

immediate cause of death but may have caused a crippled condition which hindered capturing prey.

As a final check on possible causes of death, E. A. Boykins, who was running tests for DDT in birds at that time, analyzed the owl for DDT. However, as was usual with our tests on predatory birds using the Schechter-Haller method of analysis, he obtained a "red reaction" which we have interpreted to mean that DDT was present, presumably in substantial amounts, but was masked by interference of another closely related chemical, or that break-down of DDT into metabolites not recoverable by the Schechter-Haller method had already taken place.

Obviously, then, the Barn Owl could have died from any one of the above causes, or from some undetermined cause such as disease, or from any combination of these. Hence, this brief history illustrates the difficulty, and danger, in trying to assess mortality from a casual inspection. George J. Wallace, Department of Zoology, Michigan State University, East Lansing, Michigan.

## RECENT LITERATURE

### BANDING

(See also 12, 13, 18, 37, 53)

1. **Shorebird Migration According to Banding Records.** (*Migratsii kulikov po dannym koltsevaniya*). M. I. Lebedeva. 1965. *Ornitologiya*, No. 7: 328-340. Five distribution maps. Numerous observations are presented here, based on banding returns for 11 species: Golden Plover (*Charadrius apricarius*), Lapwing (*Vanellus vanellus*), Little Stint (*Calidris minutus*), Wood Sandpiper (*Tringa glareola*), Marsh Sandpiper (*Tringa stagnatilis*), Ruff (*Philomachus pugnax*), Bar-tailed Godwit (*Limosa lapponica*), Black-tailed Godwit (*Limosa limosa*), Whimbrel (*Numenius phaeopus*), Snipe (*Gallinago gallinago*), and Woodcock (*Scolopax rusticola*). In summary the author notes certain features characteristic of the migrations of the order as a whole. Shorebirds nesting in north European USSR take two well-defined migration routes. One route includes the coast of the Baltic and North Seas to the shores of France and Spain, where many remain for the winter, whereas others of the same species, crossing the western Mediterranean, go on to African wintering grounds. This is most clearly marked in the Golden Plover. The other is a continental route, passing through the Baltic countries and the Ukraine to Italy, and thence to southern France or north Africa. Of special note are the directions taken and distances traveled by the Ruff, some banded on migration in England, Italy and Germany having been recovered in Yakutiya of eastern Siberia. One banded in Germany April 29, 1961 was taken in the Upper Wilyuiska area of Siberia on May 31, 1961, having traversed at least 6500 kilometers in 32 days, or 203 km. per day. A Ruff banded February 21, 1957 at Cambridge, England was taken near Yakutsk, Siberia on May 24, 1959. A juvenal Ruff banded near Copenhagen on September 9, 1951 was taken May 18, 1958 near Okhotsk on the east Siberian coast. Some Ruff populations take a so-called "loop" route, in autumn following the coast of Europe to Africa, and in spring returning through Italy and northward over the continent.—Leon Kelso.

2. **Banding and Tagging of Animals** (*Koltsevanie i mechenie zhivotnykh*). M. I. Lebedeva and P. P. Shevareva. 1964. Information Bulletin (Informatsionnyi Byulleten), No. 2, Institute of Zoology, Academy of Sciences USSR, Moscow, pp. 1-88. Following an introduction by G. P. Dementiev, there is a table of banding totals for USSR by bird orders for years 1925-1959. Of the total 1,395,029 banded 617,337 were passerines, 417,434 Lari, 156,236 Anseres, and 98,841 alcids. There follows a table of totals banded by years for each (of 477) species, a bibliography (363 titles) by A. A. Vinokurov containing publications utilizing the results of the banding data, and an index to the birds (134 species) involved in those data.—Leon Kelso.

**3. Banding Activities at Ledskär Bird Station 1957-1963.** Station Report No. 4. (Ringmärkningsverksamheten vid Ledskär fågelstation 1957-1963.) Karl Fredga and Ingemar Frycklund. 1965. *Vår Fågelvärld*, **24**: 193-217. (English summary.) This report from Sweden's newest bird station located among the islands of the southern part of the Gulf of Bothnia deals extensively with the trapping methods worked out for this particular area, trap models, and the influence of weather and climatic conditions upon the trapping success. A total of 15,578 birds of 123 species were banded, of which 202 recoveries of 39 species were reported. The most remarkable among the latter were two female Ruffs (*Philomachus pugnax*), one banded as a fledgling was found two years later near the river Ob, Siberia, and the other, a juvenile, was killed the following year at Yakutsk, Siberia, at distances from Ledskär of, respectively, 2320 and 4645 km. Maps illustrate the recoveries of 13 species and two tables give data on 15 foreign recoveries and 23 returns.—Louise de K. Lawrence.

**4. The Activities at Ottenby Bird Station 1962.** Report No. 43. (Verksamheten vid Ottenby fågelstation 1962.) Anna Tolstoy. 1965. *Vår Fågelvärld*. **24**: 144-155. (English summary.) A new waterfowl trap added 591 ducks and one grebe to the grand total for the year of 21,584 birds banded, which is a record. There were 2,721 recoveries. The most interesting among these was a Blackcap (*Sylvia atricapilla*) which, having flown northwest instead of southeast, was found dead in Norway 37 days after banding. This kind of reversed migration is thought to derive from shock. The same was noted in 1961 when a Redwing (*Turdus musicus*), banded in November, was found dead in Norway the following February.—Louise de K. Lawrence.

**5. Greatest Ages Reached by Ringed Birds in Switzerland.** (Höchstalter schweizerischer Ringvögel) Urs Glutz von Blozheim. 1964. *Ornithologische Beob.*, **6** (4): 106-127. The greatest ages in years reached by birds ringed in Switzerland and recovered are as follows: Little Grebe (*Podiceps ruficollis*), 8, 8, 9; Grey Heron (*Ardea cinerea*), 11, 12, 13; Purple Heron (*A. purpurea*), 9, 10, 10; Mute Swan (*Cygnus olor*), 18, 19, 19; Mallard (*Anas platyrhynchos*), 11, 11; Buzzard (*Buteo buteo*), 24; Kite, (*Milvus milvus*), 24, 26; Honey Buzzard (*Pernis apivorus*), 16; Kestrel (*Falco tinnunculus*), 16; Coot (*Fulica atra*), 18; Lapwing (*Vanellus vanellus*) 11; Black-headed Gull (*Larus ridibundus*), 18, 18, 20, 24; Tawny Owl (*Strix aluco*), 13, 14; Barn Owl (*Tyto alba*), 9, 13; Swift (*Apus apus*), 11, 13, 20; Alpine Swift (*A. melba*), 19, 19, 20; Northern Shrike (*Lanius excubitor*), about 12; Dipper (*Cinclus cinclus*), 6, 7, 8; Nightingale (*Luscinia megarhynchos*) 6; Blackbird (*Turdus merula*) 7, 7 1/2, 7 1/2; Marsh Warbler (*Acrocephalus palustris*), 8; Icterine Warbler (*Hippolais icterina*), 6; Pied Flycatcher (*Ficedula hypoleuca*), 6, 6, 7; Marsh Tit (*Parus palustris*) 10; Great Tit (*P. major*), 8, 8, 8; Nuthatch (*Sitta europaea*), 6, 8, 9; Yellowhammer (*Emberiza citrinella*), 5, 7, 7; Chaffinch (*Fringilla coelebs*), 8, 8; Greenfinch (*Carduelis chloris*), 6, 7, 10; Bullfinch (*Pyrrhula pyrrhula*) 8; Hawfinch (*Coccothraustes coccothraustes*), 6, 7, 8; House Sparrow (*Passer domesticus*), 5; Starling (*Sturnus vulgaris*), 7, 11, 12; Jay (*Garrulus glandarius*), 6, 7; Nutcracker (*Nucifraga caryocatactes*), 8; Alpine Chough (*Pyrrhocorax graculus*), 6, 6; Jackdaw (*Corvus monedula*), 6, 7, 12.—Margaret M. Nice.

**6. Notes from Falsterbo Bird Station Summer and Fall 1962.** Station Report No. 29. (Notiser från Falsterbo fågelstation sommaren och hösten 1962.) Gunnar Roos. 1965. *Vår Fågelvärld*, **24**: 257-271. (English summary.) There were no regular observations of diurnal migration but assiduous banding operations were carried out from 1 June to 3 November, involving a total of 10,800 birds. Observations on breeding birds revealed two new nesting species, Red-necked Grebe (*Podiceps ruficollis*) and Mute Swan (*Cygnus olor*). Crossbills and woodpeckers were among the most notable "invasion" species.—Louise de K. Lawrence.

**7. Notes from Falsterbo Bird Station the Summer and Fall of 1961.** Report No. 27. (Notiser från Falsterbo fågelstation sommaren och hösten 1961.) Gunnar Roos. 1965. *Vår Fågelvärld*, **24**: 133-143. (English summary.) This report is based on observations made by the banding personnel. Since the inaugura-

tion of the station ten years ago, this is the first time a lack of volunteer observers prevented the full recording of the fall migration. Banding operations were carried out from 1 June to 31 October; a total of 5,700 birds was banded.

Migration during October was unusually heavy. The most interesting species was the Fieldfare (*Turdus pilaris*), never before numerous, but now represented by at least 5,000 individuals. Among the invasion species were the titmice and a notable number of Bullfinches (*Pyrrhula pyrrhula*). An unlikely Flamingo (*Phoenicopterus ruber*) appeared in late September. In the same autumn the species was observed in several places also in Denmark.—Louise de K. Lawrence.

## MIGRATION

(See also 1, 6, 7)

**8. Some Radar Measurements of the Altitude of Bird Flight.** E. Eastwood and G. C. Rider. 1965. *British Birds*, 58 (10): 393-425. This valuable paper summarizes 20,000 measurements of the heights of birds migrating over England and the North Sea. It is more systematic than previous radar studies of the height of flight, because the observations were specifically planned for the purpose. The main results can be summarized as follows:

1. Most birds fly within a few thousand feet of the ground: on the average, 80% flew below 5,000 feet by night, and 80% flew below 3,500 feet by day. Heights above 10,000 feet were very rarely observed. Flight below 250 feet was observed much more frequently in months when few birds were genuinely migrating.

2. The median altitude was significantly higher by night than by day, and slightly higher in spring than in autumn (a misprint in Table 2 exaggerates the latter effect).

3. Birds flew markedly higher in the morning than in the afternoon, and markedly higher before midnight than after midnight.

4. There was virtually no correlation between the height of flight and the direction or speed of the wind.

5. Under overcast skies the average height of flight was higher than that under clear skies; some birds could be tracked both within cloud layers and above them.

6. Some birds flew higher over land than over the sea.

7. On at least one occasion a freezing layer in the atmosphere appeared to impose a ceiling on the migrating birds.

In a concluding section the authors discuss the theory of bird detection by radar, and conclude that changes in the height of flight should not have a major effect on the range at which birds can be detected, nor on the apparent density of echoes. Their argument is too technical to summarize here, but the reviewer would point out that it applies only to birds above 2,000 feet: when birds descend much below this altitude, they can disappear very dramatically from the screens of some radar stations, as was shown by Myres (*Ibis*, 106(1): 7-51, 1964).—I. C. T. Nisbet.

**9. Night Flight with a Thrush.** Richard R. Graber. 1965. *Audubon Magazine*, 67(6): 368-374. Dr. Graber has made studies on many aspects of bird migration: counting the calls of the birds at night, watching migration by radar, investigating the physical condition of tower victims. In the present paper he describes a new achievement. His colleague at the Illinois Natural History Survey at Urbana, William W. Cochran, devised a tiny radio transmitter, weighing about as much as a dime, and one of these was glued to the back feathers of an immature Gray-cheeked Thrush (*Hylocichla minima*) caught in a mist net at noon 24 May 1965. The bird, as revealed by signals from its radio, stayed the rest of the day in the same grove; at 7.55 p. m. it took off, as did Dr. Graber and the pilot, Jim Taylor, a few minutes later in their plane. Under clear skies the thrush flew steadily north-northeast at 50 mph, helped by a south-southwest wind of 22 mph, making its own air speed about 33 miles. Just north of Evanston, Illinois, 140 miles from the start, its steady course took it over Lake Michigan,

but the scientists had to fly north over land. At 2.48 a. m. at the north tip of Door County, Wisconsin, they *again made contact with the thrush!* Here, because of an approaching thunderstorm, the men had to turn back, confident that this dauntless bird would reach Washington Island in another 40 minutes despite the tempest—a flight of 400 miles in 8 hours without rest.

