted, some up to 15 times. One was in the area over 5 years. The possible distortion of behavior by the transmitter was undetermined. It weighed 9.5 g, 6% of the owl's weight. "The birds often pulled strongly at the loop around the breast, distorting the aerial and attenuating the signal." One pair had 4, another 9 different roosts. No satisfactory tracking of the birds at night was achieved. They sometimes crossed their territories, of 3 to 5 ha area, several times in an hour. "Radio telemetry appears to be an adequate technique for obtaining, directly or indirectly, information on the biology of an owl, and probably also of many other nocturnal birds (e.g. Kiwi)."—Leon Kelso.

23. Affiliation between the sexes in Common Grackles. I. Specificity and seasonal progression. R. H. Wiley. 1976. *Z. Tierpsychol.*, **40**: 59-79.—Individual *Quiscalus quiscula* were identified by voice alone in this study of pair-formation and nest-building phases of reproduction. There is a long association of the sexes and much group display prior to the sudden onset of nest-building. About one half the males deserted their mates during incubation (which is not reported by previous authors), and one must wonder if the local conditions in the Bronx Zoo where the study was performed did not induce the desertions.—Jack P. Hailman.

ECOLOGY

(See also 8 and 31)

24. Predator-prey relations and breeding biology of the Great Horned Owl and Red-tailed Hawk in central Alberta. W. B. McInvaille, Jr., and L. B. Keith. 1974. *Can. Field-Nat.*, **88**: 1-20.—Between 1965 and 1971 the population of snowshoe hares (*Lepus americanus*) on a 62.5 sq. mi. study site near Rochester, Alberta, increased 19-fold. The total population of Great Horned Owls (*Bubo virginianus*) rose from five to 16 pairs, and the breeding population increased from one to 16 pairs. The proportion of hares, by weight, in the diet of Great Horned Owls increased from 23% to 81% with a concomitant drop in the proportion of Ruffed Grouse (*Bonasa umbellus*) consumed from 23% to 0% by weight. The population of Red-tailed Hawks (*Buteo jamaicensis*) remained constant throughout the study period, although the proportion of *Microtus* in the hawk's diet showed a positive correlation with changes in *Microtus* density, a correlation not shown by Great Horned Owls. Richardson's ground squirrels (*Spermophilus richardsonii*), an insignificant part of the owl's diet, comprised a constant 34% of the diet of Red-tailed Hawks despite fluctuations in the ground squirrel population.

The concept of a "buffer species" is discussed in relation to the Ruffed Grouse. A buffer species is "one . . . which presumably minimizes predation on a game bird or animal through serving as a major component of the diet of one or more of the latter's important predators." (Darrow, *Trans. Tenth North Amer. Wildl. Conf.*, Amer. Wilde. Instit.: 270-273, 1945). Any species that a predator kills more frequently than some reference species is a buffer species. The Ruffed Grouse is a minor item in the diet of the Great Horned Owl and Red-tailed Hawk, and most prey species captured by these predators are therefore buffer species. The concept seems unnecessary as the importance of both Ruffed Grouse and other prey in the diet could be discussed directly.

Analysis of diet is based on pellets regurgitated by nestling owls and hawks tethered near their nests. Is the diet of nestlings representative of the diet of adults? Perhaps, but the assumption is not discussed.

Mortality of tethered juvenile hawks was strikingly different from mortality of undisturbed young. Mortality of tethered and untethered owls showed no difference during the year of peak snowshoe hare abundance and maximum owl breeding success, the only year in which owl mortality was measured. The authors argue that tethering had no effect on reproductive success and compare such success in different years, but comparisons of reproductive success based on tethered young should be viewed skeptically.

The hare population rises to a maximum in the last year for which data are presented. Was that a peak year for hares or did the population increase further? The authors have convinced me that changes in the population and diet of the predators are tied to changes in the prey population, but I am disappointed that no model of the relationship is proposed. The analysis is *post hoc,* and no predictive model, however crude, is suggested.—Edward H. Burtt, Jr.

