RECENT LITERATURE

Edited by Bertram G. Murray, Jr.

MIGRATION, ORIENTATION, AND HOMING

(See also 16, 20)

1. Orientation and position-finding by birds. G. V. T. Matthews. 1973. *Oxford Biology Readers,* no. 38: 16 p.—This booklet is one in a series designed as supplemental reading matter for students enrolled in general zoology or biology courses. It is an excellent summary of the major findings from studies of bird orientation and navigation through 1972. The following topics are discussed: kineses, taxes, and orientation; sun orientation; time measurement; migration by bearing and distance; landmarks; orientation by night; other possible bases for orientation; "nonsense" orientation; homing; position fixing on navigational grids; and position fixing by the sun. For further reading 13 references in English from 1968 to 1972 are recommended. The treatment of the literature is somewhat spotty but in general covers the important works during the 4-year period following the publication of his book, "Bird Navigation" (Cambridge Univ. Press, 1968). The booklet is well illustrated and is quite worthwhile for its intended audience.—Sidney A. Gauthreaux, Jr.

2. Bird orientation under different sky sectors. W. Wiltschko and R. Wiltschko. 1974. *Z. Tierpsychol.,* **35:** 536-542.—European robins (*Erithacus rubecula*) could see either the whole sky or a 95° sector around the zenith, but the difference did not affect orientation of migratory restlessness. The results are different from those of Emlen (*Auk,* **84:** 463-489, 1967) on Indigo Buntings (*Passerina cyanea*), which required view of the circumpolar sky for oriented behavior.—Jack P. Hailman.

3. The homing of pigeons. C. Walcott. 1974. *Am. Scientist,* **62:** 542-552.—Under overcast skies pigeons released in unfamiliar localities orient toward and reach the home loft. How can they perform such feats of navigation? Walcott's paper is a fascinating, if cursory, review of the status of the various theories on pigeon homing. Random search cannot explain the well oriented take off direction or the low frequency of lost birds. Landmark orientation is used, but pigeons wearing frosted contact lenses home just as accurately as pigeons wearing clear contacts. The sun compass hypothesis stands up well under experimentation, but the sun navigation hypothesis is unable to predict the homing of pigeons. Inertial navigation is unable to predict the behavior of pigeons, but both the magnetic compass hypothesis and olfactory orientation are revitalized.

Walcott's review excites an interest in the problems of navigation and orientation that can be satisfied only by further reading into the subject.—Edward H. Burtt, Jr.

4. Sounds audible to migrating birds. D. R. Griffin and C. D. Hopkins. 1974. *Anim. Behav.,* **22:** 672-678.—Frog and insect choruses, wind-blown vegetation, and the crash of breakers are natural sound fields that provide migrating birds with a potential source of information about the kind of land or water below them. Progress over acoustic landmarks could inform migrating birds about wind velocity and their ground velocity. Because the atmosphere absorbs high frequencies more readily than low frequencies, altitude could be estimated from the relative decrease in high frequencies in a known sound. Birds may avail themselves of none of these cues, but the authors quantitatively establish the existence of these auditory cues at the altitude of migrating passerines. The idea is novel and should stimulate some exciting research.—Edward H. Burtt, Jr.

NESTING AND REPRODUCTION

(See also 32, 33)

5. The Siberian White Crane in Yakutiya. (Sterkh, *Grus leucogeranus*, v Yakutii). V. Flint and A. Kishchinskii. 1975. *Z. Zhurn.*, **54:** 1197-1212. (In Russian with English summary.)—This paper covers the available literature and field observations of 26 birds watched at close range in 1965 and from 1971 to 1973. The present breeding range falls between the lower Yana and Kolyma rivers. Migration routes and winter ranges of the two surviving main populations are uncertain. The present total population (about 300) is the lowest of recent counts. In summer territorial pairs constitute 60%, with fewer than 40% nesting. The general Yakut breeding range is 130,000 km², the regular area about 30,000 km². The suggested population density for the latter is 5 per 1,000 km², based on numerous census counts. The four distinct plumages, as described, enabled age composition estimates of the population. Sterkh (the Russian name for the species) 3 years and older comprised 75% of those seen in the field. Both calls and courtship displays differed decidedly from those of other cranes. The dentate, or slightly "sawtooth" margins of the bill, rather than for seizing animal prey, serve for pulling roots and stems of plants out of boggy soil. Sterkh, these authors find, are predominantly vegetarian. Such a situation is common enough among large and "endangered" species. On the question of survival, the total number has been relatively stable over the past 15 years. The present total stock, precariously small, the low breeding rate, and the history of decline allow little justification for optimistic forecasts.—Leon Kelso.

6. Seasonal variations in the food intake of captive Red Grouse. C. J. Savory. 1975. *Br. Poult. Sci.*, **16:** 471-479.—Adult *Lagopus lagopus scoticus* were reared in captivity out-of-doors in Aberdeenshire, Scotland, and their food intake recorded over 26 months. Short-term food intake was correlated with body weight in both sexes, and sex differences in food intake were mainly due to weight dimorphism. Monthly averages for intake were positively correlated with day length and negatively correlated with ambient air temperatures. Food intake in both sexes rose during molt, and for cock birds this was the time of maximum food requirement; in hens, however, intake was even higher during breeding. Total egg production was positively related to food intake in the five weeks prior to laying but was not related to food intake during laying.

The crucial point in this paper is that Savory has shown that energy limitation prior to the commencement of laying will have greater effects on subsequent egg production than will energy limitation during laying itself. Some careful re-appraisal of conventional wisdom about the energetics of egg formation seems called for by this study.—Raymond J. O'Connor.

7. Sexual behavior of the lek-forming White-bearded Manakin (*Manacus manacus trinitatis* Hartert). A. Lill. *Z. Tierpsychol.*, **36:** 1-36.—Studies with color-banded birds suggest that females choose primarily mating sites rather than specific males, but the most aggressive males secure the best sites. There is much more to this complex story, but much also that remains to be clarified.—Jack P. Hailman.

8. A triple nesting of the Brown Accentor in high-montane Tyan-Shan. (Trekhkratnoe gnezdovanie blednoi zavirushki, *Prunella fulvescens*, v vysokogorne Tyan-Shanya.) A. Kovshar. 1975. *Z. Zhurn.*, **54** (11): 1737-1739. (In Russian with English summary.)—One pair of this species, banded and color tagged, successfully fledged three broods of 3 to 4 young between 26 April and 28 August 1973. Each successive breeding cycle became shorter by reducing the time of brood care and nest construction. Thus, the first nesting cycle, from start of nest building to departure of young was 45 days; for the second, 34 days; and for the last, 28 days. The site was near local timber-line, about 2,500 m elevation. The female built a new nest for each clutch. For this summer season the female built 4 nests (1 lost), and deposited 17 eggs, from which were hatched and fledged 13 young (4 eggs lost). The author suggests that this indicates a high breeding potential for a montane passerine.—Leon Kelso.