Of this extraordinary experience Dr. Graber writes: "I felt overwhelming admiration for that bird. Compared to the achievement, the determination, the seeming purposefulness of that small creature in its first year of life, making a journey it had never made before, to a destiny it could not know, all of human technology somehow dimmed to insignificance."

Too much of our present day ornithology appears to be motivated by a cold-blooded heartlessness, by lack of respect and sympathy for these wonderful fellow creatures of ours, and by the determination to write up researches with the minimum of life and emotion. As Julius Greenstein truly writes about present-day scientific articles (*Science*, 150(3702): 1407, Dec. 10, 1965), "The published paper is a model of conformity in thought and style, adhering rigidly to the 'scientific method' and to a sterile and unimaginative prose that belies the frequently unorthodox thinking, individuality, and literary capabilities of its author." In marked contrast, the present paper is a joy and inspiration.—Margaret M. Nice.

**10. Shorebirds and Waterfowl in Morocco in January 1964.** (Re-marques sur l'hivernage des limicoles et autres oiseaux aquatiques au Maroc (Janvier 1964).) Jacques and Chantal Blondel. *Alauda*, 32(4): 250-279. During a survey of the most important marshes in Morocco in January 1964, about 600,000 shorebirds and 60,000 ducks were counted. The commonest species were the Black-tailed Godwit (*Limosa limosa*) and the Dunlin (*Calidris alpina*)—about 180,000 of each. Of special interest was the observation of at least 600 Slender-billed Curlews (*Numenius tenuirostris*), a central Asiatic species which has long thought to be on the verge of extinction—I. C. T. Nisbet.

**11. Some Aspects on the Relationship between Resting and Migrating Shore Birds in inland Sweden.** (Några synpunkter på förhållandet mellan rastande och sträckande vadare i inlandet.) Roger Gyllin. 1965. *Vår Fågelvärld*. 24: 218-234. (English summary.) This paper challenges the theory of constricted traditional flyways and resting places. It is argued that the migrants fly on a broad front and are not traditionally bound to any particular resting places except for so long as they fulfill the birds' requirements (provide mudflats and sandy beaches). New resting places are often established where such conditions suddenly appear, resulting from changes in the environment (variations in lake levels and flooding), and they are abandoned as soon as the favorable conditions disappear. The number of resting shorebirds is usually not related to the actual number of migrants in the air at a given time. Shorebirds habitually fly high, especially in the spring, and they are known to be fast, long-distance flyers. Inducements to come down to rest and be counted include the distance already flown, the existence of suitable feeding places, and weather conditions, winds, fronts, and precipitation.—Louise de K. Lawrence.

**12. Distribution and Migration of the Garganey: an Analysis of European Banding Results.** (Zugwege und Verbreitung der Knäkente, *Anas querquedula*; ein Analyse der europäischen Beringungsergebnisse.) Monica Impekov. *Ornith. Beobachter*, 61(1): 1-34. (French and English summaries.) The Garganey has a wide distribution across Europe and Asia, but its main breeding stronghold is in European Russia and western Siberia. Banding recoveries show that many Russian birds pass through western Europe in autumn, although winter mainly in Africa. There is evidence for "loop-migration": in autumn some birds fly further north than their spring routes, and some fly further south. The author uses the scanty recoveries to draw a map of "migration routes", but these must be interpreted skeptically, because the banding recoveries (as usual in such analyses) appear to reflect very closely the distribution of hunters. The results of this paper should be compared with banding results for the Blue-winged Teal, the Garganey's ecological counterpart.—I. C. T. Nisbet.

**13. Migration Routes and Mortality Rates of Canada Geese Banded in the Hudson Bay Lowlands.** Richard W. Vaught and George C. Arthur. 1965. *J. Wildl. Mgt.*, **29**: 244-252. Flightless adults and goslings were captured along rivers with long-handled dip nets. Geese were most easily captured when broods were 1-4 weeks old, by chasing them onto shore. Recoveries from 4 years of banding (1955-56, 1960-61) indicate that *Branta canadensis* breeding between the Owl and Machichi Rivers on the southwest coast of Hudson Bay belong to the Eastern Prairie population that migrates west of the Mississippi River and winters at Swan Lake in north-central Missouri. Geese breeding further southeast, between the Mistigoken and Shagamu Rivers, belong to the Mississippi Valley population that migrates east of the Mississippi and winters at Horseshoe Lake in southern Illinois. Overall hunting mortality, as measured by band recoveries, was the same for the Eastern Prairie (15.8%) and Mississippi Valley population (16.3%). However, first-year hunting mortality declined from 12.8 - 15.6% in 1955-56 to 10.4% in 1960 and 5.4% in 1961, perhaps due to initiation of harvest quotas for both populations in 1960.—Robert S. Hoffmann.

**14. The Migration through Kalmar Sound 1961.** (Fågelsträcket genom Kalmarsund 1961.) Ragnar Edberg. 1965. *Vår Fågelvärld*. **24**: 97-106. (English summary.) This is Ottenby Bird Station Report No. 44 and it deals with the migration through the narrow straits between Öland and the mainland. Thirteen observers carried out continuous observations from 1 March to 19 November and recorded a total of 562,542 birds of 138 species. The main table is arranged according to flight direction by reason of the frequent overlapping of southward and northward movements in the late spring. A table, calculated in percentages and comparing the waterfowl records of 1958-1961, is of interest but suffers from a confusing translation of the caption.—Louise de K. Lawrence.

**15. The Blackpoll Warbler in Fall on Nantucket.** John V. Dennis. 1965. *EBBA News*, **28**(4): 175-178. The Blackpoll Warbler is a late migrant on Nantucket, peak numbers usually being observed during the first half of October, when a large proportion of the birds which are trapped reach high weights. Dennis suggests that these data are consistent with the hypothesis of a long over-water flight.—I. C. T. Nisbet.

**16. Ecology of the Indigo Bunting in Florida.** David W. Johnston. 1965. *Quart. J. Florida Acad. Sci.*, **28**(2): 199-211. The breeding distribution and habitats of the Indigo Bunting in Florida are described. In late October a number of immature birds were trapped in central Florida weighing up to 20 grams, probably including about 7 grams of fat. Previously Odum (*Proc. XIIIth Intern. Ornith. Congr.*: 563-576, 1960) had reported that Indigo Buntings killed in north-west Florida in early October contained little fat. Johnston discusses the energy requirements for long-distance migration, and concludes that most of his birds could have flown nonstop across the Gulf of Mexico, but that most of Odum's could not have done so.—I. C. T. Nisbet.

## POPULATION DYNAMICS

(See also 6, 22, 44, 45)

**17. Breeding Home Range in the Nighthawk and Other Birds; its Evolutionary and Ecological Significance.** Joseph T. Armstrong. 1965. *Ecology*, **46** (5): 619-629. During a two-month period in 1963, Dr. Armstrong made observations of 13 neighboring home ranges of Common Nighthawks in urban Detroit. Emphasis was placed on size of home range as it relates to body size, food availability, and behavior patterns. A conclusion reached was that "the apparently primary importance of aggressive interaction in determining home range size, in the present study, suggests that in nighthawks, as well as in other species having more strictly type A territories, aggressiveness at high population levels may reduce the proportion of individuals breeding and population natality rate below what resources would allow." Also, for 42 species of birds it appears that home range increases as a function of increasing body mass.

This paper would have been strengthened greatly if Dr. Armstrong had had a marked population of breeding nighthawks and had there been a quantification of food supply.—David W. Johnston.

**18. Territory Defense in the Oystercatcher.** (Haematopus ostralegus (Haematopodidae) Revierverteidigung.) H. Rittinghaus. 1964. Film E 354 der *Encyclopaedia Cinematographica*, : 3-10. Oystercatchers are long-lived birds. The oldest known was 36 years of age when last trapped on its nest. Unfortunately records are incomplete, for the aluminum bands become frayed and are lost, while the colored bands may last longer. For 14 years the author has watched the stable breeding colony of his color-banded population of these birds in the sanctuary on the island of Oldeog; many times pairs have remained together for more than ten years. Oystercatchers not only know their mates but their neighbors of previous years; three or four old inhabitants go through the so-called "piping performance" to discourage a stranger that tries to settle in the colony. A picture is given of four individuals with heads down and bills open thus intimidating a visitor. Margaret M. Nice.

**19. Study of a Population of Melodious Warblers in Dijon.** (Étude d'une Population d'*Hippolais polyglotta* à Dijon.) C. Ferry. 1965. *Alauda*, **33**(3): 177-205. A ten-year study in the 'Parc des Sports' in Dijon where some eight hectares are devoted to shrubbery. The male Melodious Warbler sings a great deal at the start of nesting but becomes silent from the beginning of incubation. The female builds, incubates, and broods the young; both parents feed them. Five eggs are usually laid early in the season, four eggs later. Incubation lasts 12-13 1/2 days, fledging 11-12 days.

As to the success of 108 eggs during five years, 53 fledglings left the nest (43.6%), a typical figure for open nests of altricial species. Table 3 shows that success was high in 1953 and 1955—27 fledglings from 38 eggs (71%), whereas in 1956, 1957, and 1959 it was low—only 26 fledglings from 70 eggs (37%). In the two early years there were five and six pairs respectively; in the three later years there were nine, seven, and five pairs. In 1962 there were only two pairs. The author attributes the changes in population size to the growth of the shrubbery; in 1956 to 1957 it had reached the optimum for the Melodious Warblers but by 1962 it had outgrown their preferred habitat. Under causes of mortality it is suggested that bad weather (cold rains) played the chief role. Although no birds were banded, this is an interesting study of a species on which only one account of a nesting seems to have been previously published.—Margaret M. Nice.

**20. A Study on Resting and Wintering Waterfowl in the Inner Archipelago of Southern Bohuslän.** (Studier över rastande och övervintrande sjöfågel i södra Bohusläns inre skärgård.) Olof Phersson. 1965. *Vår Fågelvärld*, **24**: 107-132. (English summary.) Originally undertaken to investigate the hunting pressure on the declining populations of the Goldeneye (*Bucephala clangula*), this study was enlarged to produce an excellent presentation of the habits and movements of the winter populations of all the waterfowl in this locality on Sweden's west coast. The list includes 28 species. Diagrams illustrate the discussions on a number of the species, showing, besides the population counts, also the ice conditions, open seasons, and the waterlevels.

Food supplies were also investigated, especially the bottom vegetation and invertebrate life. Interesting instances of commensalism are related, one involving a Black-backed Gull (*Larus marinus*) trying to grasp the food from a Coot (*Fulica atra*) as it came up from a dive, but the theft was prevented by the coot flock rushing to the defense. Instances of torpor-like sleep in Whooping Swans (*Cygnus cygnus*) are also described. Once a flock was observed lying on the ice for a week and presumed dead, but when approached the whole flock lifted and flew away.

In summarizing the results, the author concludes that many species are under unduly hard pressure from hunting and other interfering human activities at a time when the "ice winters" often threaten survival. "It ought to be just as important to set aside protected areas for resting and wintering waterfowl as to protect them during the breeding season." This is a fine objective study with a significant meaning.—Louise de K. Lawrence.