WILDLIFE MANAGEMENT AND ECONOMIC ORNITHOLOGY

(See 31)

CONSERVATION AND ENVIRONMENTAL QUALITY

25. Environmental evaluations using birds and their habitats. J. W. Graber and R. R. Graber. 1976. *Ill. Nat. Hist. Surv. Biol. Notes* no. 97: 1-39.—Whoever writes environmental impact statements will be interested in this paper in which the authors develop a method to provide more quantitative evaluations of impact areas than investigators are usually able to supply. The evaluation method is based on five criteria. The "replacement cost of the habitat" is the time required to re-establish the habitat insofar as possible. "Habitat availability" is the acreage of the gross habitat in a particular area. The "changing availability of habitats" refers to the rate of change of the gross habitats in an area. An "acreage factor" is the percent of a particular habitat within an impact area. Finally, the "faunal index" or the "floral index" is the sum of the numerical values given to each species within the impact area, these values determined by the size of the breeding population within some larger political unit, in this case the state of Illinois. From the first four factors is derived the "habitat evaluation index," which must be used with the "faunal index" in order to determine the biological value of the impact area. The generation of these values is described in some detail using birds in the state of Illinois. The method is applicable to any geographic region and to any taxon. The method, however, requires faunal or floral surveys in the major habitats of a state and a knowledge of the acreage of each major habitat, information that is not usually available. This paper should stimulate the necessary research.—Bertram G. Murray, Jr.

PLUMAGES AND MOLTS

(See 8)

ZOOGEOGRAPHY AND DISTRIBUTION

(See also 8, 30 and 34)

26. Some notes on the Red-breasted Goose in Taimyr. (Nekotorye svedeniya o krasnozoboi kazarke na Taimyre.) F. Shtilmark. 1976. *Byull. Mosk. Osbsch. Isp. Prirody, Biol. Div.*, **81**(1): 134-136. (In Russian with English summary.)—Surveys carried out in the summer of 1973 along Logata River found that this species (*Rufibrenta ruficollis*) was still an established resident there (28 broods along 120 km of river channel). In western Taimyr, however, in the course of human occupation of the arctic the species has definitely declined. Among the 450-500 total in the area surveyed were 5 breeding pairs of Peregrine Falcons, 22 pairs of Rough-legged Buzzard, and 12 pairs of Snowy Owls. This situation was in the midst of a lemming "eruption." As usual the presence of the raptors cited may have been more a protection to the geese than otherwise.—Leon Kelso.

FOOD AND FEEDING

(See also 24)

27. Fixation of food selection in behavior development of insectivorous birds. (Stanovlenie elektivnosti pitaniya v ontogeneze povedeniya nasekomoyadnykh ptits.) K. Blagosklonov. 1976. *Biol. Nauki,* **1976**(2): 87-92.

(In Russian.)—Research on the origin and development of feeding reflexes of young Pied Flycatchers (*Muscicapa hypoleuca*) and 10 other passerine insectivores found that in general the reflexes determining food selection in later life were determined during transition from nestling life to independence. For these fledglings 1 to 3 experiences habituated food choice. Young may thus adapt to unusual foods and reject the usual. This suggests the dominance of acquired experience in food selection. In cases where trial and error is hazardous, observation of adults reinforces security for the future. More remains to be learned of what determines individual habituation to special foods in birds. The Wryneck (*Jynx torquilla*) feeds itself and its young almost exclusively on ants, and 14 observers, as reported here, throughout Europe found the Great Tit (*Parus major*) little less preferential for spiders.—Leon Kelso.