9. Laying dates of four species of tits in Wytham Wood, Oxfordshire. E. K. Dunn. 1976. *Brit. Birds,* **69:** 45-50.—This analysis tests the hypothesis of Perrins (*Ibis,* **112:** 242-255, 1970) that breeding seasons are timed by the availability of food for clutch formation, eggs being formed only when seasonal changes bring food supplies above the maintenance needs of the female. Dunn argues that as small species have smaller maintenance costs than large species, they should therefore breed sooner. His analysis of the Wytham tit breeding season data since 1947 confirms the argument, average laying dates paralleling increases in average body size.—Raymond J. O'Connor.

BEHAVIOR

(See also 5, 7, 16, 26, 28, 29, 32, 33, 37)

10. The importance of certain assemblages of birds as "information-centres" for food-finding. P. Ward and A. Zahavi. 1973. *Ibis,* **115:** 517-534.—Here is an interesting and provocative discussion of flocking behavior in birds. Although this is not an experimental test of the "information-centre" hypothesis, the authors muster a formidable body of circumstantial evidence from the literature. My difficulties with their arguments are twofold. First and perhaps most easily answered is the problem of finding new food sources. Their various scenarios never mention a hungry individual setting out to seek its own fortune; rather the hungry individual always returns to some congregating point to await the arrival of a well-fed flock member, which will lead it or will be followed back to a plentiful food source. In fact Ward and Zahavi point out that such a strategy in a patchy environment is the best strategy because energy is not wasted in random searches for a full patch. However, the strategy must fail sooner or later. At some point before the flock is reduced to feeding on one depleted patch individuals must wander off in search of new resource patches, but when will searching for a new source be energetically more efficient for the individual than following another bird to a known source?

My second difficulty is with the evolution of the "information-centre" system. The authors predict that the system will evolve "only in situations where patches of food are normally too large for the finders alone to consume. . . . Presumably also, the food is of a type which would disappear quickly (by being eaten by other animals, by rotting, by falling, etc.) were it not eaten promptly - otherwise the finder might benefit more by defending the food source, than by tolerating other birds coming to share it." The argument is not consistent with evolution. Each genotype competes with every other genotype and selection will favor a behavior pattern that reduces the contribution of competing genotypes to the next generation. Therefore I can see no advantage to advertising a food source, whatever type of food it is and regardless of how abundant it is, unless the presence of a flock increases the individual's chances of survival. Selection would favor gorging and defense of the source as long as the energy used in defense did not lower the reproductive potential of the defending individual.

I realize that selection will favor an individual that excels at discovering and pilfering the food resources of another unrelated animal. By approaching the flock problem from this angle, one might argue that flocks evolved from the tendency of some individuals to follow others that had sought and found a food resource. If that is true, flocks are merely a bunch of avaricious birds watching their neighbors lest those neighbors leave suddenly for some hidden resource. Two problems emerge from this line of reasoning; (1) selection will favor secrecy when approaching or departing from a resource; therefore, advertising behavior cannot be explained, and (2) if all members of the flock are waiting for the other fellow to fly to a new resource patch, which one discovers the new patches?

I hope the paper is widely read because I think the ideas will provide the basis for productive research. I am skeptical of many of the explanations but I admit that I cannot offer a simple alternative.—Edward H. Burtt, Jr.

11. The influence of the resemblance between mimic and model and of alternate prey upon the effectiveness of artificial Batesian mimicry. (Die Schutzwirkung künstlicher Batesscher Mimiky abhängig von Modellähnlichkeit und Beuteangebot.) W. Schuler. 1974. *Z. Tierpsychol.*, **36**: 7 1-127. (In Germany with English summary.)—An ingenious contraption was used to feed mealworm pupae to Starlings (*Sturnus vulgaris*), in that extraction of one mealworm advanced the machine to make the next available. From a huge host of experiments using palatable and unpalatable food items painted in various ways, a general conclusion emerges: even poor mimics of unpalatable prey are protected when there is an abundance of acceptable non-mimetic prey, but when acceptable prey are few the birds discriminate very closely so that a palatable mimic must look very much like its unpalatable model to escape predation.—Jack P. Hailman.

12. Winterlife and food of the Rock Ptarmigan in the far northeastern USSR. (Zimnyaya zhizn i pitanie tundryanoi kuropatka, *Lagopus mutus*, na krainem severo-vostoke SSSR.) A Andreev. 1975. *Z. Zhurn.*, **54**(5): 727-733. (In Russian with English summary.)—This fairly detailed etho-ecological study found that local conditions favor the Rock Ptarmigan more than its congener, the Willow Ptarmigan (*L. lagopus*). Perhaps undescribed elsewhere are details of snow burrowing when going to roost. A bird selects a spot and sinks into the snow by writhing its wings and body and digging with its feet. With only the head visible, the bird looks around briefly, ducks its head under, and moves forward about 40 cm by kicking. It then lifts its head above the snow, again looks around for several seconds, ducks under, pushes forward for about 30 cm, and finally comes to rest. The whole process takes about 15 seconds.—Leon Kelso.

13. Some behavior and vocalization by the Jungle Crow. N. Kuroda. 1974. *Misc. Repts. Yamashina Inst. Ornithol.*, 7(4): 427-437. (In English.)—Numerous behavioral details are described with illustrative diagrams concerning *Corvus macrorhynchos*, with comparisons to *C. corone*. An annotated vocabulary of 30 vocal expressions is given. Notable are its food scavenging and storage. Food items are carried by the males to niches in buildings and trees or to the ground under fallen leaves. Both parents transport food from storage to the young in a moderately developed gular pouch.—Leon Kelso.

ECOLOGY

(See also 5, 32)

14. A vocal strip census of male Hazel Hens. (O marshrutmom uchete samtsov ryabchika po golosami.) S. Fetisov. 1975. *Vest. Leningradskogo Univ.*, **1975**(21): 34-38. (In Russian with English summary.)—A single strip census of male *Tetrastes bonasia* by male calls through a control area is 5 to 66% accurate and three censuses by the same method over the same area are 99% reliable.—L. Kelso.

CONSERVATION AND ENVIRONMENTAL QUALITY

(See also 5, 36)

15. Aid for oiled waterfowl. K. Hay. 1975. *Atlantic Nat.*, **30**(4): 156-163.—This might be read as a follow-up or consequence of the paper "Aftercare of Oil -covered Birds" by J. Naviaux (rev. **80**, *Bird-Banding*, **43**(1): 77, 1972). Further results developed by groups of organized workers at recent oil-spills are summarized. Wider dispersal of sound, therapeutic information is even more urgent now, as shown in a selected instance: "Splinter groups of volunteers established their own treatment centers and zealously guarded their patients. . . . Long hours, fatigue, and frustration led to dissension and bitter quarrels." Meanwhile mortality following spills remains much too high.—Leon Kelso.