**21. Economic Importance of the Blackbird.** Jiri Havlin. 1965. *Zoologické Listy*, **14**(2): 129-142. (In Czech with a three-page summary in English.) "More than a hundred years ago, the blackbird, a 'shy bird of the woods', began pervading human settlements to become a frequent and conspicuous bird of most of the European towns." Now, "two kinds of blackbird populations, the 'forest' and the 'town' ones, are found in most of the territory of Czechoslovakia." The author studied exhaustively these two populations of *Turdus merula* from 1951 to 1960 and published a number of papers on his findings (see *Bird-Banding*, **33**(4): 209, 211-212. 1962.). He finds "'town' blackbirds" . . . have become "an unsound phenomenon. Their density is four times as high as under their original conditions and results from copious food in winter and early spring." He dwells on the impossibility of measuring the beneficial traits of the birds against their pernicious activities, particularly their destruction of fruit in home gardens. He is sure that blackbirds are far too abundant in town and pleads strongly for the abolition of feeding of birds by people.—Margaret M. Nice.

**22. Some Effects of Heptachlor and DDT on New Brunswick Woodcocks.** Bruce S. Wright. 1965. *J. Wildl. Mgt.*, **29**: 172-185. A sample of 148 woodcocks, representing early spring migrants, territorial males and breeding females, chicks, premigrants and migrants, were analyzed for DDT and heptachlor epoxide; 89 eggs were also analyzed. Between 1961 and 1963 a large increase in contamination of spring arrivals and breeding females with both pesticides occurred. Territorial males showed increase in DDT, but not heptachlor. Eggs and young were also contaminated, and 86 per cent of fall migrant birds contained residues. Woodcock productivity in New Brunswick, as measured by the ratio of juveniles to adult females in hunter-kill, is inversely correlated with amount of DDT used there yearly in budworm spray programs ( $r = 0.88$ ) and area sprayed ( $r = 0.82$ ). Nova Scotia populations which in contrast to New Brunswick had never been sprayed with DDT had productivity ratios 1 1/2 to 2 times higher.—Robert S. Hoffmann.

**23. Differential Winter Mortality of Bobwhites in Kansas.** Robert J. Robel. 1965. *J. Wildl. Mgt.*, **29**: 261-266. Of 216 *Colinus virginianus* shot between September and April, 1961-65, 216 were juveniles and 45 were adults. Comparisons of autumn (Sept.-Dec.) with winter (Jan.-Apr.) age ratios indicate that "adults survived approximately four times as well as juveniles in winter." The major shift in age ratio appeared to be correlated with the onset of severe weather. Females comprised 53.3 per cent of the sample; no sex-differential mortality could be detected.—Robert S. Hoffmann.

**24. A Method for Estimating Fall Adult Sex Ratios from Production and Survival Data.** 1965. Howard M. Wight, Robert G. Heath, and Aelred D. Geis. *J. Wildl. Mgt.*, **29**: 185-192. *Basic sex ratio* is defined as the average sex ratio about which fall adult sex ratios tend to fluctuate because of annual changes in production and survival. Production and survival rates are defined over a year-period, from the beginning of one hunting period to the beginning of the next; a sex ratio of 1:1 is assumed for immatures at the beginning of this period. Another assumption is that sub-adult survival rates are not sex-differential. The basic fall adult sex ratio is then calculated as an asymptotic value which is the limit of an infinite series, given specified average adult male and female, and sub-adult survival rates, and an average rate of production per adult female. Graphs are provided which permit the estimation of basic sex ratios, where survival and production rates for the population are known. Other applications of the formulae from which the asymptotic values are derived are discussed.—Robert S. Hoffmann.

## NIDIFICATION AND REPRODUCTION

(See also 17, 19, 37, 39, 43, 44, 49)

**25. Nest Transfer in the Three-banded Sandplover *Charadrius tricoloris* Vieillot.** G. L. Maclean. 1965. *Ostrich*, **36**(2): 62-63. Nest transfer has been previously reported for some members of the Caprimulgidae, but is a rare phenomenon otherwise in ground-nesters. In this instance, an adult plover was

observed to remove a broken egg from its nest. Two days later the one remaining good egg was discovered in a new nest about one foot from the original site.—David W. Johnston.

**26. Observations on the Breeding Biology of the Razorbill.** W. J. Plumb. 1965. *British Birds*, **58**(11): 449-456. A study of *Alca torda* on the island of Skokholm, Pembrokeshire in the summer of 1964. Preferred nest sites are under boulders or at the entrance of old rabbit or Puffin (*Fratercula arctica*) burrows. Incubation of the one egg averaged 36 days. Thirteen pairs lost their eggs; five of the females laid a replacement egg. Hatching success of 86 eggs was 69%; 46 chicks fledged—53% of the eggs laid. The fledging period averaged 18 1/2 days. Twelve pairs of Razorbills, away from the chief study area, were given an extra chick; the host and guest chicks at first pecked each other severely, but the parents accepted the stranger. Only two, or possibly three, of the 12 pairs reared both chicks to fledging and these young were below normal weight.—Margaret M. Nice.

**27. One Hundred Thirty-three Michigan Sandhill Crane Nests.** Lawrence H. Walkinshaw. 1965. *Jack-Pine Warbler*, **43**(3): 136-143. A summary of the nests of *Grus canadensis tabida* found by the author since 1931. There were 4 sets of 1 egg, 121 sets of 2 eggs, and 1 of 3. Eggs were laid 2 to 3 days apart and usually hatched a day apart. The elder chick sometimes was aggressive to the younger, but the parents usually walk a few dozen meters from each other, each followed by one young. Two eggs were flooded, 18 deserted, 20 destroyed by predators (usually raccoons), whereas 21 proved infertile. "Young hatched in 79 (73.8%) of 107 nests and fledged from 77 (71.9%) nests. Of 201 eggs laid, 137 (68.1%) hatched, and 127 (70.55%) young fledged." Details are given of nest location, measurements of eggs and chicks, and dates of nesting. A remarkable record of tireless zeal.—Margaret M. Nice.

**28. Why the Decrease in Young Cranes?** Lawrence H. Walkinshaw. 1965. *Jack-Pine Warbler*, **43**(3): 148. From 1952 to 1958 and again in 1963 and 1964 the author counted the size of southern Michigan Sandhill Crane families in August and September. During the first period an average of 45 pairs had raised an average of 0.838 young per year. During the later period, however, an average of 44 pairs had raised an average of only 0.425 young per year.

"Is the continued and often unnecessary use of poisons and weed-killers responsible for this decrease? Only time will answer these questions. In the meantime, though, our crane flock could diminish or be lost."—Margaret M. Nice.

**29. On the Biology of the Pygmy Owl** (Zur Biologie des Sperlingskauzes (*Glaucidium passerinum* (L.)). Hans-Heiner Bergmann and Maria Ganso. 1965. *J. F. Ornith.*, **106**(3): 255-284. In German with English summary. Opportunity was afforded the authors to observe a pair of these diurnal owls raising their young in a spruce forest in Austria. The paper treats especially breeding activities and behavior of the parents, fledging of the young, call-notes, and food. The list of prey taken includes about 14 species of passerine birds and two species of microtine rodents. American investigators, interested in the breeding biology of owls, will find this paper to contain valuable information.—David W. Johnston.

**30. Territorial and Breeding Habits of Red-bellied Woodpeckers.** David W. Stickel. 1965. *Amer. Midl. Nat.*, **74**: 110-118. This is a very sketchy presentation of an obviously painstaking study, one that nevertheless contains valuable contributions to the nesting biology of the Red-bellied Woodpecker (*Centurus carolinus*). A brief discussion on territoriality places the territory among those of Nice's B type. Except at "the height of the reproductive period" (which is not otherwise defined) territorial defense (or aggression?) is not very intense. An informative table on the excavation activities shows the roles of two females as compared to the evenly regular performances of their two mates. One worked very little except at the end. The other one was by comparison quite a worker although not on par with her mate.

The incubation period for this woodpecker was definitely established at 11.5 days, and its brevity is apparently related to the high percent of attentiveness (between 85 and 98 percent). The nestling period lasted from 24 to 26 days. The females took a slightly greater share of the nest duties during incubation and nest-



life than did their mates. Nest predation by the Black Rat Snake (*Elaphe o. obsoleta*) was common.—Louise d. K. Lawrence.

**31. The Ecology of the Dancing Wheatear in Turkmeniya.** (Ekologiya Kamenki-Plyacuni v Turkmenii). G. S. Belskaya. 1965. *Izvestiya Akad. Nauk Turkmenskoi SSR, Seriya Biol.*, No. 2: 64-73. A study under the direction of G. P. Dementiev. Whereas in the American steppe and semidesert areas only one bird species (the Burrowing Owl, *Speotyto cunicularia*) regularly utilizes mammal burrows for nesting locations, at least 16 species of birds, including two species of ducks, do so in corresponding arid areas of the Asian southwest. On that account this article was selected for review. The Dancing Wheatear (*Oenanthe isabellina* Temm.) is a breeding, migrant, and regularly wintering species in Turkmeniya. The wintering population is chiefly of males. The spring arrival of the remainder of the population occurs Feb. 19-22; start of nesting, Feb. 20-30; and fall departure, Oct. 23-26. Courtship behavior (hence the common name) is described in detail. The ratio of males to females in the breeding season is 1.01-1.0. Of the nesting population 93.7% nests in inhabited (43.3%) and non-inhabited (56.7%) colonies of the Big Gerbil (*Rhombomys opimus*), 3.1% in colonies of the Red-tailed Gerbil (*Meriones libyeus*), and 3.1% in old nests of burrowing birds (chiefly *Merops* sp.). The index of abundance in Turkmeniya is 6.1 per 10km. of travel, and 3.1% of the total local bird population. The nests are of two types: (1) in dead end burrows (at the edges of rodent colonies and nests excavated by birds) and (2) nests in burrow passages connected with the remainder of the rodent colony. Two clutches are laid each year: early March to April, and late April to early June. The first nesting engages only 1/3 of the population and consists of birds from the second nesting of the preceding year. A clutch contains 4-6 eggs; incubation commences with deposition of the fourth egg and lasts 12 days. Growth of young requires 13-14 days, and they separate from the parents at 14-15 days age. A graph shows correlation of weight to development of gonads and molts. The food of adults consists mainly of beetles (52.3%, percentage of occurrence), and ants (56.0%); food of young, caterpillars (42.4%), and beetles (36.7%). While nesting the adults are active from daybreak to darkness, and on through midnight on moonlit nights. Visits to the young with food averaged 21.3 per hour. The first complete plumage is acquired by the young of the first brood in late May to June; by young of the second brood, mid-July to August. The adults have two molts annually, a partial one February to mid-April, and a complete one late May to November.—Leon Kelso.

**32. Some Associations of Behavior to Reproductive Development in Canada Geese.** Jack S. Wood. 1965. *J. Wildl. Mgt.*, **29**: 237-244. Wood previously reported (*J. Wildl. Mgt.*, **28**: 197-208, 1964.) that *Branta canadensis* are all immature in the first year; 2 year males, but usually not females, appear mature, and reproduce infrequently. "All of the Canada geese examined (both male and female) which were 3 years old or older were physically mature." (italics mine) The author's terminology is confusing, but he is apparently referring above to one-year-old, two-year-old, and three-year-old birds. Portions of, but not the complete pre-copulatory display, were observed in immature, and unpaired mature geese. Immature geese also formed pairs, and went through the first two stages of territorial defense, as did non-nesting mature pairs. The third stage, defense of a fixed area against not only other geese, but also man or dog, was observed only in pairs subsequently nesting. The occurrence of behavior normally associated with maturity in immature geese suggest that this behavior is partly in response to neural stimulation. Results of treatment with pituitary extracts were inconclusive, but display and pair-formation in "2 year" geese might have been increased.—Robert S. Hoffmann.

**33. RENESTING IN BLUE GROUSE.** Fred C. Zwickel and Art N. Lance. 1965. *J. Wildl. Mgt.*, **29**: 402-404. On the basis of observations on two individually marked hens, the authors conclude that "(1) at least some blue grouse are capable of reneesting. (2) For blue grouse, successful reneesting can occur even when a first clutch is destroyed in the late stages of incubation or, possible, shortly after hatching. (3) A second clutch can be started within approximately 14 days after a first nest is destroyed."—Robert S. Hoffmann.