28. The food motivation role in organization of Pied Flycatcher nestling behavior. (Rol pischevoi motivatsii v organizatsii gnezdovogo povedeniya ptentsov Mykolovki-pestrushki, *Muscicapa hypoleuca*.) S. Khaotin and L. Dmitrieva. 1976. *Z. Zhurn.*, **55**(4): 577-589. (In Russian with English summary.)—This detailed study takes territoriality into account even among nestlings during nest life. According to this, the spot occupied by the nestling at a given moment determines its own and the parental food response. There is an optimal zone of response to a parental food visit. A course of circulation of young around the nest effects more or less equity of food supplied to all nestlings. By this rotation each affects the drift around the nest of all the others. The level of intensity of feeding motivation is declared the main factor through the whole period of nest life. There are purportedly zones of different response to proffered food. The regularity of each nestling at a spot of optimal bonding tends to uniform feeding for all young, following a "trajectory around the nest." Unaccounted for is the sometimes obvious inequity of growth of siblings, and even cannibalism resulting.—Leon Kelso.

SONG AND VOCALIZATIONS

29. A review of hearing and song in birds with comments on the significance of song in display. T. A. Knight. 1974. *Emu*, **74**: 5-8.—The article is exceedingly cursory in its treatment of sound production, hearing, song-learning, and function. The facts are drawn entirely from other works, but the synthesis, although offering no new insights, provides a readable abstract of work on auditory communication.—Edward H. Burtt, Jr.

BOOKS AND MONOGRAPHS

30. Atlas of Eastern Canadian Seabirds. R. G. B. Brown, D. N. Nettleship, P. Germain, C. E. Tull, and T. Davis. 1975. Ottawa, Canadian Wildlife Service. 220 p. $6.75 ($8.10 outside Canada). (Available from Information Canada, Ottawa K1A OSO).—This book has been extensively advertised (I received notice through at least four different routes). Because of the relative unavailability of C.W.S. publications and the worth of this particular one, I feel the publicity is justified. As stated in the ads, "This Atlas brings together and summarizes basic information on the ecology and pelagic and breeding distributions for the seabirds of the Gulf of St. Lawrence, the Atlantic Provinces, the eastern Canadian Arctic and west Greenland. It represents the *first* detailed account of the status and distribution of marine birds in northeastern North America and the western North Atlantic and the *first* comprehensive quantitative treatment of the pelagic distributions of seabirds over a wide geographic area."

The authors make a strong case for the value of such data, which might seem to many of marginal or only very specialized significance. First, the area covered is under extensive development, particularly for minerals and oil, and the data for bird distribution in all seasons are important in preparing environmental impact statements. The Atlas even includes a section suggesting how to use the data for this purpose. Second, the data are important ecologically. Movements of seabirds outside the breeding season are almost completely unknown, and this period comprises, after all, the majority of a bird's life. Movements, once known, can be correlated to oceanographic data to determine ecological requirements of each species. The breeding colony catalogue provides a data base for future comparison, and with more work, annual variations in movement patterns and relative numbers of each species may provide early warnings of large-scale population changes.

In the past, pelagic distribution data have been so sparse and intermittent as to be essentially useless. Extensive surveys such as this illustrate the value of, and increasing need for, coordinated large-scale surveys, and should be extended to other sensitive localities. Here is a case in which heavy governmental financial support, as seen in this study, is necessary and well justified.

The bulk of the Atlas contains distribution data. For each species, a map shows breeding sites. If the colonies are scattered and small or are difficult to locate (such as for storm petrels) the maps show only general areas of breeding. In other cases, colony sites are numbered, and a table gives particulars of size, latitude-longitude, year of census, and authority for each colony. Also shown are maps giving the number of birds seen during 10-min watches in 1°N x 1°W (Atlantic) or 1°N x 2°W (Arctic) blocks of lat.-long. for each month in which surveys were conducted. Sightings of birds seen only rarely are mapped on "rarebird" maps as stars, without quantitative indicators, and sightings of birds seen only very rarely are listed in an Appendix. A short, useful summary accompanies each species' account. A brief comment on breeding habitat should perhaps have been included with these, as another section discusses habitat availability as a factor in breeding distribution.

The pelagic data are only as good as the censuses on which they are based, and the authors cover methodology briefly but clearly. The data recording format is given in an appendix, and maps show the number of watches made in each lat.-long. block each month. The authors mention what types of data were discarded, what biases remain, and emphasize that the data give relative numbers in different localities and seasons rather than absolute numbers. Unfortunately, a similar discussion of the breeding site data is lacking.