PARASITES AND DISEASE

(See 32)

PHYSIOLOGY

(See also 6, 22, 37)

16. Attempts to condition homing pigeons to magnetic stimuli. M. L. Kreithen and W. T. Keeton. 1974. *J. Comp. Physiol.*, **91:** 355-362.—Classical conditioning has often been used to examine the ability of an organism to detect a particular type of stimulus or the range of perception for a particular stimulus. Reille (*J. Physiol.* (Paris), **60:** 85-92, 1968) used a conditioned autonomic response (heart rate) rather than the usual key-peck response to demonstrate that pigeons perceived changes in the magnetic field produced by a set of Helmholtz coils. In the current paper Kreithen and Keeton attempt to duplicate Reille's results without success. Ninety-seven experienced homing pigeons were used with at least one record of poor homing performance during a free-flying test in the hope that they would be particularly responsive to magnetic stimuli. The responses to small changes in magnetic fields were no different than responses of controls, although significant responses to a light flash demonstrated the overall viability of the test method. What are the ramifications of these new findings? The authors point out that all the studies showing positive evidence for a biomagnetic effect fall into three categories: (1) experiments involving locomotion, (2) experiments seeking slowly adapting response patterns with long temporal delays, or (3) combinations of both. They comment that experiments involving stationary animals or fast response times have consistently produced negative results. The negative results in this well-designed experiment nonetheless are very puzzling, and make one quite cautious concerning recent evidence in support of a magnetic compass in bird orientation.—Sidney A. Gauthreaux, Jr.

17. Blood cell indices of five species of auk (Alcidae) from Newfoundland, Canada. L. W. Bradley and W. Threlfall. 1974. *J. Zool., Lond.*, **174:** 377-385.—Circulating blood cells of various auks (*Alca torda, Uria aalge, U. lomvia, Fratercula arctica,* and *Cepphus grylle*) were sampled, described, and measured. The results showed the existence of interspecific differences in the proportions of each cell type, but with wide intraspecific variation. Handling the birds in the course of transportation resulted in very large changes in lymphocyte fractions, and the authors conclude that blood parameters are not good indicators of the "condition" of individual birds.

I presume these birds were taken during the breeding season, although this is not stated explicitly by the authors. This timing leads me to wonder whether the variability in results reported in this study might not be due to variation in breeding condition of the individuals concerned, because no independent measure of "condition" was used by the authors. One would like to see this work repeated with winter samples and the results related to such obvious variables as sex, gonadal condition, and fat reserves.—Raymond J. O'Connor.

18. The hen's egg: estimation of shell superficial area and egg volume, using measurements of fresh egg weight and shell length and breadth alone or in combination. T. C. Carter. 1975. *Br. Poult. Sci.*, **16:** 541-543.—This note describes a method of estimating egg volume (and also surface area) from length, breadth, or weight measurements. Volume was assumed to be related to these dimensions by the function $V = kL^aB^bW^c$. The parameters a, b, c, and k were estimated from a multiple regression of the logarithmically transformed dimensions. Checks against displacement measurement of volume showed the estimation error when all three dimensions were used to be about 0.5%. However, if egg weight was omitted the errors rose to only 1.0%. The method could therefore be useful to avian ecologists requiring a measure of egg size but unable to weigh the eggs when first laid.—Raymond J. O'Connor.

19. Day-length during rearing and the subsequent egg production of meat strain pullets. C. G. Payne. 1975. *Br. Poult. Sci.*, **16:** 559-563.—Broiler-strain chickens were reared on either a 15 hr or a 6 hr photoperiod, and their subsequent breeding performance assessed on a 16 hr photoperiod. A number of control experiments were also performed. Birds reared on short photoperiods came into breeding condition sooner than those on long photoperiods, and did so at lighter body weights. They also laid more eggs than long photoperiod birds but these eggs were lighter and less successful in hatching. Most of these differences proved due to the sudden transfer from a 6 hr to a 16 hr photoperiod undergone by short period birds at laying, but the difference in age of maturity remained when the change was brought about gradually.

This paper prompts me to point out that nestlings or chicks reared at different latitudes are exposed to different photoperiods: one wonders whether a corresponding correlation with age of first breeding, as in Payne's study, would occur in the wild?—Raymond J. O'Connor.

20. Moult, flight muscle "hypertrophy" and premigratory lipid deposition of the juvenile Willow Warbler, *Phylloscopus trochilus*. G. K. Baggott. 1975. *J. Zool., Lond.*, **175:**(3):299-314.—Juvenile Willow Warblers were examined in the course of their molt in England, a molt which commences immediately after fledging and concludes shortly before the birds commence their autumn migration. Total body weight remained constant throughout the molt, and lipid levels increased only on completion of the molt. Pectoral muscle wet weights and lean dry weights were lower during the molt than afterwards, but the water content of the muscle was constant throughout the molt. Prior to the start of the molt the pectoral muscles were small and had high values for their water index, suggesting these muscles were not yet fully grown. The glycogen content of these muscles was correlated with their total weight when measured immediately after dawn: cold stress, brought about by feather loss during molt, is thus implicated.

Baggott is rather critical of the concept of premigratory hypertrophy of the pectoral muscles, the idea that the flight muscles adaptively increase in size prior to migration. He asserts instead that his data show such an increase in Willow Warblers to be due to recovery to premolt weight levels. I find his data here less than convincing. In his Table II mean pectoral weights at different molt stages are quoted, of 1191.2 ± 26.8 mg (n = 14) for molt stage 1 birds, and of 1245.0 ± 26.1 mg (n = 27) for molted birds, but without any premolt sample for that particular year. In his Table III (which relates to a different year) the stage 1 birds' muscles are shown to have been 62.1 mg heavier than premolt birds. Combining these results provides a premolt-postmolt pectoral weight difference of 115.9 mg, and this is to be compared with a decrease of 133.6 mg found between stage 1 and stage 2 and with an increase of 130.5 mg found between stage 4 and completion of molt. Baggott has to explain part of this "extra" 115.9 mg as due to ongoing growth in premolt juveniles and then loses the remainder in the variance of his data. He may well be correct to reject the idea of pectoral hypertrophy but his paper lacks the crucial evidence - a full molt cycle's data - with which to do so conclusively. I remain, therefore, somewhat skeptical about his conclusions as to the phenomenon in Willow Warblers.—Raymond J. O'Connor.

MORPHOLOGY AND ANATOMY

(See also 33, 37)

21. Changes in avian egg shell porosity during incubation. (Izmenenie poristosti skorlupy yaits ptits v prosesse embriogeneza.) G. Goryanova and T. Tarnovskaya. 1975. *Z. Zhurn.*, **54**(7): 113-1115. (In Russian with English summary.)—The permeability of egg shells of the Common Eider (*Somateria mollissima*) to gases varies during incubation. At the start there were 96 to 188 ($\bar{x}$ = 123) pores per 1 cm² at the blunt end and 56 to 92 ($\bar{x}$ = 75) per 1 cm² at the sharp end. At 20 to 25 days the figures were 92 to 204 ($\bar{x}$ = 145) and 64 to 104½($\bar{x}$ = 86), respectively. Permeability to oxygen increased 18% at the

blunt end and 14% at the sharp end. In eggs of domestic fowl permeability to oxygen increased 79% at the blunt end and 54% at the sharp end during incubation. The increase in porosity is seen as an adaptation against embryo asphyxiation through the opening of "organic plugs."—Leon Kelso.