## LIFE HISTORY

**34. Studies of Less Familiar Birds: 136 -- Red-breasted Flycatcher.** Hubert Weber. 1965. *British Birds*, 58(10): 434-438. *Muscicapa parva* breeds from central Europe through Siberia and winters in India and southeast Asia. In the Serrahn Nature Reserve, Mecklenburg, East Germany, the male of this species sings during pair formation and while his mate is building the nest in a hole and laying the eggs, but stops when she begins to incubate. During this period he feeds her on the average twice an hour. Both parents feed the young. A brood left the nest when 14 days old. "In twos and threes, pressed against each other, they wait to be fed by the adults." One fledgling was able to fly well at the age of 16 days.—Margaret M. Nice.

**35. The Wattled Crane *Bugeranus carunculatus* (Gmelin).** Lawrence H. Walkinshaw. 1965. *Ostrich*, 36(2): 73-81. Here is another contribution by Dr. Walkinshaw on his favorite subject, the cranes. The paper amounts to a brief account of this species' distribution, description and measurements, nesting habits and times, attentiveness, general behavior, and courtship dance.—David W. Johnston.

## BEHAVIOR

(See also 17, 32, 61)

**36. Notes on the Behavior of the Red-breasted Merganser in Spring.** (Iakttagelser över småskrakens (*Mergus serrator*) beteende under våren.) Leif Nilsson. 1965. *Vår Fågelvärld*, 24: 244-256. (English summary.) The life of this duck is to a great extent dominated by the assembly (communal) places where the birds gather to court, preen, bathe, and sometimes sleep. Courtship is performed in groups of varying sizes. The average composition of 44 groups was 3.9 males and 1.9 females. Five main posturings and rituals of the males are described and comparisons made with those observed in other Anatidae, and one of the females (invitation to coitus). Precopulatory behavior and copulation are also described.—Louise de K. Lawrence.

**37. The Behaviour of the Gannet.** J. B. Nelson. 1965. *British Birds*, 58(7): 233-288; (8): 313-336. Some 250 pairs of *Sula bassana* (*Morus bassanus*) on Bass Rock in the Firth of Forth, Scotland, were studied from 1960 to 1963 by Mr. and Mrs. Nelson; during the last three years both of them lived continuously on the Rock from February to October or November. One hundred and seventy-one adults were ringed with colored and aluminum bands. Gannets usually start to breed at the age of five years. "Gannets breeding for the first time tend to return not only to the natal colony, but to the local part of this from which they fledged." Incubation lasts 44 days; the males' spells averaged 35.6 hours, the females', 30.2 hours. Breeding success was high; 73% of eggs during three years resulted in fledged young.

Gannets are highly gregarious when fishing, gathering nesting material and resting on the sea, but are not aggressive in these circumstances. On the nest site, however, severe fighting is common, particularly with the males. "In relation to pair formation and the pair bond, females show appeasing behaviour, 'facing away', and the pair perform a meeting ceremony, 'mutual fencing'." On the nesting site males exhibit violent aggression towards rivals; they may also show aggression to their mates throughout the long nesting season. The conspicuous "sky-pointing" display occurs mostly before movement away from the nest.

The author found "an effect of density in advancing the onset and increasing the synchronisation of laying, but not on breeding success *per se*." He believes that Gannets were originally cliff nesters; now they also use flat surfaces for nesting. "The dense colonial nesting and strong aggression require clear-cut signal behaviour to ensure adequate communication between members of the community. Correspondingly, Gannet displays are numerous, strongly differentiated and conspicuous. Throughout them all, the determinative influence of aggression can be traced."

There are 15 illuminating photographs, 9 charts and 8 figures that are line drawings of displays of from one to many Gannets. This is a notable study, remarkable for its thoroughness.—Margaret M. Nice.

## ECOLOGY

(See 16, 31, 44)

## PARASITES AND DISEASES

(See also 22, 42)

**38. Helminth Parasites and Possible Causes of Death of Some Birds.** W. Threlfall. 1965. *Ibis*, **107**(4): 545-548. Herein are several tables of birds examined, numbers infected with parasites, possible causes of death, and specific helminth parasites recovered from the birds. Out of 83 birds representing 27 species, 66 (80%) were infected by helminths, but only four deaths were definitely attributed to parasitic infections. The latter figure, however, is somewhat misleading because several of the birds examined were either shot or killed by cars or found dead at lighthouses.—David W. Johnston.

**39. Peculiarities of Nest Parasitism in the Glukha Cuckoo (*Cuculus saturatus*).** (Ob osobennostyakh gnezdovogo parazitizma glukhoi kukushki). S. P. Chumikhin. 1964. *Zoologicheskii Zhurnal*, **43**(8): 1249-1250. (In Russian). The parasitism by *Cuculus saturatus* on Chiffchaff (*Phylloscopus collybita*) nests is an extreme case of this type of adaptation. The ratio of egg weight to that of the adult bird for *C. saturatus* (1.78-2.13%) is the lowest for this family of birds, and the female weight is correspondingly reduced in comparison to that of the male (69.0%). The young of *C. saturatus* have developed a special color adaptation consisting of a black border in the lining of the mouth which reduces the apparent size of the open mouth (in the eye of the foster parent supposedly) to that of the host young when begging food. The black border of the oral lining merges with that of the head in the juvenal plumage. The existence of the black border is limited to the apparent time of need for it; it appears when the juvenal cuckoo begins to exceed the young of the host in size, and disappears 2-3 weeks after departure from the nest.—Leon Kelso.

**40. The History of Our Knowledge of Avian Brood Parasitism.** Herbert Friedmann. 1964. *Centaurus*, **10**: 282-304. The earliest reference to an avian brood parasite occurred about 2000 B. C. in the ancient Vedas of India; it concerned the Koel (*Eudynamis scolopacea*), a large black cuckoo. The next oldest known parasite is the European Cuckoo, (*Cuculus canorus*) mentioned by Aristotle in the 4th century B. C. In the 17th century A. D. a Moghul Emperor of India wrote of the parasitic habit of the Pied Crested Cuckoo (*Clamator jacobinus*). In the 19th and 20th centuries many cuckoos in Africa, Asia, and Australia were found to be parasitic.

As to the Cowbirds, Alexander Wilson first reported the parasitic behavior of our Brown-headed Cowbird (*Molothrus ater*) in 1810. The Shiny Cowbird (*M. bonariensis*) in South America was first recorded as parasitic in 1802 by de Azara. As to the honey-guides, the first evidence of the parasitic nature of *Indicator indicator* was published in 1849. The first proof of this habit in a Weaverbird came in 1907. The last group in which brood parasitism was discovered was the ducks. The Black-headed Duck (*Heteronetta atricapilla*) was found by Daguerre in 1920 in Argentina to be wholly parasitic.

A very interesting, scholarly paper.—Margaret M. Nice.

**41. Lead Poisoning of Waterfowl in Wisconsin.** Daniel O. Trainer and Richard A. Hunt. 1965. *J. Wildl. Mgt.*, **29**: 95-103. Relatively few reported cases of mortality exist for Canada Geese and Whistling Swans due to lead poisoning. Cases in Wisconsin dating from 1940 have been analyzed, and since 1956, confirmed by laboratory analysis. The number of Canada Geese succumbing to

plumbism during this period is estimated to be nearly 1,800, with two-thirds of the outbreaks during spring months, although four major fall die-offs resulted in approximately equivalent seasonal mortality. Geographic distribution of mortality, number of pellets/bird, and pathology are discussed. Mortality of 231 Whistling Swans occurred during the spring, and was scattered throughout the state. All major duck lead poisoning outbreaks coincided with goose die-offs, but it is not an important duck mortality factor (215 deaths estimated), the majority mallards.—Robert S. Hoffmann.

## WILDLIFE MANAGEMENT

(See also 20, 22, 23, 61)

**42. Effects of Heptachlor - contaminated Earthworms on Woodcocks.** William H. Stickel, Don W. Hayne, and Lucille F. Stickel. 1965. *J. Wildl. Mgt.*, **29**: 132-146. Thirty-five *Philohela minor* were captured on wintering grounds in Louisiana, and divided into three groups. Twelve were fed earthworms contaminated with an average of 2.86 ppm of heptachlor epoxide (worms from areas in Louisiana treated with two lbs of heptachlor / acre often contain 3ppm). Twelve received earthworms with 0.65 ppm of toxicant; and 11 birds ate untreated worms. In the first group, 10 Woodcock had died by the 53rd day, and contained residues ranging from 43 to more than 300  $\mu\text{g}$ . The second group all survived, except for one that probably died of aerosaculitis. Residues at the end of 60 days amounted to 17 and 54  $\mu\text{g}$  in two samples. The control group all survived, and had "very small amounts" of heptachlor epoxide in their tissues. Nine survivors of the low-dosage group and nine controls were then starved, receiving a one-fourth normal ration of untreated worms for 11 days. Five of those previously receiving a low dosage died, compared to two of the control group. The remaining 11 starved Woodcock were then given unrestricted access to worms, some treated and some untreated, for five days. All birds survived and gained weight rapidly, but those fed treated worms also accumulated unusually large quantities of residue, 140-430  $\mu\text{g}$ , although they exhibited no toxic symptoms. Residue loss rate was estimated to be about 2.8 per cent per day; toxicant absorption was about 16-20 per cent. Residues in field-caught birds averaged 67.9  $\mu\text{g}$ , similar to the overall average for Woodcock on low dosage and low dosage followed by untreated worms, suggesting a similar average contamination of the food supply. Weight changes and food consumption during the different experiments are discussed, as are symptoms of heptachlor poisoning. The authors conclude that the plan to treat the range of the fire ant with 2 lbs. / acre of heptachlor "was a serious threat to the continental woodcock population." Fortunately, the original treatment program has been discontinued, but heptachlor residues persist for long periods in soil in dangerous concentrations. Most fire ant control now is done with two one-fourth lb. / acre applications of heptachlor, or else with mirex, which has "not been found to do any wildlife damage; it is to be hoped that such specialized methods will completely displace residual broad-spectrum poisons, particularly for use over large areas."—Robert S. Hoffmann.

**43. Blue-winged Teal Nesting Success as Related to Land Use.** Harold H. Burgess, Harold H. Prince, and David L. Trauger. 1965. *J. Wildl. Mgt.*, **29**: 89-95. For four years, 1958-1961, breeding pair counts indicated increase of total breeding pairs of ducks on the Union Slough National Wildlife Refuge in Iowa, perhaps as a result of drought conditions elsewhere. Blue-winged Teal comprised from 41 to 69 per cent of the total population; nest-search was employed to study nest location and success. Of 111 *Anas discors* nests found, densities of 8-10 acres / nest occurred in hayfields (haying was restricted to July 1 to August 20), grazed grasslands, and public areas (recreation area, road rights-of-way), whereas ungrazed grasslands held lower densities (17 acres / nest) and small-grain fields had only four nests. Moreover, native grass cover was only lightly utilized in grasslands, introduced bluegrass being preferred. Associated with these nesting cover preferences, overall nest success was 46-47 per cent in preferred cover, but only 14 per cent in ungrazed grassland. Moderate grazing thus improves habitat for Bluewinged Teal; however, "limited observations of the other upland-nesting duck species seemed to indicate less tolerance to grazing."—Robert S. Hoffmann.

**44. Ecology of Duck Populations in the Island Group of Valassaret, Gulf of Bothnia.** Olavi Hilden. 1964. *Ann. Zool. Fenn.*, 1(3): 153-279. This extensive work was carried out on the western Baltic coast of Finland. The archipelago consisted of seven larger (up to 4 km<sup>2</sup>) partly-wooded islands and 60 small islets, often more or less barren. Vegetation, topography and water conditions of the islands are described, as are the census methods—repeated counts of pairs and territorial drakes, and nest counts. The influence of local variations in sex ratio and flocking of drakes on census counts is discussed.

