

time each day, such as is the preening period. Thus the Mallophaga, once introduced into the plumage of such an individual, would quickly become abundant.

To gather some idea of their abundance, I plucked eight feathers from the breast of the Junco and then counted their complement of Mallophaga. There were twenty-one lice in various stages of development on the eight feathers, or about 2.7 per feather. Multiplying the number of lice per feather by the number of contour feathers on a Junco<sup>1</sup>, we might be led to think that this particular Junco harbored 5,386 Mallophaga in its plumage, unless we remembered that the breast feathers were larger, and therefore infested more heavily, than the smaller contour feathers in regions such as the head.

In any case we achieve an idea of the immense number of lice which can congregate on an individual bird as soon as its ability to preen itself is interfered with. Such a bird would at once become a center from which other birds became infested.

This brings up a point of speculation. Do Mallophaga and other ectoparasites regularly depend on birds with deformed bills for their dissemination within the population? As a first step in studying this question, bird banders might examine all birds with deformed bills for evidence of particularly heavy infestation with ectoparasites.—C. BROOKE WORTH, Rockefeller Institute for Medical Research, Department of Animal and Plant Pathology, Princeton, New Jersey.

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## RECENT LITERATURE

Reviews by Margaret M. Nice

### BANDING AND MIGRATION

**1. Banding in North America.** 1939. *Bird Banding Notes*, 3 (1): 1-25. During the past year 436,648 birds were banded. The 10 species banded in largest numbers were Chimney Swift (*Chaetura pelagica*) 71,623; Junco (*Junco hyemalis-oreganus* group) 22,274; Purple Finch (*Carpodacus purpureus*) 21,595; White-throated Sparrow (*Zonotrichia albicollis*) 20,495; American Pintail (*Dafila acuta tzitzihua*) 19,160; Common Tern (*Sterna hirundo*) 17,179; Herring Gull (*Larus argentatus*) 17, 168; Mallard (*Anas platyrhynchos*) 16,732; Black Duck (*Anas rubripes*) 10,207; Song Sparrow (*Melospiza melodia*) 9,743.

**2. Movements of Ringed Birds from Abroad to the British Isles and from the British Isles Abroad. Addenda VI.** H. F. Witherby and E. P. Leach. 1939. *British Birds*, 33: 62-75. Different wintering quarters in different years are shown for three species. Five Starlings (*Sturnus vulgaris*) ringed in November, December and March in England were recovered in November and December in Holland and Belgium, three times the following year, once four years and once five years later. A Brambling (*Fringilla montifringilla*) ringed in England in February 1937 was taken in France the following December; another ringed in England December 1934 was recovered in France in January 1938. As to the Redwing (*Turdus musicus*), two birds were in England one winter and in Italy the next, while a third spent two winters in England.

**3. Results of Ringing Starlings in the Mark.** (Ergebnisse der Beringung kurnmärkischer Stare.) Georg Steinbacher. 1939. *Märkische Tierwelt*, 4(1): 62-69. There have been 250 returns and recoveries of *Sturnus vulgaris* ringed in the Berlin region: 93 in the Mark, thirteen in West Germany, ten in Holland, 65 in Belgium, 25 in western France, five in England, three in Spain, three in North Africa, one in northern Italy. Most winter in Belgium and there they are killed

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<sup>1</sup> Wetmore. The Number of Contour Feathers in Passeriformes and Related Birds. *Auk*, 53, 1936: 159-169.

in large numbers. Dr. Steinbacher suggests that protective laws be modified, so that this necessary reduction in numbers might be partially accomplished in German orchards and the farmers protect their fruit and also obtain "an exceptionally tasty bit of nourishment." As to the recoveries of young birds, 79 per cent fell in the first year of life, 14 in the second, 5 in the third, 1.5 in the fourth, and 0.5 in the fifth. Twenty-five nestlings returned to breed in their natal region.