PLUMAGES AND MOLTS

(**See also 20, 32**)

22. Photoperiodic control of prenuptial molt of the Yellow Wagtail. (Fotoperiodicheskaya regulyatsiya predbrachnoi linki zheltoi tryasoguzki, *Motacilla f. flava.*) A. Kukishch and G. Noskov. 1975. *Biol. Nauki,* **1975**(8): 11-15. (In Russian.)—A selected captive population from the Leningrad area was kept in 12 hour day illumination during winter. Then, an experimental group, increase to a 16 hr day from November to February, initiated molt in 15 to 25 days. A control group held to normal molt schedule with prenuptial molt occurring from February to April. Those kept all winter on the 12 hr day had their prenuptial molt in February and March only. The time span of the prenuptial molt was definitely longer for those birds on a 16 hr than for those on a 12 hr day.—Leon Kelso.

ZOOGEOGRAPHY AND DISTRIBUTION

(**See also 5, 32, 33, 34, 36**)

23. The Whistling Swan breeding in USSR. (Gnezdovanie amerikanskogo tundrovogo lebedya (*Cygnus columbianus*) v sovetskoi soyuze.) A. Kishchinskii, R. Zlotin, and V. Flint. 1975. *Z. Zhurn.,* **54**(10): 1525-1538. (In Russian with English summary.)—A definite record: at Kolyuchinsk Bay on the Chukotsk Peninsula on 8 July 1974, a pair with 3 downy young were collected. Two other pairs of the species without young and one solitary bird were found in an area of 1.5 x 4.0 km. On one lake a pair, one a *Cygnus columbianus* and the other *C. bewickii,* with 4 young, 2 to 3 days old were observed 12 July 1974, suggesting the close affinity of the two species.—Leon Kelso.

SYSTEMATICS AND PALEONTOLOGY

(**See also 23**)

24. Chemotaxonomy of Anseriformes. J. Jacob and A. Glaser. 1975. *Biochem. Syst. and Ecol.,* **2**(4): 215-220.—Apparently an experimental attempt by this method rather than fulfilling the promise of the title. It is a chemical analysis of the preen gland waxes of eight species: 4 *Anser,* 2 *Anas,* 1 *Aythya,* and 1 *Mergus.* They were composed of various "methyl-branched fatty acids and alcohols." A total of 26 anatid species have thus far been analyzed presumably indicating the reliability of chemotaxonomy in this family of birds.—Leon Kelso.

25. Variability in the chemical content of waterfowl plumage. J. Kelsall, W. Pannekoek, and R. Burton. 1975. *Can. J. Zool.,* **53**(10): 1381-1386. —Three species, *Anas platyrhynchos, A. rubripes,* and *Aythya affinis,* in varied numbers were kept three years in a common enclosure. Their primaries were clipped each October and analyzed for nine chemical elements for distinctions between species, sexes, and year classes. The object was to test for means of determining origins of waterfowl through feather chemistry. Determination of age class within a species was possible, but not for identifying species from species. For age classes 89% of known birds could be sorted accurately, and 78% of unknowns could be determined correctly. "A few individual birds were chemically indistinguishable from species other than those to which they belonged." All in all therefore chemoanalysis like other "new" methods needs more trials on more material to assure reliability as a tool in systematics.—Leon Kelso.

EVOLUTION AND GENETICS

(See 11, 23)

FOOD AND FEEDING

(See 5, 12, 13, 32, 37)

SONG AND VOCALIZATIONS

(See also 13, 14)

26 Some acoustic signals in behavior of the Common Tern. (Nekotorye akusticheskie signaly v povedenii rechnoi krachki *Sterna hirundo.)* I. Nikolskii. 1975. *Z. Zhurn.*, **54**(11): 1734-1737. (In Russian with English summary.)—Field recordings of the calls of 10 pairs of this tern, associated with 11 pairs of Black-headed Gulls (*Larus ridibundus*) were tape-recorded at Engure Lake, Latvia. Seven signal types were discerned and illustrated by oscillograms. This variety of calls, most of them uttered on nest alighting, suggests that their role served for individual recognition.—Leon Kelso.

27. Intermediate calls in the Crested Lark. (Mischformen von Lautausserungen bei der Haubenlerche (*Galerida cristata* L.): Ein Beispiel für Superposition von Verhaltensmerkmalen.) H.-H. Bergmann and J. Weiss. 1974. *Z. Tierpsychol.*, **35:** 403-417. (In German with English summary.)—It is argued from sonagraphs that certain calls result not from continuous variation, but rather from superposition of elements of two or three simple calls. Some of these intermediate calls are marvelously complex, such as the one believed to be a combination of the "flöten," "zwitschern," and "flugruf" calls.—Jack P. Hailman.

28. Song learning, dialects, and dispersal in the Bewick's Wren. D. E. Kroodsma. 1974. *Z. Tierpsychol.*, **35:** 352-380.—Kroodsma followed young *Thryomanes bewickii* in Oregon, finding independence from the parents at about 35 days and establishment of a territory (held at least for the next year) by about 60 days. The subsong, begun at about 60 days, displayed most of the permanent repertoire of about 16 song-types and resembled repertoires of males singing where the young wrens spent the 35- to 60-day period. Local dialects develop because of this song-learning and dispersion of only about 1 km, and although neighboring males have nearly identical song repertoires, dispersion across habitat barriers contributes to local isolation and hence different dialects.—Jack P. Hailman.

29. Influence between partners in duetting Robin Chats. (Ueber die Beeinflusing des Partners im Duettgesang der Schmätzerdrossel *Cossypha heuglini* Hartlaub (Aves, Turdidae).) W. Wickler. 1974. *Z. Tierpsychol.*, **36:** 128-136. (In German with English summary.)—The male can alter the female's singing speed by changing his motif (an invariant succession of sounds), and the female can alter the male's motif by changing her singing speed. Results are compared with some other animals, including frogs and toads, in which the influences in duetting are different.—Jack P. Hailman.

PHOTOGRAPHY AND RECORDINGS

30. Voices of Neotropical Birds. J. W. Hardy, Ara Records No. 1. Published privately by J. W. and C. K. Hardy, 1615 NW 14 Ave, Gainesville, Florida 32605. $6.00.—A new record of neotropical bird songs is always welcome, and this disc, bearing the designation Ara I, offers the promise of more to come. Since the appearance of Irby Davis' record of "Mexican Bird Songs" in 1958, relatively few such recordings have appeared and many are not available in North America. One comes to the inescapable conclusion that it simply is not profitable to make records of neotropical bird songs. Hopefully the Hardys

will not find this to be the case. The present record is clearly of high quality, and listening to it conveys a sense of Hardy's appreciation of the birds he has recorded.