The author's findings, based upon observations from 1949-1963, are presented under four main headings, the first of which is local distribution and habitat selection. Mallard, teal, garganey, widgeon, pintail, and shoveler are mainly found on the large islands, whereas the velvet scoter and red-breasted merganser nest about equally on the central islands and the islets, as does the tufted duck. The eider and goosander and to a lesser degree the scaup are more restricted to the islets or the exposed parts of the large islands. For each species, the number of nesting pairs, nest sites, habitat requirements, and social attraction to larids are discussed. Hilden found that the *Aythya* species exhibited the strongest attraction to larids, showing direct correlation between their breeding density and density of larid colonies. In *Melanitta* and *Mergus serrator* as in the *Anas* species for which data were sufficient, the attraction is less, but still significant. The goosander and eider showed no dependence on larids. In all species nests in larid colonies were more exposed than nests outside the colonies, and there was also a distinct tendency for nests on the large, wooded islands to be more concealed than on the barren islets, perhaps in response to increased danger from corvid predation. Overall, the breeding habitat selected by ducks on Valassaret corresponds closely to their habitat elsewhere with the exception of *Mergus merganser*. This species, normally a bird of the inland forests, nests here on the ground beneath boulders or in buildings, and consequently selects open boulder islets.

The next section attempts a detailed analysis of factors affecting the regional distribution of ducks. Climate and weather, including time of ice break-up, food supply, display, feeding and loafing places, and nest sites are ultimate factors considered. Proximate factors include type of landscape, characteristics of the nesting place (presence of pools or shore vegetation and steepness of shores), and the presence of larids. Finally, the significance of learning in control of distribution is discussed.

Clutch size and nesting success is based upon observations of a very large number of nests in many cases (*A. fuligula* — 550; *A. marila* — 360; *Somateria* — 193; *Melanitta* — 187; *M. serrator* — 144; the remaining species, 11-43). Mean clutch size was about 8-9.5, except in the eider (4.6). However, late nests and re-nests had smaller clutches than earlier nests. Significant annual differences in clutch size were also established. Dump nests, eggs lost during incubation, and unhatched eggs are analyzed, and there is a summary discussion on the evolution of clutch size, with the author giving qualified support to Lack's hypothesis as concerns duck clutches. Nest mortality is considered species by species, and compared with other studies. Total egg losses are "surprisingly similar," 23-26%, except *Melanitta*, with 15.7%. This relatively low rate of egg mortality is in sharp contrast to loss rates of 40-60% or even higher found in inland localities, and is attributed to the scarcity of predatory mammals on the archipelago. On the other hand, brood losses are very high, as is detailed in the last section on brood ecology. The goosander leads its broods away from Valassaret, to the inner archipelago, but the other archipelago species which remain (*Aythya*, *Somateria*, *Melanitta*, *M. serrator*) failed to produce fledged young in from 76 to 100% of the eggs laid. The only exception was the eider, with a loss of 46% in 1958. Oddly enough, the dabbling ducks are a little more successful, with losses of 50-75% the rule. "... the broods of all the ducks that breed both in inland waters and in the archipelago survive considerably better in the former environment; this appears both from the larger average number of young per brood and from the smaller number of unsuccessful hens;" and also from greater stability of productivity. Hilden concludes that the principal cause of juvenile mortality was exposure and food shortage brought on by stormy weather, except in 1960, when an unidentified disease might have been important.

This is but a brief outline of this excellent paper. Not only are the data abundant, well-analyzed and clearly discussed, but also American workers seeking an entrée to the rich Scandinavian literature on this subject will find the references of great value.—Robert S. Hoffmann.

## CONSERVATION

(See also 20, 21, 28, 55)

**45. A New Bird Pest?** Jon Tinker. 1965. *New Scientist*, 28 (471): 282-283. The rapid spread of the Collared Dove (*Streptopelia decaocto*) across Europe, covering some 1500 miles in 30 years, is rather well known. In the British Isles, the species was first recorded as a breeder in 1955, and since that time, its numbers have sky-rocketed to the point where in Britain alone an estimate in 1964 indicated the presence of some 19,000 birds. By the end of 1970, the species will probably occupy the whole of Ireland and Scotland as well. The author, among others, is interested not only in the spread of Collared Doves and their explosive increase in numbers but also possible threats to other avian species (wood pigeon and feral dove). He is pessimistic, but likely realistic as well, in pointing out "that control measures, even if they were now contemplated, might be too late."—David W. Johnston.

## MORPHOLOGY AND ANATOMY

**46. Weights and Measurements of Migrant Passerines September 1962.** Report No. 28 from Falsterbo Bird Station. R. E. Scott. 1965. *Vår Fågelvärld*, 24: 156-171. (In English.) This study was carried out from 9 to 30 September 1962 and involved 825 birds of 32 species. Adults and juvenile Robins (*Erithacus rubecula*) show no difference in weights and measurements. In the Redstart (*Phoenicurus phoenicurus*) the wing-length of the females is shorter than that of the males. There is no difference in weight between the sexes of the Goldcrest (*Regulus regulus*) but the females have, nevertheless, shorter wings and tails than the males. The relationship between wing-length and weight (i.e., the weight increases with increased wing-length) is indicated in the Falsterbo material although the difference is not statistically significant.

Birds taken at Falsterbo, originating from the north, generally have longer wing-lengths and are lighter than birds taken at Dungeness in southern England. This is apparent especially in the Redstart, the Wrens (*Troglodytes troglodytes*), and the warblers.—Louise de K. Lawrence.

**47. Weight Change in Frozen Specimens.** Richard C. Banks. 1965. *J. Mammalogy*, 46(1): 110. Although this note pertains to small mammals specifically, it has possible application to birds as well. Specimens were weighed, sealed in airtight plastic bags, and placed in an electric freezer. After having been kept frozen for three months, 13 specimens had an average loss of 0.08g (0.35%) between original and frozen weights. The results suggest that "the change in weight caused by freezing is negligible, at least if specimens are sealed in airtight plastic bags before freezing and are prepared within a reasonably short time."—David W. Johnston.

**48. Electron Microscopy of the Organ of Corti in Birds.** (Elektromikroskopicheskie issledovaniya kortieva organa ptits). Vinnikov, I. V. Osipova, L. K. Titova and V. I. Govardovsky. 1965. *Zhurnal Obshchei Biologii*, 26(2): 138-150. Anything definite on the nature of the Organ of Corti in birds is hard to find in literature; therefore this article, reviewing a literature of 50 titles on that element which is all-important in birds' acoustic reception, and providing new information via the most advanced techniques, is of especial value. That organ as represented in the domestic fowl and common pigeon was subjected to extreme magnification. The Organ of Corti in birds bears hair-cell receptors, covered by a tectorial membrane, surrounded by supporting cells with nerve-endings. As shown by electron micrographs, each of these receptor cells bears a tuft of 40-50 stereocilia, attached to the inner surface of the tectorial membrane, and a single antennal kinocilium containing nine peripheric and two central fibrils. The nerve-endings, forming synapses at the bases of the hair cells, are of two types: light endings with large mitochondria, and dark endings containing many synaptic vesicles. The supporting cells are attached basally to a basilar membrane. They form hollows or receptacles enclosing the receptor cells; their "phalanx-shaped" apices bearing numerous microcilia which define their borders.

The evolution of the Organs of Corti took different routes in birds and mammals but led to the same result, the construction from the same phylogenetic source, the labyrinth, of a highly specialized apparatus for sound reception. The hair cells, as in other sense organs of vertebrates, are provided with flexible antennae, the kinocilia. These antennae receive the transformed energy of sonic vibrations from the middle and inner ears. By analogy to the Corti organ of mammals it is concluded that sound reception is based ultimately on a cytochemical process.—Leon Kelso.

**49. Indicators of Sex, Age, and Breeding Phenology in Blue Grouse.** David A. Boag. 1965. *J. Wildl. Mgt.*, **29**: 103-108. This paper reviews the use of plumage and body weight in sex and age determination for three populations of *Dendragapus obscurus*: Vancouver Island (*fuliginosus*), north-central Washington (*pallidus*), and southwestern Alberta (*richardsoni*). Blue grouse over six weeks old can be sexed by the color of the postjuvinal cervical feathers. Juvenile birds are smaller, with lighter, more mottled plumage. Sub-adults (yearlings) possess, in their second summer, pointed outer primaries and shorter, narrower rectrices than do adults. Length and width of rectrices are graphed for each population. Weight variation is considerable both seasonally and geographically, and is not a means of separating sub-adults from adults. In Alberta, adult males and non-breeding sub-adults molt primaries about four weeks ahead of breeding females, in contrast to other populations where molt may be synchronous in the entire population. Molt chronology is correlated with time of hatching; in Alberta, females commence molt a week after hatching, whereas on Vancouver Island females must commence molt while still incubating. Onset of molt in adults and sub-adults can be used to estimate breeding phenology, as can molt sequence in juveniles.—Robert S. Hoffmann.

## PLUMAGES AND MOLTS

(See 49)

## ZOOGEOGRAPHY

(See also 7, 58, 60, 66, 67)

**50. Black-winged Pratincole Observed in Sweden for the First Time.** (Svartvingad vadaresvala (*Glareola nordmanni*) för första gången iakttagen i Sverige.) Roger Gyllin and David Lundegård. 1965. *Vår Fågelvärld*, **24**: 235-239. (English summary.) This bird which breeds in Asia and in Europe in southwestern Russia and on the Danube delta in Roumania appeared near Lake Hjälmarén in central Sweden. It remained in the locality three days 4-6 August 1964.—Louise de K. Lawrence.

**51. Wilson's Phalarope (*Steganopus tricolor*) Found in Lapland.** (Wilson's Svømmesneppe (*Phalaropus tricolor*) truffet i Lapland.) Chr. Ebbe Mortensen. 1965. *Vår Fågelvärld*, **24**: 240-243. (English summary.) The bird was observed for about 10 minutes at a distance of 10 to 15 meters by two ornithologists near Ammanäs, Lycksele, on 24 July 1963. Five photographs were taken. There are 11 previous records of the species in Europe, but this is the first one from outside Great Britain.—Louise de K. Lawrence.

**52. Siberian Nuthatches in Norrbotten 1962-1963.** (Sibiriska nötvächor (*Sitta europea asiatica*) i Norrbotten 1962-1963.) Jens Wahlstedt. 1965. *Vår Fågelvärld*, **24**: 172-182. (English summary.) In the winter of 1962-1963 and into 1963-1964 a notable invasion occurred of Siberian Nuthatches in Finland. This irruption spilled over into Sweden's northernmost province and spread up the river valleys and along the coast of the Gulf of Bothnia. This article deals with the identification of the bird as belonging to the race *asiatica* which is domiciled in a broad area stretching along southern Siberia from, and including, China to the Urals. So far as known no breeding took place.—Louise de K. Lawrence.

**53. A Preliminary Check-list of the Birds of Powdermill Nature Reserve.** Robert C. Leberman. 1965. *Research Report No. 14, Powdermill Nature Reserve, Carnegie Museum, Pittsburgh, Pa.* 6 pp. From 1956 until 1965, 193 species have been recorded on the Reserve (1500 acres), and 139 species have been banded. The check-list is arranged in the form of tables in which the relative abundance in each season for each species is presented.—David W. Johnston.