I have several minor complaints on presentation, as might be expected with a compilation of this sort. A good map giving all the place names would be helpful to many readers, even though all maps and place names have lat.-long. references. A footnote (p. 14) refers to maps at the end of the book and should have been placed with them. A few terms are not defined (e.g. "growlers," p. 212), and Appendix 2 (a long table) has no labels for the columns of figures. As with all C.W.S. publications, I find myself, as a subsidizing Canadian taxpayer, annoyed at the large margins and blank spaces between maps and blocks of print. The lined tables are not reduced to save space, and presumably, money. Buyers, however, cannot complain about the price of this volume.

The only major flaw in the mapping format is in the sightings recorded non-quantitatively as stars in the "rarebird" maps. When species were difficult to separate at sea (such as Red and Northern phalaropes), only positive identifications were mapped, and in this format. It seems, however, that some indication of the numbers of unidentified phalaropes would have been in order, to indicate area of concentration. For the purposes of environmental impact, the species in question hardly matters. There is inconsistency on this point, however; maps are given for "*Sterna* sp." Further, unlike the quantitative maps, the "rarebird" maps do not indicate the locations of watches where no birds were seen. This would be a fairly simple, and useful, addition.

Although the book's summary and advertising state that information on "the ecology and pelagic and breeding distributions" of eastern Canadian seabirds is included, only 4 pages of text plus some maps concern ecology, and these are mainly a discussion of the factors that probably influence distribution. I do not feel it would have been appropriate to include more "ecology" in a book of this type, but do think it somewhat misleading to advertise the book as containing same.

The discussion of factors influencing pelagic and breeding distribution (ocean currents, salinity, water temperature, ice cover, food, appropriate nesting sites, and human disturbance) is tantalizing in its brevity and vagueness, reminding the reader how very much work remains to be done in this area.

Overall, I would classify this as an important book, even if not as complete as one might wish. Censuses were not conducted in all localities in all parts of the year, nor are the data sufficient for analyzing annual variation in movement patterns or numbers. The authors are working on this, and plan to publish more later. Rapid development of coastal and arctic areas, however, precludes retaining such valuable information until it is complete. Hopefully, the seabird surveys now being conducted in the western Canadian Arctic and Alaska will be published with similar rapidity, and pelagic censuses will hold high priority in research plans for these areas. I also hope that future information will be added to new editions of comprehensive geographical-area volumes, instead of published in small pieces here and there. A large degree of the usefulness of this book is in having all the data in one place. The authors are to be commended for their pioneering effort.—Erica H. Dunn.

31. Golden Eagle Country. Richard R. Olendorff. Illustrations by Robert Katona. 1975. New York, Alfred A. Knopf, Inc., 202 p. $12.95.—The eagle country in this book is the high plains and ranches of eastern Colorado, and the eagle is the powerful Golden (*Aquila chrysaetos*). That locale and bird are about as far removed from the eagle country familiar to me, Florida Bay and its 50 or more resident Bald Eagles (*Haliaeetus leucocephalus*), as seems imaginable. In spite of the difference (or because of it?) Olendorff's book quickly captivated me, and I read it through non-stop.

The book is non-fiction, a very readable narrative account of the author's 1971 and 1972 surveys of all nesting raptors in a 1,000 square mile study area in the Colorado grasslands. The text is saturated with first hand information on the biology and character of not only the Golden Eagle but also the Great Horned Owl (*Bubo virginianus*), Prairie Falcon (*Falco mexicanus*), Ferruginous Hawk (*Buteo regalis*), Swainson's Hawk (*B. swainsoni*), and a scattering of other raptors and their prey. Practical aspects of locating and observing raptors and their nests are included (example: a Swainson's that is hardly visable when tight-setting on a nest is recognizable by shiny white patches on the head between eye and bill). The mixture of information makes the book attractive to both experienced raptor biologists and the less-informed, with a range of topics encompassing discussions of such subjects as interspecific relationships of nesting raptors to simple descriptions of what Peregrines look like and what Golden Eagles eat.