**4. Variability of Wing Length in a Ringed Population of Great Tits.** (Ueber die Variabilität der Flügellänge in einer beringten *Parus major*-Population.) H. N. Kluijver. 1939. *Limosa*, 12 : 80-86. Great Tits breed freely in nest boxes in a 200 hectare woods near Wageningen; they are caught in the boxes both in summer and winter. Females can be divided into adult and juvenal by plumage characters, but this is not true of the males. Through measuring the wings of banded birds an increase was found in their length during the first 3 winters. Ten females averaged 70.3, 71.6 and 73 mm. during their first, second and third winters, respectively, 8 males, 74.2, 75.3 and 76 mm. An examination of Blackbirds (*Turdus merula*) in the Leiden Museum showed longer wings with adult males than with juvenals, but the curve showed two maxima corresponding to different races.

**5. Movements of Wintering Birds.** (Déplacement d'Oiseaux hivernants.) Robert Poncy. 1939. *Ornithologische Beobachter*, 36 : 87-90. The extraordinary cold wave over central Europe from December 17-21, 1938 sent great numbers of birds south in a rapid, late migration. They were chiefly Snipe, Woodcock, Lapwings, Plover, Larks, Ducks, Geese, Swans, Grey Herons.

**6. Gull Checking. How Old Are Your Gulls? And Where Do They Come From?** J. J. Hickey. 1939. *New England Naturalist*, No. 4 : 1-3. Thousands of Herring Gulls (*Larus argentatus*) have been color banded during the last three years, the combinations showing the year and locality. On fish piers and garbage heaps they are easy to see at close range. Some enthusiasts "have seen as many as fifty banded birds in a single day on the Atlantic coast." Over a thousand records are on file with the Gull Survey Committee of the Linnaean Society of New York, representing over six per cent of the total number of birds banded. These birds should be wintering further north as they grow older. There will be a chance to study plumage in relation to age, and the wintering area of different colonies.

**7. Marking Birds by Imping Feathers.** Earl G. Wright. 1939. *Journal of Wildlife Management*, 3 : 238-239. A description of the falconer's method of splicing feathers, with the suggestion of the use of dyed feathers for field identification.

**8. Bird Banding Brevities—No. 14.** Amelia R. Laskey. 1939. *The Migrant*, 10(3) : 47-48. A six year old Junco (*Junco hyemalis*) has been retaken each winter at Nashville, Tenn. A female Carolina Wren (*Thryothorus ludovicianus*), at least five years old, raised three broods the past summer: four young left April 20 from a nest in a dust mop; two young left in early June; three young were fledged August 12 in the dust mop.

In Numbers 20, 25, and 28 banding was the basic technique.

#### LIFE HISTORY

**9. Nesting Habits of the Pied-billed Grebe.** Muri Deusing. 1939. *Auk*, 56 : 367-373. An interesting article with excellent photographs. Forty-two hours were spent in a blind at a nest of *Podilymbus podiceps*; both parents incubated, the female for periods of 24-53 minutes, averaging 40; the male 9-65, averaging 29. Strange wing movements of the incubating birds are described, as well as the notes of adults and young. When the young wished to climb on the back of a parent, they would poke at the breast or sides and the adult would swing around and present its tail.

**10. Intermittent Breeding of the Fulmar (*Fulmarus glacialis* (L.)), with Some General Observations on Non-Breeding in Sea-Birds.** V. C. Wynne-Edwards. 1939. *Proc. Zool. Soc. London*, A. 109 : 127-132. Among Fulmars, "apparently, only about one bird in three breeds in any one year. Large non-breeding populations are well known also in other Albatrosses, Shearwaters, and Petrels." Almost all of these pelagic birds "lay only one egg when they do breed." "Their reproductive rate would appear to be slower than that of any other birds, or, indeed of any animals at all, with the exception, perhaps, of elephants and whales. In spite of this the Fulmar has increased its breeding range in western Europe during the last fifty years to an extent unparalleled by any other species in that region." p. 127. "It is surprising that birds which frequent stormy seas during most of their lives, often in Arctic and Antarctic latitudes, without refuge in bad weather, should have a lower birth- and death-rate than, probably, any other avian group." p. 128.