## SYSTEMATICS

(See 60)

## FOOD

(See also 17, 20, 29, 42)

**54. The Selectivity of Avian Feeding and Some Reasons for its Variation.** (Elektivnost pitaniya ptits i nekotorye prichiny ee izmenchivosti.) A. A. Inozemtsev. 1963. *Ornitologiya*, 6: 424-450. (In Russian.) The publication of W. L. McAtee on the "Effectiveness in Nature of the So-called Protective Adaptations in the Animal Kingdom" (*Smithsonian Misc. Coll.*, 85(7): 1-201, 1932), disturbing the trust placed previously by evolutionists in mimicry and color adaptations especially, did not go unnoticed or unchallenged in the slavic countries any more than in the English-speaking world. It would seem to be having a beneficial effect, if only in the discussions and studies of the food habits of insectivorous birds that have been made to challenge it. Whereas it has been denied as disproof of natural selection, the availability principle the McAtee study advanced has been credited to the extent that analyses of mass collections of raptor pellets have been used as the bases of censuses of invertebrate populations in given areas by the eminent ecologist A. N. Formozov and collaborators. Even mathematical coefficients of availability had been worked out, (Ivlev, V. S. 1955. *Experimental ecology in the feeding of fishes.* Moscow). The article here reviewed is the latest of several studies by its author on the foods and feeding of insectivorous birds, with the aim being to find whether there is selectivity or choice in bird feeding or whether they take for their young and themselves food items in proportion to occurrence in the environment. In favor of the latter is the capacity of birds to change over to different foods when there are fluctuations in abundance of food items in the habitat. However, according to this author, basic differences in the food rations of birds feeding in similar conditions hold against the availability theory, and while cases of narrowly specialized feeding (stenophagy) are comparatively rare, yet choice of food is a definite characteristic of many species, and it would seem to be of importance in the economic aspect of food habits.

As the example for this study the Pied Flycatcher (*Muscicapa hypoleuca*) was chosen because of its abundance and availability in a wide variety of habitats in the Moscow region. In all eight biotopes of this area the food brought to the young at age of 4-14 days was recovered by ringing the necks and forced disgorging of the food items for periods of 3-5 hours per day, thus obtaining about 10,000 invertebrate items. At the same time the invertebrate fauna of each of the eight biotopes was censused by a described method. In the deciduous forest biotopes more and better food was available, with consequent larger broods and higher survival of young than in the coniferous forest biotopes. For defining selectivity

the index used by Ivlev in ichthyology was used: 
$$E = \frac{r - p}{r + p}$$
 where r is the percentage of occurrence of an item in the food ration, and p is the percentage of occurrence of the item in the environment.

This study favors selectivity over availability, but admits that the latter is an important underlying factor. However the McAtee study was concerned with the predation of birds in general, not just individual species.

The specific composition of invertebrates brought to young Pied Flycatchers in different biotopes is varied; in oakeries and microphyll forests they receive twice as much easily digestible material (e. g., larvae of Hymenopters and Lepi-



doptera) as in the coniferous forest. Beetles, having a thicker cuticular cover, and other less suitable invertebrates are predominant in the coniferous forest. Because the intensity of feeding in the coniferous and deciduous forests is about even, the young in the oakeries and microphyll forests receive more nutritious food. This difference in nutritive value is a factor causing varied mortality in different biotopes.

Comparison of ratio of certain species and groups occurring in the food and in the biotopes, where entomological censuses were taken, confirms a pronounced selectivity as to larvae of butterflies, tenthrinids and snipe-flies (Rhagionidae) and shows that selectivity of a particular prey may vary within wide limits.

Thus, in microphyll forests and oakeries positive selectivity appears in only a few "preferred" foods, whereas in coniferous forest biotopes considerable selectivity is shown for less nutritious groups of invertebrates (Coleoptera, Diptera, and Hymenoptera). Such variation in selectivity is explained in that in deciduous forest biotopes (where the frequency of "preferred" prey is apparently so high that obtaining it presents no especial difficulty) the birds exist on a narrow choice of more suitable nutritious foods, almost never resorting to the less suitable ones. In the coniferous forest where searching for the larvae of Lepidoptera, Coccinellidae, and Rhagionidae and other "digestible" foods is hindered by their lower absolute and relative frequency, the birds must of necessity feed on second-choice and supplemental foods.

Thus, in feeding selectivity the Pied Flycatcher is influenced by the presence and accessibility of the "main foods", and also by the alternate and accessory foods in the environment. However, in a biotope the extreme increase of any species of invertebrate does not lead to its absolute predominance in the food of the young. Under all conditions birds tend to feed their young a fairly diversified diet characteristic of that particular species, although it may vary within wide limits, depending on environmental conditions. Consequently selectivity in bird feeding depends primarily on the neural reflex action of the given species of bird.

In deciduous forests the invertebrates more often selected by the Pied Flycatcher as food in the nesting period are predatory insects beneficial to the forest. Since these species are utilized in oakeries and microphyll forests, in their biotopes this bird is injurious, or at best, neutral to silviculture. Therefore hanging out nests for Paridae in deciduous forests is impractical if most of them are occupied by the Pied Flycatcher. In coniferous forests, and in predominantly mixed coniferous forests it selects many insect species noxious to the forest, wherefore it should be regarded as beneficial there and measures to attract it are economically justified.

The above facts related to the feeding of the young by the Pied Flycatcher are said to apply to other insectivorous birds, and it is recommended that they be considered when formulating biotechnic measures for control of the fauna.—Leon Kelso.

**55. Food and Economic Importance of the Starling, *Sturnus vulgaris* L.** Jiri Havlin and Cestmir Folk. 1965. *Zoologické Listy*, 14(3): 193-208. (In Czechoslovakian with a two-page summary in English.) In 1961 these two investigators published a notable study on the breeding of the Starling in Czechoslovakia (see *Bird-Banding*, 33(4): 207. 1962.) Now they report on an analysis of 344 stomach contents and 63 samples of food of the nestling "(method of close fitting collars)," carried out from 1955-1962. The six detailed tables are published in both Czech and English. "A lot of animals consumed by the starlings are harmful, and in this respect the starling is beneficial. But a solid basis for a critical evaluation is still missing." Great harm is done to cherries, but worse yet to the grape harvest, of which 10% may be taken by the birds. Scaring the birds merely sends them to the neighbors. Reproduction of the Starlings' warning cry proved a failure. The authors' conclusion: "We recommend to do away with artificial nesting boxes for starlings in their entire area."—Margaret M. Nice.

**56. Further Evidence of the Passive Dispersal of Small Aquatic Organisms via the Intestinal Tract of Birds.** Vernon W. Proctor and Charles R. Malone. 1965. *Ecology*, 46(5): 728-729. Oospores of *Chara* and eggs of certain crustaceans were fed to caged ducks, chickens, pigeons, and canaries. In most cases, viable disseminules were recovered from the feces of these birds. Thus,

dispersal of these micro-organisms is not only possible via these specific birds, but the results suggest the avian intestinal tract as a mechanism for dispersal of some aquatic organisms in wild birds.—David W. Johnston.

### SONG

**57. Effects of Deafening on Song Development in American Robins and Black-headed Grosbeaks.** Masakazu Konishi. 1965. *Z. Tierpsychol.* 22(5): 584-599. Representatives of these species were both hand-raised in isolation and deafened (for technique, see Schwartzkopff, *Z. vgl. Physiol.*, 31: 527-608, 1949). Robins raised in acoustic isolation and others deafened as young developed abnormal syllables in their songs; so did deafened grosbeaks, although the latter had some normal song patterns as well. The author concludes that in these species the development of a normal song pattern is dependent upon the bird's ability to hear its own sounds.—David W. Johnston.

### BOOKS AND MONOGRAPHS

**58. Birds of the Mayas.** Anne LaBastille Bowes. 1964. West-of-the-Wind Publications, Big Moose, New York. v + 50 + xxii pp.; 54 black-and-white drawings, one map and one picture in color on the cover, all by the author. \$2.95. On the title page of this paper-bound handbook three subtitles indicate its scope, "A Collection of Mayan Folk Tales," "A Guide to Finding and Knowing Birds of Mayaland," and "A Check List of Birds."

The 12 Mayan bird legends in the first part of the book are nature myths told to the author by Ramon Costillo Perez, a Mayan area native of Yucatecan ancestry. Mrs. Bowes has written the myths entertainingly so they sound like fairy tales, but her use of slang or near-slang terms such as "girl-friends" and "job" detracts from her otherwise artfully-told stories. I wish she had not called the Whip-poor-will "dumb." It is anything but. In fact it is vociferous. If Mrs. Bowes meant "stupid" she should have used that word or a synonym for it. Also a few bits of awkward sentence structure should have been edited out. The black-and-white drawings of birds and other creatures copied from stylized Mayan art are amusing and well chosen, except for the Quetzal which, to my perhaps uneducated eye, has been stylized out of existence. I would have preferred one of the lovely Quetzals from a Mayan polychrome bowl. A short archeological bibliography ends part one of the book.

Part two starts with a map and geographical description of the Mayan area which introduce a short bird-watcher's travel guide, complete with "Tips for Birders" and a list of ornithological supplementary reading. This is followed by short life-histories of 33 "Common Birds of Mayaland." The author has sketched each species as well as describing it.

Part three is a check-list of 660 species known to occur regularly or accidentally from the Yucatan peninsula, Tabasco, and Chiapas through Guatemala and British Honduras to western Honduras. The check-list gives the scientific name for each species and the common names in Spanish and English, the latter following Eisenmann. No extinct birds are included and no list of birds the Mayan artists reproduced before the conquest, but an English-Mayan glossary of common names for many birds follows the checklist. The value of this glossary is questionable as no pronunciation is given and the average touring bird-watcher may have difficulty pronouncing such puzzlers as Xpatux Ja, Quauhtli, Xexolotl, Xecuteib, X-ukueh, and Xtunkiyaj.

Mrs. Bowes' bibliography follows the glossary. Its 9 titles, 5 of which are repeated from the list of reading for tourists, seem scant for a place that has inspired so much ornithological writing.—Elizabeth S. Austin.

**59. A Survey of the Birds of Kauai, Hawaii.** Frank Richardson and John Bowles. 1964. Bernice P. Bishop Museum Bulletin 227. Honolulu, Hawaii, 51 pp. This report deals with a study of the approximately 64 species of birds found today on Kauai, the geologically and biotically oldest major island of the Hawaiian Chain. The results reveal which native birds survive in the mountain

forests, the marshes, and the seacoasts and the extent to which introduced foreign birds have increased. They also describe how these birds are distributed among the different habitats on the island and name factors influencing present bird distribution. This information is welcome because of the dearth of publications on birds of Kauai, there being in fact no adequate analysis of these birds in existence, as the authors point out.

The authors were faced with the obstacles of jumbled topography, dense vegetation, and extremely wet climate; yet it was essential to penetrate the most remote forests if the rare, unique birds were to be found. In two and one-half months of field work they succeeded in locating all four of the unique endemic species of perching birds, some of which had long been feared nearly or quite extinct; moreover, *all* of the native species of birds of all sorts were found, which is most remarkable in view of losses on the other islands.

Species accounts of the 39 native species of birds as well as of the established introduced species include observations on nesting cycles, foods, population numbers, and behavior. Because few of these birds have been studied in the modern sense, these records even if fragmentary are of distinct value.

Certainly a principal factor in the survival of the native forest birds has been the continued existence of large tracts of the complex native flora of Kauai. This forest enjoys permanent protection because of its need as a watershed; however, certain processes are threatening the native flora. One is the replacement of native plants by introduced ones in the wake of disturbance. Also there has been a search for kinds of trees that will grow more rapidly than the native species and yield forest products of more value; some of these are succeeding. Since the native Hawaiian birds are adjusted to the primeval habitat and their powers of rapid accommodation have proven generally rather poor (especially on the other islands), all such changes may adversely affect the native birds. The authors are gravely concerned over this prospect. They argue for the establishment of a major native forest sanctuary to be controlled as a wilderness. This calls for a reevaluation of the animal life in these forests with due recognition given to the worth of non-economic, non-game species. The authors recommend cessation of further introduction of non-native plants and birds and mammals, as the results of such introductions to the Hawaiian Islands in the past have been largely unpredictable.

This paper is embellished by a colored frontispiece with portraits of the four endemic forest passerine birds, by many excellent photographs of the habitats, and by an outline map of Kauai showing topographic and climatic features as well as localities mentioned in the text. This is a timely paper bringing a significant message.—Paul H. Baldwin.