The present record has 45 cuts arranged taxonomically. The jacket describes the author's rationale in presenting informal but detailed accounts of the biology and habitats of the birds and their voices. The record certainly fulfills the stated purpose, but I expect that listeners will be divided on the desirability of detailed commentary. In several cases it is clearly rewarding, e.g., social behavior of the Tufted Jay, singing posture of a bellbird, ecological interactions of Red-winged Blackbirds. In other cases, e.g., details on the nightingale thrushes, it seems less rewarding. In most cases, locality listings, which are treated adequately on the jacket, could have been omitted from the commentary. Hardy does have a pleasant voice for such commentary, and several listeners have considered this the most interesting of bird song records, precisely because of the details he provides.

A strictly taxonomic sequence of bird voices inevitably leads to aesthetic imbalances in the presentation. In several cases, however, the juxtaposition of closely related species (e.g., the three sympatric lowland trogons, the jays, the nightingale thrushes, and the blackbirds) is very interesting, and I consider these sequences to be the strongest points of the record. I found the voices of the wrens tantalizing, particularly the Sinaloa Wren that ends side I which is perhaps the most dramatic song on the record. One looks forward to the appearrance of a record with more wren songs, knowing that Hardy has a special interest in this family.

Of the 45 cuts, only six species are on the earlier record by Davis, and a few more species are on the three records by Paul Schwartz. I detect one confusing entry. Both Schwartz and Hardy provide somewhat different songs of the Green-backed Sparrow (*Arremenops conirostris*), but Hardy's commentary implies that the bird is endemic to southeastern Mexico. The form he recorded, *A. c. chloronotus,* is found mainly in Mexico, but extends to Honduras, whereas the species as a whole occurs to northern South America (hence its inclusion in the Venezuelan record).

I was surprised that after a moderately detailed discussion of the interaction of Rufous-sided and Collared towhees in various Mexican localities, Hardy provided only a recording of the latter species from one locality. Hopefully we will encounter a more detailed presentation of their voices on a future record.

In addition to providing locality data and general background, Hardy has included on the jacket a brief glossary of some of the more technical terms he employs. This novel idea does fulfill a real need as expressed by one lay person who listened to the record. At least two more terms, "secondary contact" and "hybrid swarm" were called to my attention as deserving definition. Hardy includes the dictionary definition of "endemic" as the opposite of "exotic," and then gives the definition usually employed by ornithologists indicating restriction to one place. Ornithologists probably prefer "indigenous" as the opposite of "exotic." The jacket contains a few inconsequential errors such as a misspelling of "*ararauna*" and "*Cassiculus*" and omission of "Grosso" after "Mato" on cut no. 3.

In conclusion I think that despite the value and interest of much of the commentary, judicial pruning might have allowed inclusion of several more species. Nonetheless this is an interesting and valuable record. Many of the species have their voices published for the first time. Except for the inclusion of the Violaceus Jay, all recordings are of Central American species (although not all the recordings were made there), and this could have been indicated in the title. The record should find a place in the library of anyone interested in bird voices, and because of the commentary it would make a suitable gift for anyone with even a casual interest in natural history or natural sounds.—Michael Gochfeld.

BOOKS AND MONOGRAPHS

31. Portraits of Mexican Birds. George Miksch Sutton. 1975. Norman, University of Oklahoma Press. 106 p., 50 col. pl., 11 x 14 inches, cloth. $35.00. —This book contains the most impressive and ambitiously conceived collection of Dr. Sutton's paintings yet published. Each is full page size and is faced by a page of text written by the artist. The book is dedicated to the memory of Louis Agassiz Fuertes "whose drawings stirred me deeply . . . whose criticism of my work . . . made clear its good points and its bad . . . and whose unselfish offer to 'show me just how he did it' took me to Sheldrake Point on Lake Cayuga in the summer of 1916. That summer in the maestro's shadow was the most important in my early life." There follows a *Prologo* (Foreword) in Spanish (and English) by Enrique Beltran and a Preface by Sutton. We learn from the former that Sutton is much esteemed in Mexico not only for his artistic efforts but for his "spirit of companionship with his Mexican colleagues . . .", and from the latter, that the paintings published here represent a span of 35 years, 1938 to 1973. And furthermore, all were made in Mexico, the earliest in Nuevo Leon and Tamaulipas, and the most recent in Colima. A few were done indoors, but a majority were painted outdoors and a notable few from living wild birds either captive or by some chance or character of their behavior cooperatively tame while going about their natural activities. The species' accounts and a closing section "A word from the author" tell in Sutton's gentle, reflective manner about the trials and tribulations of accomplishing painting in such circumstances, including the amusing incidents surrounding such work (actions of onlookers, dogs, ticks, clouds, sun, and so on). There is a photograph of the artist clad only in shorts, shoes, and socks, perched on a camp chair under the trees, carefully applying brush to paper while the straw hat clad audience of Mexican boys assesses the developing work with the hands-on-hips attentiveness of true art critics. Another shows student Dwain Warner holding a Boat-billed Heron, freshly shot, while Sutton draws it. Among the artist's student companions in the early days were O. S. Pettingill, Warner, Ernest Edwards, Richard and Jean Graber, and Frederick Loetscher. Drawing upon his field notes and his recollections, Sutton provides us with a fine array of anecdotes involving "my friends" as he consistently refers to his associates, and the life of the expeditions undertaken to paint, collect, and study birds in Mexcio.

Judging from the material presented, Sutton has had more intimate experiences and more unusual ones with wild birds than most field naturalists. His encounters with hawks that pursue their prey (or his freshly killed specimens) almost at his feet, the way he was able to depend upon a small owl to arrive in the same tree branches each day until he completed painting a branch and the owl as if by appointment, and his opportunities to examine a variety of species performing seldom seen (or at least described) behavior, make engrossing reading. Although the accounts are very informally rendered in flowing prose, they are not just rhetoric, being well-stocked with valuable information on feeding, nesting, flight, courtship, and other aspects of biology. There are also some stimulating speculations about relationships and functions that will repay the serious biologist who takes time with this book. For besides being a painter and a self-admittedly romantic bird lover, George Sutton is a curious and accomplished naturalist/scientist.