Non-breeding Fulmars molt in June and July; breeders in August. Wear on claws gives an indication of age; a bird with sharp claws 16 mm. long is young and has seldom or never bred, while one with claws 10.6 mm. long is old and has bred many times, as shown by post-mortem examinations. "When breeding is inhibited in the Fulmar and certain other birds the annual (post-nuptial) moult occurs prematurely." p. 131.

**11. Man-o'-War.** R. M. Murphy. 1939. *Natural History*, 44(3) : 133-143. A delightful account of this remarkable Frigate-bird, illustrated with splendid photographs. Its piratical methods of obtaining food from the Boobies are contrasted with its mild manners at the nest, the female "toting lumber," while the male "squats on the platform under construction, arranges the incoming sticks and, what is more important, protects them from pilfering by strange females." The female is larger than her mate and it is he that does the incubating and brooding of the chick. A chart is given showing the similar youthful plumage of the five species of Fregata and the different adult plumages, illustrating the genetic relationships. The "naked chick just out of the egg is hardly a man-o'-war bird at all", just "a mere 'bird'", closely resembling "the young of its relatives, the pelicans, cormorants and boobies." "By the time the fledgling is ready to leave the nest, a structural freak has been fashioned . . . a highly specialized flying machine, with feet barely large enough to grasp a perch, but with wings a yard in length, each furnished with 25 per cent more flight feathers and 40 per cent more area than those of a gull or other sea bird having the same bulk of body."

**12. Notes on the Life History of the Shoveller.** George Girard. 1939. *Trans. 4th North American Wildlife Conference*: 364-371. On the Nine-Pipe and Pablo Migratory Bird Refuge in western Montana, 1,135 eggs were laid in 132 nests of *Spatula clypeata*, 70 per cent hatching. The average set was 8-9 eggs; average hatch was six. Incubation lasted 28 days. An average of five young per brood was raised to the flapper stage. Coyotes, crows, skunks and weasels were controlled. Shovellers nested "amicably within a few yards of Short-eared Owl nests." The male usually stayed "near the nest and nearly always met and stayed close to the female when she flew from the nest to the water to feed. The male appeared to be much interested in her and was observed also to spend considerable time with the family after the young ducks arrived."

**13. The Downy Young of Some Nearctic Limicolines.** Allan Brooks. 1939. *Ibis*, 14, ser., 3 : 450-453. Downy Limicolines have "snow-white carpals" . . . "this character has no correlation with the coloring of the full-feathered bird. Is its object directive? The chick when lost or alarmed holds its wings high and outstretched as it toddles over the tundra or sand." As to the share of the sexes in the care of the young, "in all the species in which the female is the larger she is the first to leave the breeding grounds after the eggs are laid or hatched, leaving the care of the young, and in some cases the duties of incubation, to the male bird. This habit includes such diverse forms as Numenius, Aphriza, Ereunetes, Pisobia, Tringa, and all three species of phalaropes." p. 451.

**14. Studies on Woodcock Management in Maine, 1938.** C. M. Aldous. 1939. Trans. 4th North American Wildlife Conference: 437-441. Of nine artificial openings made for singing grounds for *Philohela minor*, five were occupied. Of 50 nests, 31 (62 per cent) hatched. The feral house cat is the worst enemy, dogs also do damage, as do fires and telegraph wires. Of 161 young banded there were six returns, all in the same fall, all in late October and all near the place of banding.

**15. History of One Hundred Nests of Arctic Tern.** O. S. Pettingill, Jr. 1939. *Auk*, 56 : 420-428. A large colony—some 2,000 pairs—of *Sterna paradisaea* nest on Machias Seal Island, yet despite lack of predators and human interference, nesting success is low. A group of one hundred nests was studied from July 2-28, 1937; of the 144 eggs laid, 91 hatched (63 per cent) and 23 were fledged (15.9 per cent). The loss of 26 per cent of the eggs and young was due to external factors—cows and a severe storm, but 58 per cent of the loss was attributable to internal factors, chiefly failure of nesting drive and the marauding of other terns. The author suggests that "lack of sufficient food" may have been "an indirect cause of both marauding and failure of the nesting drive." An excellent article.