**60. The Birds of the Palearctic Fauna. Non-Passeriformes.** Charles Vaurie. 1965. H. F. and G. Witherby Ltd., 61/62 Watling Street, London. xx + 763 pp. \$20.00. In this, the second and concluding volume of Vaurie's compendium on the Palearctic avifauna, the non-passerines are treated in the same thorough and painstaking fashion as were the passerines earlier. As the author states in his introduction, "the purpose of this book and of its predecessor is to furnish a list of the birds which breed in the Palearctic region, to arrange them in a systematic sequence, and to outline their distribution as accurately as I can." Incorporated into the book are the author's ideas and observations previously published in 20 numbers of "Systematic Notes on Palearctic Birds," appearing in *American Museum Novitates*. It also includes references to the pertinent literature through July 1963, as well as Dr. Vaurie's observations, measurements, and notes gleaned from hundreds of specimens in museums on both sides of the Atlantic. The first volume, appearing in 1959, contained a helpful gazetteer, but no gazetteer is found in the present volume.

The Systematic List embraces 734 pages. Generally, for each species the following information is presented—English, French, and German names, synonymy since 1938, geographic range, migratory status, preferred habitats, comments on geographic variation, and extralimital subspecies. The same information is found in most cases for subspecies as well, with additional terse but helpful statements on principal subspecific characteristics. All these data are summarized in clear and concise terms. Users of the book interested in morphological details should note Vaurie's method of numbering primaries beginning with the *outermost* one and wing measurements made by flattening the wing against a ruler. Most

readers will welcome, I believe, his continued subjective grading of subspecies as to whether or not they are "too weakly differentiated to be accorded nomenclatural recognition . . ."

Students of North American birds will find this volume valuable if for no other reason than the fact that 128 of the 559 species breed in both the Nearctic and Palearctic realms. Furthermore, many notable taxonomic changes from the *A. O. U. Check-list* (1957) are given. These include the following—flamingos are placed in the order Phoenicopteriformes; the families Tetraonidae, Scolopacidae, Phalaropodidae, Rynchopidae, and Tytonidae are not recognized; the Black-bellied Plover is placed in the genus *Pluvialis*, snipes in *Gallinago*, all phalaropes in *Phalaropus*, and Belted Kingfisher in *Ceryle*; all plovers, sandpipers, curlews, and phalaropes are placed in the family Charadriidae; sandpipers formerly placed in the genus *Erolia* are put into *Calidris*; and jaegers and skuas are placed in the family Laridae. Many of these amendments have been urged for years by some American ornithologists, whereas other changes suggested by Vaurie might not be especially welcome to taxonomists.

The volume is concluded by indices to English, French, German, and scientific names, as well as a handy bibliography. The latter is not intended to be a complete bibliography but rather "names of a few general works, check lists, and faunal papers" that were especially helpful in preparing the book. A more complete bibliography appeared in the 1959 volume on Passeriformes.—David W. Johnston.

**61. Handbook of Waterfowl Behavior.** Paul A. Johnsgard. 1965. Cornell University Press. Ithaca, N. Y. 378pp. \$10.00. A summary of the sexual behavior of the Anatidae, tribe by tribe, species by species, based upon wanderings "about the Americas, Europe and Australia," with 20 months spent at the Wildfowl Trust in Gloucestershire, England, "the largest collection of living waterfowl ever brought together at one place in the world." Citations to seven pages of references range from Heinroth (1911), to Hochbaum (1944), Delacour and Mayr (1945), Lorenz (1951-53), and McKinney (1953). Dr. Johnsgard has been able "to study 133 of the 142 extant species of Anatidae, and 40 of the 43 genera accepted" by him. Behavior is illustrated by 20 photographic plates and 96 pages of drawings from 7,000 feet of film. The studies were "undertaken to test and evaluate the various taxonomic arrangements of the family, to discover some of the trends of behavioral evolution, and to provide a basis for future workers to use in naming, describing and evaluating the behavioral patterns observed in waterfowl."

Geese, swans, whistling ducks, and magpie geese are slow to mature; both sexes tend to return to the place of hatching and to pair for life, whereas the true ducks (Anatinae) tend to mature quickly and to choose new mates each year, while the male follows his mate from the wintering grounds to her birthplace. These striking differences in life histories influence molt, plumages, family care, and displays.

Most of the book is devoted to the species accounts in which are mentioned plumages of downy young, juveniles, and adults; general behavior; and agonistic and sexual behavior. An amazing amount of information is presented, although gaps in our knowledge are pointed out.

The volume concludes with a ten page Summary, a Synopsis of the Family Anatidae, References, a General Index, and an Index of Scientific Names. This is indeed a fine example of modern, international cooperative ornithology, utilizing as it does subjects gathered from all over the world, journeys by airplane, grants for scientific study, and the motion picture camera.—Margaret M. Nice.

**62. Water, Prey, and Game Birds of North America.** Alexander Wetmore and other eminent ornithologists. 1965. National Geographic Society, Washington, D. C. 464 pp. \$11.95. Like its companion volume, *Song and Garden Birds of North America* (see review in *Bird-Banding*, 36(2): 132, 1965), the present book is another comprehensive survey of fascinating and attractive groups of North American birds. Brief but informative life histories of 329 species are found herein. Assisting Dr. Wetmore in writing these accounts were Drs. Aldrich, Humphrey, Miller, Pettingill, Rand, Sprunt, and Sutton but superb editing would lead the reader to believe that the book had a single author.

In *Water, Prey, and Game Birds*, will be found accounts of North American loons, grebes, albatrosses and their allies, peleciform birds, long-legged waders, swans, geese, ducks, vultures, hawks, owls, grouse, quail, shorebirds, cuckoos, goatsuckers, and swifts. For these groups an attempt is made to cover each species occurring north of Mexico, even though the species might be quite rare in this region. For example, rarities in the United States such as the Jacana, European Widgeon, and Thick-billed Parrot are included. Each account is well-written, interesting, and contains information on habits, habitats, nests, calls and songs, range, and distinguishing characteristics.

Hardly could one imagine a book of this kind being better illustrated. The 600 color photographs are for the most part impeccable, these being selected to show the bird in a natural setting and some identifying features. Those species for which color photographs might not have been readily available are, nonetheless, ably illustrated by the brush of Walter Weber, Allan Brooks, and Roger Tory Peterson.

A few miscellaneous chapters add interesting reading—"The world of Birds," "The battle against extinction," and "The mysteries of migration." Ornithologists with a physiological proclivity will enjoy the account of the hibernating Poor-will discovered and studied by Dr. Jaeger in 1946. Still other stimulating statements appear. As a caption to a beautiful photograph of California Condors, one finds the following: "Still grounded by the chill of the night, two condors preen and bask in the morning sun. They have lowered the ruffs that warm their barenecks; now they wait on their cliffside perch for the canyon air to rise so they can ride a thermal into the sky." My guess is that these thought-provoking remarks were conceived by the author of the section on Condors and Vultures, the late Alden H. Miller.

Finally, in a tuck-away pocket at the end of the book is a set of unbreakable records containing the sounds (mostly voices) of 97 selected species. The listener will thrill to the voices of the many ducks, penetrating cries of the hawks, and eerie nocturnal vocalizations of owls and goatsuckers. These recordings were selected from the Library of Natural Sounds at Cornell University and were edited by Drs. P. P. Kellogg and R. C. Stein.—David W. Johnston.

**63. Our Natural World.** Compiled and edited with comments by Hal Borland. 1965. Doubleday and Co., Garden City, N. Y. ix + 849 pp., 15 black-and-white drawings by Rachel S. Horne. \$9.95. Anthologies are all too often the pot-boilers of lesser writers or the emergence of thwarted editorial ambitions that should have remained thwarted. Then too, many anthologies seem to feature one or two best-selling authors between a padding of obscure material in the public domain that requires no royalty payments and which should have been allowed to die as obscurely as it was created. Mr. Borland's collection of writings about America and its natural history, to the contrary, is a thoughtful and scholarly compilation of essays and chapters, each an intrinsic unit, from the works of 89 fine writers including himself, who are or were naturalists, historians, or explorers. I have met only ten of these authors but I have known many more of them through their books and articles. Reading their consummate praise of our land, our wildernesses, our peoples, and our wildlife assembled together makes me aware of the kinship between them. These authors gathered together in the same decade or meeting as a group would form warm friendships with one another. And what tales they would tell around the campfire! Their very names symbolize adventure—16th century Don Juan de Oñate, Meriwether Lewis, William Clark, George Catlin, Washington Irving, Stewart Edward White, Theodore Roosevelt, Rachel Carson, Thoreau, George Miksch Sutton, John Burroughs, John Muir, Olin Sewall Pettingill, Roger Tory Peterson, John K. Terres, Robert Porter Allen, Audubon, Alexander Wilson, Aldo Leopold, William O. Douglas, and all the others that make this book a joy. This is delightful reading for long winter nights and lazy summer days, and no selection in "Our Natural World" will offend a professional biologist.

My only objections to Hal Borland's anthology are his omission of a few of my favorite naturalist authors and that very few reptiles appear on its pages. Only one garter snake and William Bartram's alligators represent this large class, and amphibians are equally neglected, but birds, mammals, insects, the country's flora and land and water are all well represented.

Rachel S. Horne's drawings do not add very much to the text and in a few cases detract. Young opossums when they leave the maternal pouch cling to the mother's back with paws and tails and do not hang like a row of cups from her tail. In the same picture, opposite page 565, few competent bird-watchers will be able to identify the flying gargoyle above the skyscrapers on the left. A slight distortion of most of the animals pictured is distracting. It is a pity that the excellence of the text was not matched by good pictures.—Elizabeth S. Austin.

**64. Familiar Garden Birds of America.** Henry H. Collins, Jr. and Ned R. Boyajian. 1965. Harper and Row, New York. *viii* + 309 pp. \$7.95. The senior author is certainly no stranger to the world of ornithological publications because most people recall his earlier books: *The Bird Watcher's Guide* and *Complete Field Guide to American Wildlife: East, Central and North*. According to a publisher's note, Mr. Collins conceived the idea of the present book namely that the life histories of a small, selected group of familiar birds would be well received by the public. Part of his justification for this type of coverage appears in the statement (*vii*) "that for many of us the large, scholarly tomes on bird behavior simply cover too many unfamiliar species and reveal more esoteric information than we want." Before the book was finished, Mr. Collins died, and several of the species accounts and other notes were added by Ned Boyajian. After considerable early discussion between the authors and with ornithologists throughout the country, the list of species to be covered was narrowed down to 70, emphasis being given to "birds that are common to American gardens or their winter equivalent in the North, the bird feeder."

About 75 species are represented by the color paintings of John C. Yrizarry, and there are a number of black-and-white drawings by Nina Williams. Of the latter illustrations, one of the most helpful is that of immature sparrows (*Zonotrichia* especially), though details are not accurately portrayed. It will be disconcerting to even the novice to find illustrations of birds scarcely mentioned in the text. For example, in the account of the American Goldfinch there appears a drawing of what-the-authors-call a Dark-backed Goldfinch, and a Brown Towhee is illustrated in the section on Rufous-sided Towhee.

Whereas I feel that the concept of this book is good, it nonetheless suffers from the lack of judicious editing which could have eliminated numerous errors and given a better selection of Suggested Readings. Many of the latter are outmoded, out-of-print, or would be difficult to obtain unless one had access to a large library. Still other pertinent references—of especial value to the novice—have been omitted.—David W. Johnston.

**65. The Bird: Its Form and Function.** C. William Beebe. 1965. Dover Publications, Inc., New York. *xi* + 496 pp. Paperbound. \$2.75. Most readers will recall that this book was first published in 1906 and was at that time another classic from the pen of the famous Charles William Beebe. Dover has now republished the book in an unabridged and unaltered condition, and even the original photographs are reprinted with remarkable clarity.