The paintings, of course, are the book's *raison d'etre;* they are largely beautiful examples of Sutton's art and exquisitely reproduced. George Sutton is one of the half dozen most important painters of American birds and the current "president" of the club. He is the last of a line that can be drawn almost straight from Audubon to himself, in a satisfying historical series. Beyond Sutton, American bird art has developed in an incredibly complex way. There are fine painters who seem to have been inspired directly by Sutton, Fuertes, and Audubon, and others, who seem to have sprung more or less independently into being. There is not space here to develop that theme (nor do I feel qualified to do so), but a point that I wish to make is that Sutton is not only temporally and historically paramount, he is by the quality of his efforts unsurpassed in portraiture, scientific authenticity, technique, and warmth of presentation. He is the most successful abstract scientific bird painter. Sutton paints subjects, not a collection of their visible parts. His work, when it is successful, must be viewed as a whole,

and indeed cannot be appreciated for the marvel of its detail. When it fails, it simply fails, and no amount of the examination of subdivisional components will show how it fails. For an example of what I mean, barbs and lesser divisions of feathers cannot be seen on Sutton's birds, although they are not missed when one views the whole. Sutton is one of the best at capturing the identifying facial expression of a species and its attitude, either in action, or more commonly, when it has paused suddenly to view the observer or another object.

If ones examines really early work of Sutton (previous to the earliest presented here), one can see that he had a developmental period in which his work on the average was ordinary. But by the time he went to Mexico in the late 1930's, he had matured, and his efforts had stabilized. The best paintings from that period, it seems true, were painted from the late 1940's on. So far, he has not shown signs of "old age," either in his personal vigor or his paintings. The odd thing is that just like other humans, George Sutton is uneven in his work! Fortunately, what I would call failures are few. Far more often the less successful ones are just plain, looking something like the bird, but somehow just not coming off. To me, the only clear failure in this book is the painting of the Elegant Trogon, which is either a painting of a bird in an awkward pose, or an awkward painting of a bird, or both. It suffers especially in trying to follow the act of the preceding leaf, which is that of two perfect Mountain Trogons (the one that appeared in "Bend of a Mexican River"). The ordinary (for Sutton) paintings might include those of the Bicolored Hawk, Boat-billed Heron, Mangrove Cuckoo, Blue-crowned Motmot, Ivory-billed Woodcreeper, Masked Tityra, Boat-billed Flycatcher (another awkward one), Brown Jay, and Alta Mira Oriole. That leaves 40 paintings that, in my opinion, range from successful to peerless. My favorites are: the Thicket Tinamou, Ornate Hawk eagle, Military Macaw, Yellow-headed Parrot (see that impressionistically painted wing feathering!), Northern Pygmy Owl, White-eared Hummingbird, Mountain Trogon, Beardless Flycatcher, Magpie-Jay, Gray Silky Flycatcher, and Chestnut-sided Shrike Vireo. Some of the others illustrate an odd failing that I usually cannot explain: the the illusion of birds being smaller than I *know* they are. In the case of Abielle's Oriole, this is attributable to the plant on which the bird perches; it is a thistle of typical appearance, but according to Sutton, was a specimen of a giant species. No such easy explanation suffices, however, for the feeling I get of smallness of the Mangrove Cuckoo, the Blue-crowned Motmot, and the Hooded Orioles, only the latter of which I really like otherwise as a portrait of the species. The intentional expression of diminutiveness is beautifully achieved in the Beardless Flycatcher, Tropical Parula Warbler, and various hummingibrds.

In recent years, Sutton has achieved a stunningly bold lighting effect on some paintings by placing the subjects against somber backdrops of muted forest green, with perhaps a hint of leaf shadow (as with the Shrike-Vireo and the Magpie-Jay herein) as opposed to unpainted backgrounds. Sutton seems most successful with simple props and white backgrounds for the birds, or with these more uniform darker settings. But the more detailed settings, such as the plant, roots, and earth for the Fan-tailed Warbler, are to my eye "washed-out" and tedious, detracting rather than complementing the avian subjects.

I must remind the reader, in closing this review, that Sutton is a master bird artist, and that this is the most important published realization of that mastery—a notable contribution to this kind of art and to ornithology.—John William Hardy.

32. Birds of the Antarctic and Sub-Antarctic. G. E. Watson. 1975. Antarctic Research Series, American Geophysical Union. 350 p. illus. $15.00.—We bird fanciers of the northern and even southern hemispheres have been blessed with quite an array of field guides to aid us in our work and excursions within various terrestrial and aquatic habitats. In fact we sometimes might take it for granted that with a trip in the offing to new territory one important problem is solved merely by knowing which field guides to acquire. It thus may be a surprise to many that few guides convenient to field experience have heretofore been available for the southern portion of this planet, except in somewhat local circumstances, for example, New Zealand. Publication of "Birds of the Antarctic and Sub-Antarctic" has provided a great boost toward solution of this problem.

Watson's book is a guide to seabirds, a fact that sets it apart from the bird guides with which most of us are familiar. Only 15 of its 184 pages on species' accounts deal with land birds, most of which are northern hemisphere species introduced to subantarctic islands. A look at a globe quickly reveals why this book has to be about marine birds: the geographic area covered is one of sea and ice with only a scattering of islands. The book pertains to birds at sea and of the sea, particularly the many species found in the vast southern oceans south of 35°S. Based on those facts alone, only the naive would predict it to be the total solution to filling the void in guides to identification of southern seabirds. The added fact that specific characters discussed for many species are observable only at unusually close range, in the hand even, foretells the difficulties one should be prepared to face when venturing south with the guide in hand. That, however, is not so much a fault of the book but rather a characteristic of identifying birds at sea in general, and in the southern oceans in particular, where the avifauna is relatively little known and where one rarely has much in the way of others' direct experience to draw upon. To be sure, and more so than for guides to land birds, the usefullness of this book will increase immensely with the experience of the observer.

Another aspect that sets the book apart from the usual bird guide is the large amount of text on the antarctic and subantarctic environments, on how to study seabirds and what information on southern ocean birds still needs gathering, and finally on background information, both historical and biological, concerning 21 island groups in the far south. Some 120 of its 350 pages are devoted to these topics; a great deal more information of a biological background nature is included in the accounts of each species. This then is a handbook rather than merely an identification guide to southern ocean bird life. George Llano's remarks prefacing the book, describing how it grew from the biological research efforts of the United States research program in Antarctica, gives one an inkling into why the work took on such breadth. It is good that it did, in a sense, become a guide to our knowledge on southern birds because almost any careful, somewhat experienced observer venturing to the southern ocean is presented with the very real probability that his field notes will present new information on bird life there. At the least, the book should guide interested observers in making contributions along these lines.

In the same regard, it is at best difficult to synthesize a handbook with a field guide and have the result be successful for one, the other, or both purposes. The epitome of the first, for seabirds anyway, will perhaps forever remain Murphy's "Oceanic Birds of South America," whereas the epitome of the second is perhaps Peterson's "A Field Guide to the Birds." Elements of both these standards are evident in Watson's book, and for that reason it will be compared with them both. How "Birds of the Antarctic and Sub-Antarctic" will fare is a question requiring more time to answer.

This much needed book was a long time in coming, perhaps so because it is the fruit of many person's efforts and experience. I would like to have had it with me on my excursions to Antarctica. It will surely travel along should I ever venture south again.—David G. Ainley.