**16. Nesting Habits of the Mourning Dove in Alabama.** A. M. Pearson and G. C. Moore. 1939. Trans. 4th North American Wildlife Conference: 468-473. Of 592 nests of *Zenaidura macroura*, 283 or 47.8 per cent were destroyed. Whether 52.2 per cent succeeded we are not told; two "young were fledged from each of 214 nests but only one young . . . from each of 65 nests." The authors state that in "twenty-six nests under close observation the two eggs were laid on successive days," but they fail to say at what time of day they were laid. Whitman (Behavior of Pigeons, III, 1919, p. 45) found that Mourning Doves laid the first egg of a set between 4 and 6 p.m. and the second early in the morning of the second day after, and this was my experience in Oklahoma (*Auk*, 1922, 39 : 465; *Condor*, 1931, 33 : 148.)

**17. Temperature, Growth and Other Studies on the Eastern Phoebe.** Dayton Stoner. 1939. New York State Museum Circular 22 : 1-42. Detailed measurements were made on twenty nestlings, the paper being illustrated with photographs of different stages of growth of primaries, etc. Fledging lasted sixteen days. Temperature control is fairly well established at ten days. Growth is rapid up to the same age, practically adult weight being attained at 16-17 days, at which time the bird has fair proficiency in flying, one making a distance of 75 feet at the first attempt. Different feathers and different bony elements were found to grow "at different but measurable rates." Length of primary was found to be "one of the most dependable criterions for recognition of age."

**18. Observations on Swallows and House-Martins at the Nest.** R. E. and W. M. Moreau. 1939. *British Birds*, 33 : 146-151. Barn Swallow (*Hirundo r. rustica*) nests were watched for 45 hours in England and House Martin (*Delichon u. urbica*) nests for 20 hours. "At a Swallow's nest incubation was shared fairly equally by the parents," with periods on the nest of 8-12 minutes, and off of 5-6; although both afternoons were cool the eggs were covered only 64 and 65 per cent of the 5½ hours. House Martins' eggs in two nests were covered from 95-100 per cent of the 10½ hours watched; the "usual spell 'on' lasted seven to fourteen minutes."

Feeding was watched in five Swallow nests; the number of feedings in "separate complete rain-free hours" ranged from 20-27 in A where the 3 young were 3, 4 and 20 days old; was 16 and 19 at B where the 3 young were 11 days old, and 13 and 14 at C where the 3 young were 15 days old. At E the 4 young, 18 days old, were fed 38, 39 and 38 times, but much of the time an extra female was helping, although at times driven off by the parents. At nest D the 3 young nearly ready to fly were "fed very irregularly and most visits were 'feints,' apparently to coax them out."

A brood of House Martins about ten or eleven days old was fed very regularly, 46, 39, 42, and 36 times per (rain-free) hour. These birds left the nest on the

morning of July 21, returning to it that afternoon, and the same behavior was noted the following day. Heavy rain usually stopped feeding of both species after a lag of 15-20 minutes.

**19. Observations on Sand-Martins at the Nest.** R. E. and W. M. Moreau. 1939. *British Birds*, 33 : 95-97. At a nest of the Bank Swallow (*Riparia r. riparia*) in Surrey both parents incubated, changing "instantaneously as a rule," the eggs being "covered over 90 per cent of the time." The nest was watched 9½ hours on two days; spells ranged from 9 to 77 minutes, the median being 29 minutes. Four nests containing three and four young nearly ready to fly were watched for 24 hours on three days; the number of meals ranged between 25 and 49 per hour, except for one mid-day hour (12) and one evening hour (15). Of 726 feedings over half the intervals "lasted less than two minutes; only about 10 per cent (78) lasted more than three minutes and only 19 more than five."

**20. Fecundity of Blue Tits in Relation to Age.** Guy Charteris. 1939. *British Birds*, 33 : 162. One of a brood of 12 *Parus coeruleus obscurus* ringed as nestlings May 16, 1938 in Gloucestershire, laid 15 eggs in May 1939 and hatched 13 young. "Another ringed as an adult in January, 1935, reared in 1939 eleven young from twelve eggs."