Beebe's rationale for this book is expressed in his preface wherein he points out levels in bird study. Some people shoot birds and put them into collections where they are soon forgotten. Others identify species after species afield in a continuing zeal to add to their lists. "Observing the habits, the courtship and nest-building, and memorizing the song, is a third phase of bird-study—the best of all these methods; but few indeed have ever given a moments' thought to the bird *itself*." Certainly many contemporary ornithologists would endorse this philosophy.

As Dean Amadon writes in his preface to the Dover edition, "the plan of the book might have led to a static or old-fashioned anatomical approach, but Beebe was nothing if not imaginative, and his point of view is always comparative and evolutionary." This approach becomes apparent as Beebe leads the reader chapter by chapter through such subjects as Ancestors, Feathers, The Skull, The Senses, The Body of a Bird, Feet and Legs, The Bird in the Egg, and others. Each of these chapters is well written and, though in some cases outmoded and misleading data are given, the subjects are clearly and concisely discussed. Not only does this make interesting and profitable reading for the amateur naturalist but also professionals will benefit from Beebe's enthusiastic exposition on birds as living organisms.—David W. Johnston.

**66. Birds of the Niagara Frontier Region.** Clark S. Beardslee and Harold S. Mitchell. 1965. *Bull. of the Buffalo Soc. of Natural Sciences*, Buffalo, Vol. 22, 478pp. \$10.00 (hard cover), \$9.00 (soft cover). This is an impressive record not just because it deals with the avifauna of one of the most interesting areas in the eastern part of the continent. The work is remarkable in several ways. Based on meticulous research, a wealth of data on the birdlife of the region is here presented in a work that is distinguished by careful documentation, readability, and effective organization. Doubtless, in times to come this book will become a source of references of enduring value and excellency. Furthermore it bears eloquent witness to the significant contributions made by a group of dedicated people who know how to get the most out of bird-watching.

The description of the area accompanied by a good map is well done. Information on what birds may be found where and when is given for 109 separate localities. The records deal with 372 species, not counting 19 on the hypothetical list and three extinct species. These are divided into ten categories starting with Permanent Residents (24) through Accidental Visitants (33 species). Summer Residents (118) are the most numerous with the Transient Visitants (114) running a good second. A highly useful section treats the monthly status of the birds in relation to climate, with information on average temperatures and precipitation and with the birds listed in groups according to their arrival and departure. All of this provides a clear annual picture. The terms used in the nomenclature and classification are defined and also the criteria adopted in deciding the authenticity of the records.

The annotated list contains information on status, dates of occurrence, migration, and sometimes extensive discussions on the local history of the species. Often a list of maximum counts cover peak periods of migration and, in some cases, nearly every month of the year.

A 14-page bibliography and a species index conclude the volume. With the exception of a misplaced warbler in wrong check-list order, there is a virtual absence of typographical errors.

The untimely death of the senior author, whose fine contributions nevertheless cover a large part of the book, put the onus of completing the half-finished work entirely on the shoulders of Harold Mitchell. He is to be warmly congratulated on having brought to so successful an end a work of outstanding quality.—Louise de K. Lawrence.

**67. The Birds of Kentucky.** Robert M. Mengel. 1965 *Ornith. Monogr.* No. 3, Amer. Ornith. Union (The Allen Press, Lawrence, Kans.). xiv + 581 pp. (\$8.00 to members of the A. O. U.). As indicated in the preface of this handsome and sturdy tome, Dr. Mengel's embryonic plans for a Blue Grass state ornithology, or state bird book, began to take form when he was but a lad of fifteen. Gradually it became apparent that the job—which was essentially a single-handed undertaking—was almost more than man-sized. Perhaps even before 1950, the author realized that “to deal with the ornithology of an entire state, in all its aspects, in such a way as to honor . . . expanding areas of interest in birds . . . , presents problems almost unimaginable in 1935.” Because of his persevering, the task at length was completed. (“I relinquish it herewith, with a feeling of relief . . .”) As a result the ornithological literature of the mid-twentieth century has been greatly enriched.

In the preface the author generously thanks the many people who contributed to the undertaking, and his dedication singles out “the late Josselyn Van Tyne (1902-1957), who insisted; and . . . Burt Leavelle Monroe, Sr., who encouraged.”

Incorporated in the brief introduction are adequate definitions of terms denoting manner of occurrence (permanent resident, summer resident, etc.) as well as explanations pertaining to nomenclature employed, way of citing observations, and method of handling breeding data. There follows a well-executed chapter, “A Description of the Environment,” with emphasis on physiography, climate, and vegetation. In dealing with vegetation and related aspects of the environment, Mengel relies heavily on information in E. Lucy Braun's *Deciduous Forests of Eastern North America*.

Pictorial impressions, mostly of various kinds of habitat, are conveyed by nine pen-and-ink vignettes which, like the four color plates (water colors, rendered

afield, showing birds at nest sites) and the numerous text figures, attest to the fact that Mengel is remarkably gifted not only as ornithologist and writer but also as artist and draftsman.

An extensive analytical treatment (pp. 23-78) of the distribution of Kentucky breeding birds (153 species) is a rather innovative feature. Five avifaunal regions are recognized and mapped: the Cumberland Crest, Cumberland Upland, Western Upland, Limestone Plateau, and Alluvial Forest. In this section the author coins several useful terms, of which two might be mentioned: 'The avifaunas or regions dealt with are characterized by "faunal features"—provided by indicator species "whose presence (or absence) distinguishes one avifauna or zone from another . . ."; and by "ecological features"—provided by species "whose peculiar abundance or rarity distinguishes an avifauna or region." Analyses of census data yielded much tabular information on estimated populations of singing males and on distribution (with indications of relative abundance according to avifaunal region and of occurrence in different habitat types.) In addition to distributions of avian species, those of other biotic components (vascular plants, amphibians, mammals) are taken into account. Thus, the author, while keeping focus on birds, yet displays a broad, albeit a really limited, panbiogeographic approach reminiscent of that of Leon Croizat.

An account of "Recent Changes in the Kentucky Avifauna" is followed by a substantial chapter (pp. 86-98) on "Bird Distribution in Relation to Certain Environmental Features." An interesting concept, the "richness" of forest avifaunas (based on both species diversity and relative abundance), is employed in quantitative fashion (p. 92), with the richness index for the Cumberland Upland population being highest and that for the Limestone Plateau lowest. (Incidentally, in the course of studying insular bird populations in northern Florida, I developed, independently, a richness index almost identical to that of Mengel. Naturally I was more than ready to accept his measure as valid and meaningful!) Throughout the text the author consistently and studiously eschews pat answers, oversimplifications, and superficial treatments, and many of his statements, as unhurried as they are carefully qualified, point to problems that merit further investigation. It appears to him, for example, "that the perfectly proper emphasis of the great importance to birds of radical differences in life form, as between grassland and shrubs, or coniferous and deciduous forest, has tended to obscure the probability that minor differences within these major divisions are readily perceptible and important to some species."

Life zones, the biome system, and biotic provinces are taken up in some detail (pp. 99-128) with a view to determining their utility in expressing distribution within Kentucky. In briefest terms, the utility of the life-zone concept was found to be "decidedly limited," whereas that of the biome system was "considerable." The biotic province concept led Mengel into further tabular analyses and extended, sometimes recondite discussions, which, despite clarity and preciseness, may not be readily understood or fully comprehended by the "average" bird enthusiast. As found in Kentucky, a hierarchy of Faunal Regions, based on degrees of distinctness, includes two Avifaunal Provinces (the Carolinian and Austroriparian), with the Carolinian having two Avifaunal Districts, and each district two Avifaunal Areas. ("Minor Areas" may also be fitted into this hierarchy.) Although this review can do no more than suggest, rather sketchily if not skimpily, the contents of Mengel's book, it should be clear by now that *The Birds of Kentucky* is far more than a "state list."

A summary of "Geographic Variation in Kentucky Breeding Birds" (pp. 129-134) involves, among other matters, searching and critical discussions of clinal variational patterns, biased taxonomic practices, and the need for "extensive statistical treatment [which] has been applied to few species in the eastern United States." One conclusion is the following: "The picture of geographic variation of birds in Kentucky is one of very slight and gradual change in populations from one region to another, with a scarcity of discontinuity or areas of accelerated change." There is also succinct consideration of "The Origins of the Avifauna."

"The History of Ornithology in Kentucky," extending from the Pioneer Period (ca. 1750-1800) to the Modern, is comparatively meager. "Of perhaps 1,000 titles more or less devoted to Kentucky birds (approximately 850 of which are here cited), scarcely 50 are by workers primarily trained or professionally engaged in ornithology, and only a handful of these are major papers. The



record, therefore, is the result almost entirely of spontaneous, mainly recent, amateur effort. Evaluated as such, it is a respectable one." No small part of the total effort was the author's own field work: starting in 1934, it was intensified from 1948 through 1952, when he and his occasional associates spent approximately 300 man-days in the field, traveled more than 12,000 miles within the state, and collected approximately 1,100 specimens. Other collections, 11 of which contained numerous specimens from the state, were subject to careful, critical examination.

The greater part of this weighty work consists of "Accounts of the Species" (pp. 152-516), followed by a hypothetical list, plus lists of dubious occurrences as well as species recorded on inadequate grounds. The main body of species accounts treats 296 species and 33 additional subspecies. The accounts contain lots of detail and are meticulously organized, with various subheadings (these necessarily varying somewhat from species to species): e.g., status, spring, breeding records, summer, fall and winter, geographic variation, and specimens examined. For a number of species the breeding-season distribution is mapped. Almost nowhere is Mengel hesitant about coming to grips with subtly intricate or challenging problems relative to geographic variation; such problems are encountered, for instance, in the Hairy Woodpecker and White-breasted Nuthatch. Certain analyses are statistical. Among particulars given under "specimens examined" are valuable data on weights and fat condition. The author showed good judgment, I think, in giving "only information that seemed specially applicable to Kentucky." This information is in part ecological, thus extending and complementing ecological analyses in earlier sections. Despite the mass of detail, the species accounts are quite readable and doubtless will be referred to continually by students of Kentucky birds.

The extensive bibliography, including many titles concerned with botany and other biota covers about 36 pages. The helpful index embodies the scientific names of species and subspecies and a variety of subject headings.

As suggested in foregoing paragraphs, this volume is perspicuously written and is well made in all respects. It is a masterful, idea-engendering, artistically finished piece of work. I am tempted to call it monumental. Any adverse criticism that I might offer would be minuscule, and from this I shall refrain. Whatever their geographic location, the ornithologically inclined and the ecologically oriented will find much of interest and value in *The Birds of Kentucky*.—Robert A. Norris.

#### NO MIST NETS IN JULY

During July, 1966 I expect to be abroad, partly to attend the International Congress at Oxford. Unfortunately it does not appear practical for anyone to pinchhit in handling mist nets meanwhile. Therefore we regret that NEBBA will be unable to ship nets or to reply to inquiries, from about June 24 through August 5. We hope to be able to fill all orders for nets that reach us prior to June 24, so that if you can anticipate your needs for nets to that extent, you can avoid holding up field work for lack of nets.

E. Alexander Bergstrom

#### NOTES AND NEWS

We note with regret the retirement of Dr. Charles H. Blake from our regular review staff. Dr. Blake, a past president of NEBBA and a frequent contributor of papers and notes to *Bird-Banding*, had served on the review staff since 1958.

We note with pleasure the addition of Elizabeth S. Austin (wife of Dr. Oliver L. Austin, Jr.) to the review staff on a regular basis. She has contributed individual reviews for years, largely on books on natural history.

The Bowdoin Scientific Station, on Kent Island in the Bay of Fundy (New Brunswick, Canada), is open to scientists doing field research, and to other visitors space permitting. Details may be obtained from Dr. Charles E. Huntington, Dept. of Biology, Bowdoin College, Brunswick, Me. 04011.

Descriptions and prices of the mist nets handled by NEBBA appear in the January, 1966 issue. Net orders and inquiries should be addressed to Mr.