Olendorff presents interesting speculation on some debatable aspects of raptor biology. To note a couple, he suggests that the practice of bringing green nest-lining material to nests long after eggs are laid may be a ritualized carry-over from nest-building behavior that has become incorporated into the nest-exchange of adults. It is an interesting thought, although it does not fit well with Short-tailed Hawks (*Buteo brachyurus*) I watched in Florida, where the males do most nest-building and females bring most green material to nests, usually at times of the day when there is no exchange of adults. Another point of speculation by Olendorff deals with why Ferruginous Hawks build relatively larger nests in proportion to body size than do Swainson's (it has to do with one being migratory and the other not).

An important message of the book is one of optimism, that raptors are not universally doomed where they are in contact with humans. Olendorff believes that environmental problems of raptors can be solved through "positive educational, scientific, and wildlife programs," and his book reflects that positive philosophy and is a powerful educational tool. Grassland raptors, where not directly persecuted, have widely accepted human-created situations for nesting (planted trees, etc.). To the author, this fact suggests that local management will benefit grassland raptors and that lessons learned in the grasslands will provide clues for raptor habitat management elsewhere.

One short chapter entitled "Why Raptors" presents a well stated point of view on the appeal that raptorial birds have to humans. Olendorff suggests that relatively greater behavioral versatility in hawks than in other families allows for different levels of personal involvement with hawks by people. I am not sure that a similar in-depth understanding of other families might not reveal the same sort of versatility. Still, this chapter is the best statement I have read on the attraction hawks have to people, well summarized as "a remarkable blend of animal and human nature."

The book is pleasing to the eyes, due to about 40 extremely well done drawings by Robert Katona, a fellow who obviously knows raptors well. Most of the drawings are full-page, and they honestly reveal the character of hawks, as well as other wildlife of the grasslands.—John C. Ogden.

32. Parent Birds and Their Young. Alexander F. Skutch. 1976. University of Texas Press. 503 p., illustr., $27.50..—This book is a remarkably broad survey of avian reproductive biology. Through 34 chapters the author reviews mainly behavioral aspects from parental pair-bond formation to survival of the emancipated progeny. In between, Skutch discusses the usual topics of courtship and mating systems, phenology, incubation and brooding, and feeding and nest sanitation. However, he also includes such less common subjects as nest contruction, education of the offspring, interrelationships of nestlings, occurrence and role of helpers, and parental and nestling defense behavior and strategy. He ends the book appropriately with two chapters on the nature of reproductive rates, its effects on populations, and the evolutionary determination of these rates. The chapters' topics follow a logical sequence and maintain an overall continuity so that the reader does not feel "bounced around." In the earlier chapters, Skutch painstakingly provides excellent chapter summaries. This allows a reader to think about the material and determine for himself whether he has a grasp. It is unfortunate that Skutch progressively abandons this effort as chapters pass.

Skutch's writing is eminently readable. His perspective is of a natural historian, but he occasionally comments on the adaptive nature of some traits and their probable evolutionary origin. The book is an anthology of anecdotes (first and second hand) that exemplify each fact that the author presents. Rather than summarize these stories, each anecdote is written in a style that reflects Skutch's love for his subjects. It is this warmth and excitement that enables the reader to wade through repetitive examples without boredom and absorb the multifaceted details. There is about one photographic plate (black and white only), usually a quarter or half page, for every three pages and fewer line drawings, graphs, and tables. Every photo is a valuable and clear supplement to the lesson. A novice ornithologist would need at least this many figures to associate Skutch's anecdotes with flesh and blood creatures, because Skutch's intimacy with so many exotic species seems to have led him to occasionally overlook some introduction of them.

I believe that one of the major faults of this book stems from the author's desire to make birds even more appealing. There is an inexcusable amount of anthropomorphisms, such as "betrothal," "true to first love," and "adolescent 'first love' misery." This does no real harm to a sophisticated reader, but it is disappointing, and these facile explanations can dull the potentially curious and critical mind of a new student.