**21. Ecology and Distribution of the Song Thrush.** (Zur Ökologie und Verbreitung der Singdrossel (*Turdus ericetorum phalomelos* Brehm).) L. Siivonen. 1939. *Ann. Zool. Soc. Zool.-Bot. Fenn. Vanamo*, 7(1) : 1-289. A scholarly, detailed study of the ecology of the Song Thrush, its summering and wintering ranges, its spread to the north in recent times in response to a warmer climate in Finland and Scandinavia; censuses of nesting pairs in different habitats; food, etc. It is strongly territorial, although tolerant of other species of thrushes. Its territories range in size from 1.5 to 6 hectares; while those of the Mistle Thrush (*Turdus viscivorus*) cover half a square kilometer. The preferred nest site is in a young spruce, in situations with only one third as much light as those chosen by the Mistle Thrush.

The Song Thrush starts nesting in March and April at 45° north latitude, but not until the beginning of June at lat. 67°-70°, but everywhere it stops nesting the middle of July, hence in the far north there is one brood, in the south three or possibly four broods. Sets are slightly larger to the north and east. Incubation lasts 12-14 days. The female incubates more intensely towards the end of incubation; the male often visits her at the nest and accompanies her when she leaves and returns. Feeding increases from day to day up to the 11th day, starting at 3-4 times an hour, it reaches 19. The young stay from 9-16 days in the nest, usually 13-14. Near human habitations they often leave before they can fly and never return to the nest, but in the wilderness they may stay until able to fly and then return to sleep in the nest.

In favorable years sets are larger; and there are more broods attempted when the spring is early.

Much is given on the song throughout the range; the song period lasts 2½ months at 67°-70° north latitude and 4½ months at 45°-47°; it stops the middle of July. From lat. 60° the Song Thrush sings throughout the night. Light and humidity are the most important factors influencing song.

**22. A Detailed Study of a Family of Robins.** W. E. Schantz. 1939. *Wilson Bulletin*, 51 : 157-169. A remarkable study of two nestings of a pair of *Turdus migratorius* on a porch where electrical "apparatus was used to announce and record the arrivals at the two nests so that it was impossible for the adults to come to the nest without ringing an electric bell or making a recording on paper tape", besides which a great many hours were spent in direct observation. Ten young left the three nests of this pair, five of them being reared to independence. The most valuable contribution of the paper is the data on length of periods on and off the nest, and the number of feedings given per day. These subjects are

summarized as follows: "During incubation the female left the nest from 10 to 19 times a day, averaging 16.3 times. Forty periods on and off the nest averaged 44 minutes on and 11 minutes off (*i.e.* 80 per cent of daylight hours on the nest). . . . For the first two days with both broods the young received between 81 and 84 meals per day; the third day they were given 89 and 90 meals respectively. During the rest of the time the first brood of 3 young received 82 to 99 meals per day and the second brood with 4 young 92 to 113 meals." Incubation lasted 12½ to 13 days, fledging 14 to 16 days. "The male could see well in dim light, but the female could not."

The article is full of interesting observations on the behavior of the adult pair of a neighboring pair, and of a young bird that became markedly aggressive toward Robins and other species that came to the bird bath.

**23. A Nesting of the Grey Wagtail.** (Zur Brutbiologie der Gebirgsbachstelze *Motacilla cinerea* Tunst.) Erich Eggebrecht. 1939. *Ornithologische Monatsberichte*, 47 : 109-117. A nest of the Grey Wagtail was only two meters distant from that of a Dipper (*Cinclus aquaticus*); the female Dipper incubated, leaving the male at leisure to attack the Wagtails as they came to change places at their nest. Once the male Wagtail waited 33 minutes to go to his nest because of the presence of the Dipper. The Wagtails feared both Dippers, although only the male persecuted them. Both sets of young hatched the same day; the Dipper was so busy feeding his young that he ignored the Wagtails. The author watched the Wagtail nest all day on the 7th day of incubation; the female incubated at night; she spent 11 periods on the nest ranging from 19 to 87 minutes, averaging 42.9 minutes, while the male spent 10 periods on, ranging from 25 to 61 minutes, averaging 42.7.