33. Comparative Behavior of the American Avocet and Black-necked Stilt (Recurvirostridae). R. B. Hamilton. 1975. Ornithol. Mongr., no. 17, 98 p. $7.50.—This paper will be of interest to students of shorebird biology because it presents a great deal of new information on two conspicuous but relatively little known birds, including aspects of their behavior during both the wintering and breeding periods. When studies on the behavior of other recurvirostrids are completed we will perhaps then have new information useful in pointing out taxonomic relationships within the family. The present study does represent a start toward this goal.

An interesting contribution of the study is the demonstration that several behavioral differences between the avocet and stilt are due to differences in morphology. This has been done often in comparisons of feeding behavior among species, but Hamilton carries this course even further to include discussions on how morphological differences relate to comfort behavior, locomotion, and social behavior.

The author's remarks on comfort behavior comprise one third of the paper and constitute the strongest and most interesting sections, but his failure to cite

and to follow McKinney's (*Behaviour*, **25:** 121-217, 1965) terminology and lead and his lack of reference to many other important related papers weaken the author's discussions and detract from his overall thesis that evolutionary relationships might be elucidated through behavior analysis. It was one of McKinney's major purposes to standardize comfort behavior terminology and concepts, thereby facilitating the sort of problem in which Hamilton was interested. More importantly, lack of reference to pertinent literature in several instances led to incorrect conclusions. For example, he confused preening, bathing, and washing and stated (p. 38), "I know of no other birds that use water when preening." By McKinney's very definition preening with water *is* washing, and as such it is widespread particularly among aquatic birds. As another example, in reference to preening sequences, he stated (p. 38), "This shows the tendency of comfort movements to occur together. This tendency has not been mentioned before, but it is very pronounced." The well-known studies by Iersel and Bol (*Behaviour*, **13:** 1-88, 1958) and by Delius (*Behaviour*, **33:** 137-178, 1969) are in fact analyses of the organization and relationships of complex associations of comfort movements.

The paper is in general well organized and contains many useful tables and figures. Concepts and discussions are usually clearly presented, but the last section on social behavior is sometimes confusing and could have been improved with the continued use of tables comparing the occurrence and performance frequencies of various displays in the two species as was done in the earlier sections on comfort and maintenance behavior.—David G. Ainley.

34. Ornithological Gazetteer of Bolivia. Raymond A. Paynter, Jr., Melvin A. Traylor, Jr., and Blair Winter. 1975. Harvard College [available from R. A. Paynter, Bird Department, Museum of Comparative Zoology, Harvard University, Cambridge, Mass. 02138, or from M. A. Traylor, Bird Division, Field Museum of Natural History, Chicago, Ill. 60605]. 80 p., map. $1.75.—As the forerunner of a proposed series of ornithological gazetteers covering South America, this present volume on Bolivia sets style and format. It consists of two major parts: an alphabetical listing of place names either appearing in the ornithological literature or found on labels of museum specimens, and a complete ornithological bibliography for the country (or very nearly so). I can personally vouch for the need of such gazetteers as the task of the taxonomist in determining range limits for species is both time consuming and frustrating in the absence of such an aid. The goal of continental coverage is an admirable one, and I hope the Bolivian work is indeed only the first of a long series.

One of the excellent features of the gazetteer is that in addition to the location by latitude and longitude of each place name, altitudinal and ecological information is supplied where known. References are also given to ornithological works in which the locality is used, providing backup information and clearing up confusion resulting from use of simlar or the same names for different places. The text is virtually free of typographical errors and is reproduced by photo offset from typed copy; I have not checked the Bibliography for completeness, but it is certainly extensive and highly useful.

I have only two minor criticisms. At the end of each section of the gazetteer (one section per letter of the alphabet), there is a large blank space of varying size, making for an odd-looking format, especially where the blank area is at the top of a page as between the E's" and "F's" on page 23. And on the map, there are no place names except for the departments, lakes, and rivers, thus requiring the researcher to plot by coordinates all localities with which he is dealing. Location of even a few of the more common place names on the map would greatly enhance the usefulness of the gazetteer.

Nevertheless, the volume fills a very important need, it is very well done, and certainly no one can argue with the price.—Burt L. Monroe, Jr.

35. To the Arctic by Canoe, 1819-1821. The Journal and Paintings of Robert Hood, Midshipman with Franklin. Edited by C. Stuart Houston. 1974. Montreal and London. McGill-Queen's University Press, 217 p. illustr. $17.50.—Robert Hood is one of the great, but lesser known, figures of the heroic early phase of exploration in arctic regions in North America. He was a principal member, as midshipman, of Sir John Franklin's first expedition to the Canadian Arctic from 1819 to 1822, which had instructions from the Lords Commissioners

of the Admiralty to explore the unknown arctic seaborad of America from the mouth of the Coppermine River eastward to Hudson Bay as part of Britain's resumed search for the Northwest Passage. The expedition succeeded in its objectives by descending the Coppermine River and mapping 675 statute miles of the mainland coast of Coronation Gulf, Bathurst Inlet, and the western part of Kent Peninsula north to Point Turnagain, but not without much tragedy and loss of life. Out of 20 people, 11 perished from cold and famine on the overland trek back to Fort Enterprise including Hood, the only officer to die during the expedition.

Hood's invaluable contribution to the scientific success of the expedition is well known from the official account of Franklin ("Narrative of a Journey to the Shores of the Polar Sea in the Years 1819, 20, 21 and 22" 1823) which credits him with making extensive observations on anthropological, climatological, physiographical, magnetic, geodetic, and other natural scientific phenomena. It is only now, however, with the publication for the first time of Hood's original journal and paintings that the full value of his work can be appreciated. His handwritten field diary of the expedition was discovered by Dr. C. S. Houston to be in the possession of Hood's relatives now residing near Vancouver. Permission was obtained for its publication, together with 24 water-colors and sketches of landscape and wildlife (especially birds), done by Hood during the journey. The result is a superb and unique book.

There are five parts to the book. The first is a brief introduction which provides a clear and excellent historical resume of Hood, his journal, and the events of the expedition. The second part, the main body of the work, consists of eight chapters which comprise Hood's narrative of the proceedings of the journey from its beginning at Gravesend, England, on 23 May 1819 to Point Lake, Northwest Territories, on 15 September 1820 (the journal ends just over one year before his death on 20 October 1821); two of these chapters present Hood's careful and comprehensive observations in ethnology (of the Cree Indians) and the natural sciences (buffalo, climate, aurora borealis, and magnetic phenomena). The remaining three parts complete the book by providing details of (1) the death of Hood, (2) Hood's paintings, and (3) the men of the expedition.

Hood's well-written narrative offers an informal version of the events which occurred up to the time the expedition reached the Coppermine River and is an extremely useful supplement to Franklin's official report. It is less formal and less rigid in its description of the conditions of the journey, especially those pertaining to the actions and rivalry of the fur traders and their treatment of the natives. It is the man himself, however, more than his work that gives particular distinction to the journal. It reveals him as an extremely perceptive young man with a breadth of knowledge, maturity of thought and expression, and analytic capability far in advance of his years (Hood died at 24 years of age).