Some of Skutch's conclusions seem to be weak and stem from his partiality to group selection. On page 11, he hypothesizes that reduced singing in newly mated males evolved to aid nearby unmated males. On page 48, Skutch suggests that territoriality may have evolved to avoid building up a disastrously high population. On page 50, he says that density-dependent mortality is unimportant as an agent of natural selection. On page 288, he states that brood reduction evolved for the benefit of the species. Of course, these remarks supporting group selection and others scattered throughout the book prepare an impressionable reader for the last two chapters. There, Skutch develops his now classic arguments supporting the "adjusted" reproductive rate school. I was disappointed that he did not try to develop any new arguments in support of this theory.

Another area that I criticize is his frequent value judgments. Aside from calling some birds "bird-brained," Skutch also evaluates natural selection as being "negative" and "ruthless" (page 40) and describes alleles for high reproductive rates as a "pestilence" within a gene pool (page 449).

In a book of this scope, proper citation of every reference would require an unwarrantedly large bibliography of perhaps 300 pages. Unfortunately, within the guidelines of a sensible number of citations, Skutch occasionally referred to some well-known material while ironically not citing sources of other information that are both new and intriguing. I was sometimes disappointed, as I know other readers will be, in his lack of discrimination by not giving priority to all of his more unusual and stimulating facts.

Considering the remarkable amount of information and its readability, this book's flaws are miniscule compared with its merits and it should be considered a definitive piece of work. The book will appeal to readers from a wide range of interests and perspectives. It could be an introduction of a new area of interest to individuals who have not yet become ardent nature lovers (although they would need a great deal of patience). To a bird lover, it is a lengthy but consistently entertaining story to nourish the reader's appetite for new reasons to admire "our feathered friends." To a scholar, it is a wealth of information to stimulate and feed his curiosity (in spite of the disappointing bibliography). And it would even serve as an interesting textbook in an advanced ornithology course (if the teacher remained alert and cautioned the students against its flaws). A book with such a wide application and value is certainly a great accomplishment, and I recommend it to everyone with at least a passing interest in avian natural history.—Kenneth Alan Crossner.

33. Ornithology from Aristotle to the Present. Erwin Stresemann. Foreword and Epilogue by Ernst Mayr. Translated by Jans J. and Cathleen Epstein. Edited by G. William Cottrell. 1975. Cambridge (Massachusetts) and London, Harvard University Press. 432 p. $20.00.—Most ornithologists involved in their research and studies do not take the time to think about or explore the long history of their science and its influence upon current efforts. Yet much of what they do today is rooted in or modified from the work of a long line of ornithologists extending back to the ancient Greeks.

This book, originally published in German in 1951 under the title "Entwicklung der Ornithologie," examines in considerable detail the beginnings and growth of ornithology on a worldwide basis and includes in this translation much literature documentation not contained in the original German version.

The book is divided into three parts. The first, entitled "The Foundations of Ornithology," deals with the early ornithological activities of Aristotle and others and, centuries later, the first expeditions that brought back new specimens of birds.

Part two, "The Development of Systematics and the Study of Evolution," details the rise of more traditional descriptive methods and provides information about the important collecting expeditions of the 18th century. Among the ornithologists considered in depth are Francois Levaillant, Carl Illiger, Coenraad Jacob Temminck, Charles Lucien Bonaparte, Hermann Schlegel, Otto Finsch, Ernst Hartert, and many, many others. The profound influence of the theory of evolution also is discussed along with other concepts.

Part three, "The Development of Biology," traces the changes in ornithological philosophy and methods from the idea that species were fixed creations to the modern position that species evolve.

Although Stresemann does include many references to the early American ornithologists and comments on their important work, he gave almost no treatment to the important contributions of modern American ornithologists. This gap is partly filled in this edition by Ernst Mayr who contributes an epilogue entitled "Materials for a History of American Ornithology" in which he provides a summary of the highlights of the role of modern American ornithology. I found Mayr's writing style clear and much easier to read than Stresemann's style.