**24. Observations on Breeding Behavior in Tricolored Redwings.** D. Lack and J. T. Emlen, Jr., 1939. *Condor*, 41 : 225-230. While the Redwinged Blackbird (*Agelaius phoeniceus*) defends a territory, which is the male's display center and within which his mates nest, *Agelaius tricolor* is one of the "most colonial of all passerine birds," nesting in groups of thousands. Observation in an "uncrowded portion" of a slough showed each male defending a few square feet, but "song, fighting and threat display are rather feeble and possibly are absent in crowded areas." Polygamy is the rule, counts of adults feeding young during the fledging period showing "about 47 males to each 100 females," some of the "apparent surplus" perhaps being "due to the fact that females apparently mature and nest in one year, whereas at least some males do not breed the first year." "Males desert their territories during incubation, but return to feed the young. The members of each colony show a marked simultaneity in breeding, whereas neighboring colonies may be in different phases of the reproductive cycle." Mass desertion of nests sometimes occurs; it is suggested that the colony may have "deserted *en masse*, first eating their own eggs."

**25. Same Pair of Chaffinches Mating Three Times.** E. W. HENDY. 1939. *British Birds*, 33 : 162. A pair of *Fringilla coelebs gengleri* marked with colored bands raised a brood in the garden in June 1937; in 1938 they raised two broods, in the second of which only two eggs were laid. They stayed together until November 9, when the hen disappeared; she reappeared February 5, 1939 and was constantly in the company of her mate until March 5, when she was found dead, apparently as the result of a fight.

**26. The Life History of Henslow's Sparrow, *Passerherbulus henslowi* (Audubon).** Sidney A. Hyde. 1939. Museum Zoology University of Michigan. Misc. Pub. No. 41 : 1-72. Henslow's Sparrow is "definitely pushing its range eastward across southern Ontario," in response to the clearing of forests. The birds nest in "grassy meadows, usually bush-dotted" and usually in small colonies. The nest is exceedingly difficult to find, while the adults are secretive and will not enter traps, hence the observations on nest life are rather unsatisfactory.

The female builds and incubates, while the male helps feed. Incubation lasted slightly over eleven days, pp. 37, 39 and not ten and eleven as stated; incubation should be calculated from the laying of a certain egg (either marked or the last in the set) to its hatching, as incubation often starts before the set is complete.

On the day of hatching, the female, instead of "leaving with her usual low flight" . . . "mounted to a height of about twelve feet in the air, uttering animated twitterings as she swerved over a clump of shrubbery to the eastward." p. 38. The next day one parent stayed at the nest till relieved by its mate; whether the male really brooded or only stood over the young is not told. From 46 hours' observation at several nests a rise in the number of feedings was found from "one-half feeding an hour at ages of less than one day, to ten feedings an hour at the age of seven to eight days." p. 42.

The author speaks of a "hawk call" which "differed from the alarm note given . . . when I invaded the colony." The Song-Sparrow also has two such notes, but the "hawk call" is not reserved specifically for hawks, but is uttered under stress of sudden fear. Weights of adults and young are given, the nestlings reaching "approximately 75 per cent of their adult weight of 13.07 grams before leaving the nest," which takes place "the ninth or tenth day after hatching." The author does not do justice to his paper in his summary.

#### 27. Nesting Success: Its Significance in Waterfowl Reproduction.

E. R. Kalmbach. 1939. Trans. 4th North American Wildlife Conference: 591-604. Many data are given on nesting success, divided into (1) upland species nesting on and near the ground, (2) species nesting above ground level, (3) hole-nesting species, and (4) waterfowl. The criterion is *hatching* percentage, which is logical when dealing with precocial birds, but in Tables 1 and 2 the author mixes altricial and precocial species indiscriminately, and moreover in six cases he has given the *fledging* percentage instead of hatching—Pickwell's Horned Larks, Walkinshaw's Field Sparrows, my Song Sparrows, Gates' and my Mourning Doves, and Wolda's hole nesting species (second instance), while with Baumgartner's Tree Sparrows he has used the *fledging failure* for hatching success; instead of 21 the hatching percentage was 81.