Hood's paintings (16 reproduced in color and 8 in black-and-white) are also noteworthy. They display an unusal talent for drawing both scenery and wildlife, an ability no doubt which contributed to his selection as a member of the expedition. Of particular significance to ornithologists are the previously unpublished paintings by Hood of 29 species of birds, at least five of which were painted before they were known to science. These water-colors compare very favorably with those of his contemporaries. His waterfowl habitat scenes at Cumberland House are most effective and uncover a sensitive artist with great promise, especially when the time and conditions under which they were produced are taken into consideration. If any shortcoming exists in this book, it is the regrettable fact that not all the paintings could be reproduced in color.

In conclusion, this extremely well and attractively produced book will deservedly have a wide sale. The journal and the paintings contribute much to our knowledge of natural history in the Canadian Northwest and add another important chapter to the story of arctic exploration.—David N. Nettleship.

36. The Birds of Manitoba. Ernest E. Thompson (= Ernest Thompson Seton). 1891. *Proc. U.S. Natl. Museum*, **13:** 457-643. Reprint edition (photocopy). 1975. Premium Ventures Ltd., 235 Garry Street, Winnipeg, Manitoba. $5.00. Available only through the publisher.)—"The Birds of Manitoba" has long been out of print, and this reprint edition was prepared to commemorate the 93rd Annual Meeting of the American Ornithologists' Union in Winnipeg in 1975. As might be expected, its most obvious value is to provide a historical

baseline against which changes in land use and attendant changes in wildlife populations can be measured. The rapidity with which changes have occurred is worth reflection. Thompson notes the rarity of avocets in Manitoba, the breeding of Whooping Cranes at Winnipeg, the countless flocks of Passenger Pigeons, the spread of the Prairie Chicken northward, and a Willet flushed from a nest which was "shaded on one side by the skull of a buffalo."

The book is also full of interesting observations on the general biology of birds that could have been written only by someone with a detailed knowledge of their habits. I particularly enjoyed his accounts of the behavior of the Ruffed Grouse in decoying intruders from the nest and of the possible role of Prairie Chickens in disseminating seeds of the wild rose. How many current ornithologists know enough about the Sandhill Crane to write: "As a game bird I am inclined to place [it] first on the Manitoban list . . . the quality of the flesh is unsurpassed." Thompson also argued that the crane "is so thoroughly well able to take care of itself that legislation in its favor seems altogether unnecessary."

An unexpected bonus is the reminder of how little was known about avian biology at the turn of the century (for example, the function of feathers in grebe stomachs), of how much the early naturalists contributed, and how much had to be learned over the barrel of a shotgun. The positive identification of a Red-necked Grebe, now an almost routine problem with binoculars and field guide, had to be postponed because the bird "was too shy to admit of the identification being completed on the only perfectly reliable way."

This is an interesting book that deserves wider circulation than it will probably receive. I congratulate the publisher on taking the risk to reprint it.—J. R. Jehl, Jr.

37. Location in Birds. (Lokatsiya Ptits.) V. D. Ilichev. 1975. Moscow, "Nauka" Press. 196 p. Price uncertain, about $3.00. (In Russian.)—A previous book by the same author, "Bioacoustics of Birds" (*Bird-Banding*, **43**(3): 232-233, 1972) included research largely on owls. This volume is of convenient pocket size and well illustrated with 76 figures. It rests almost exlusively on owl data and analyses, mainly concerning the Long-eared Owl (*Asio otus*). This species carries aural development to an extreme. Recalling the "*fearful symmetry*" of Blake's "*Tiger, Tiger burning bright, in the forests of the night. . .*" this and related species show an asymmetry of ear structure, externally and internally. This author and his collaborators have pursued the analysis of owl ears through even the microscopic structure of the middle and inner ears, even to the medulla and spinal column. The numerous details resulting cannot be elaborated in a review. There is abundant comparison of structure and behavior of non-"mouse-eating" owls and "non-owl" birds. Owl location of prey is seen as an adaptive procedure involving three components: the specific sonar medium, the structure of the complex auditory system, and the specific location motions (head weaving) of the owl. A hypothesis is suggested presuming sonar amplifying, sonar spectral band, and spectral phase mechanisms, rendering inequities of right and left ear structure an advantage in sound source localization. There are four chapters: An adaptive approach to owl localization; Location as an ecological phenomenon; Structure-functional bases of passive location in owls; and, Location procedure, and a hypothesis of passive location in owls. Topics include: History; Adaptation, a main concern; Choice of food object and situation; Adaptation and mosaic evolution; Eco-morphologic parallelisms (similar structures are found in the harriers, genus *Circus*); Food specialization and its results; Food of Long-eared Owls in "murine" and "nonmurine" years; Biotope noise as a sonar medium component; Population and biocenotic signals in the sonar medium; Location (searching) behavior; Biotope, territory, and activity periods; Location in aviary experiments; Food selectivity as an adaptation; The outer ear and its adaptive features (owls through dermal folds and facial disk may direct or close off sound admitted to the ear); The middle ear; eco-morphologic comparisons; Tympanal muscles and operation of the sound transmission system; The cochlea and auditory nerves; Cochlear potentials and hearing; The inner ear and its location function; Auditory centers of the medulla; Morphology of the auditory nuclei; Eco-morpholocic and adaptive features of owl auditory nuclei (they greatly exceed those of non-strigine birds in number and length). Need of further research on many points is emphasized, particularly: Can owls "extrapolate" well enough to locate a moving hidden sound source? In all, a great body of

original research derived from very refined electronic instrumentation there and in the West is summarized here. There is a bibliography of 265 titles.—Leon Kelso.

38. Flight Identification of European Raptors. R. F. Porter, I. Willis, S. Christensen, and B. P. Nielsen. 1975. T. & A. D. Poyser, Berkhamsted. 184 p. illustr. £4.80.—Europe's 38 breeding raptors comprise a greater variety of species than that found in any comparable area of North America. Many of them pose difficult problems of field identification. This book, profusely illustrated with 181 photographs and hundreds of meticulous line drawings, provides an invaluable guide to this difficult group. Its detailed account of immature plumages, variability in markings, and fine details of shape and style of flight set a high standard for writers of future books on field identification. It will be most valuable to raptor enthusiasts planning visits to Europe but will also be very useful to visitors to Africa and Asia.—I. C. T. Nisbet.

39. Birding from a Tractor Seat. Charles T. Flugum. 1975. Thomas Y. Crowell Co., New York. 442 p. illustr. $8.95.—This book, originally privately published in 1973, has now been published by the Thomas Y. Crowell Company and has already been reviewed by Charles F. Leck (see review no. 34, *Bird-Banding*, **45**: 291, 1974). The only change is the addition of an index.—Bertram G. Murray, Jr.