This important volume by one of the giants of our science should be on the shelf of all ornithologists. They can learn much from it as I did.—Donald S. Heintzelman.

34. The Birds of Libya: An Annotated Check-list. Graham Bundy. 1976. B.O.U. Check-list no. 1, 102 p. £3 ($8.00) (Available from Dr. J. F. Monk, The Glebe Cottage, Goring, Reading RG8 9AP, United Kingdom).—The British Ornithologists' Union has undertaken to publish a series of up-to-date, annotated check-lists covering areas where such lists are unlikely to be published locally or in the near future. The first check-list consists of an Introduction, Systematic List, a list of references, a series of 54 range maps, and an appendix. The introduction provides a review of ornithological work in Libya and descriptions of the climate and geography of four regions: Tripolitania in the northwest, Cyrenaica in the northeast, the Fezzan, a segment of the true Sahara Desert in the southwest, and the Libyan Desert in the southeast. There is a very brief discussion of migration.

The author lists 317 species only 69 of which breed regularly. Another 22 may breed more or less irregularly, and only the Ostrich is reported to be a former breeding species. The list follows the sequence of families in the "Check-list of Birds of the World," but genera within families (or subfamilies of Laridae and

Muscicapidae) and species within genera are listed alphabetically. This results in some peculiarities, such as, listing the Bewick's Swan (*Cygnus bewickii*) between the White-eyed Pochard (*Aythya nyroca*) and the Common Scoter (*Melanitta nigra*). What is gained in information transmitted, accuracy of presentation, convenience, esthetics, or whatever by an alphabetical listing is not at all made clear. The status of each species is discussed with respect to the four geographic regions, the author drawing upon both the literature and his own experience. Each species is characterized by a symbol, such as, RB for resident breeder and WV for winter visitor, and in the appendix these symbols are used to indicate the species' status in each of the four regions.

The ranges of 61 breeding species are shown on maps.

"The Birds of Libya" meets its goal of summarizing what is known of the distribution of Libya's avifauna. It should prove to be a useful reference and provide guidance for future research on Libyan birds.—Bertram G. Murray, Jr.

35. A. B. A. Checklist: Birds of the Continental United States and Canada. Prepared by A. B. A. Checklist Committee (Chandler S. Robbins, chairman). 1975. Austin (Texas), American Birding Association. 64 p. $3.50. (Available from A. B. A., P.O. Box 4335, Austin, Texas 78765).—The "A. B. A. Checklist" lists 794 species recorded within the 49 continental United States and Canada and the adjacent waters to a distance of 100 miles or halfway to neighboring country if less than 100 miles. The committee has followed the decisions of the A. O. U. Committee on Classification and Nomenclature with respect to taxonomy and scientific names, except to follow Jehl on the classification of the Charadrii, but it has attempted to standardize common names on a worldwide basis by giving each species a unique common name. Following the common and scientific names are a single letter showing the species' status within the checklist area and sufficient space for a brief note on the date and place of personal observations. An additional 98 accidental species are listed with a reference to a source providing substantiating data.—Bertram G. Murray, Jr.

36. The Fiat Book of Common Birds in New Zealand. I. Town, pasture, and freshwater birds. Janet Marshall, F. C. Kinsky, and C. J. R. Robertson. 1974 (third impression). Wellington, A. H. and A. W. Reed. 96 p. $4.50. (U.S. distributor: Charles E. Tuttle Co., Rutland, Vermont 05701).—This little book is not either a field guide or a textbook. It is, however, intended for "use in practical visual identification." Forty full page color paintings by Marshall illustrate 43 species, sometimes showing males and females, immatures, and color phases, when these are distinctive. On the facing page are common, scientific, and sometimes Maori names, the field characteristics, the distribution and habitat in New Zealand, and notes on breeding biology including the breeding season and descriptions of nests and eggs. The intended audience, residents with a beginning interest in birds, should find this book most useful.—Bertram G. Murray, Jr.