He states, "Mrs. Nice's studies of an approximately stationary population of song sparrows indicated an egg hatch [sic] of about 41 per cent over a 3-year period." p. 594. If he had examined Table XVII in Transactions Linnaean Society of New York, IV, 1937, he would have found an egg hatch of 66.5 per cent for these three years and also noted an average egg hatch of 61.4 per cent in six studies of open nests of passerines involving 1994 eggs.

Leaving the matter of errors, it hardly seems legitimate to me to place altricial and precocial birds in the same category, since hatching represents distinctly different stages in the two categories. I have not found any significant difference in the success of ground or bush nests, but there is a marked distinction between the success of open nests and hole nests, the percentage of *fledging* being about 43 in the former and 65 in the latter.

The author gives a great many data on hatching success of upland game birds and waterfowl; the former ranges from 25 to 60 per cent, the latter from 29 to 81, averaging 60 per cent. He suggests in regard to waterfowl setting "a standard of 70 per cent hatch of eggs as a reasonable objective on managed areas." p. 599.

### BIRD BEHAVIOR

28. The Behaviour of the Robin. Part I. The Life-history, with special reference to Aggressive Behaviour, Sexual Behaviour, and Territory. Part II. A Partial Analysis of Aggressive and Recognitional Behaviour. David Lack. 1939. *Proc. Zool. Soc. London*, A. 109: 169-219. The English Robin (*Erithacus rubecula melophilus*) is a highly territorial species, singing and holding territory most of the year. The sexes can be distinguished only by their behavior in the breeding season. For three years Mr. Lack trapped and color

banded all the Robins on eleven acres. "The Robin's posturing is aggressive, not courtship, and the red breast is a threat colour. In the male, song and fighting are prominent in both spring and autumn; after pair formation song declines but aggressiveness increases. Some females hold autumn territories with fighting and song; after pair-formation female song is rare but fighting occurs." "Males obtain mates between mid-December and March. Nest-building occurs near the end of March, followed after a few days by copulation and the male feeding the female. A succession of broods follow until June." "In pair-formation the female enters the territory of a male. How the unmated male distinguishes a potential mate from trespassing Robins is not known. Pair-formation is accompanied by no display apart from sporadic aggressive posturing." "During the pre-nuptial period, which lasts up to fifteen weeks, neither member of the pair displays sexually." p. 199.

Experiments with mounts showed that a "stuffed red breast" elicited posturing (*i.e.* threat) in 48 per cent of the cases, but a stuffed juvenal in only 7 per cent. "The Robin shows aggressive behaviour not only towards intruding Robins, but, to a varying extent, towards a stuffed adult Robin, foreign species (especially in flight), living and stuffed juvenile Robins, and a stuffed red breast. The external situation eliciting aggressive behaviour seems partially separable into a flying-away movement eliciting pursuit-flight, Robin-shape eliciting striking, a red breast eliciting posturing, and song eliciting song, but these divisions are not complete, for occasionally a Robin will posture at a specimen lacking the red breast, or strike a red breast, or sing at a silent Robin. . . . The external situation eliciting aggressive behaviour is not simply another Robin, but every Robin (excluding the mate) in a particular area, the territory, and none outside it. There is one exception, a male without territory may attack, and sometimes ejects, a male with territory." p. 213. An admirable study and thought-provoking discussion.

**29. The Behavior of the Snow Bunting in Spring.** N. Tinbergen. 1939. Trans. Linnaean Society New York, V: 1-95. (75 cents if ordered from the Linnaean Society.) Males of *Plectrophenax nivalis subnivalis* in East Greenland separate from the flocks shortly after arrival and settle on territories that are deeply covered with snow. Apparently "no Snow Bunting ever settles on the fjord ice, which in some places, where shallow bays penetrate rather far inland, is really difficult to tell from the land. Yet their knowledge of one character only, *e.g.* a more or less hilly or irregular contour as opposed to a quite flat surface (ice) would, in most cases, suffice to enable the birds to stake out their territories on land." p. 12. The birds awoke "earlier from day to day during April, until at the beginning of May their activities started at about 1.00 A.M. Although the nights grew lighter until the end of June, the birds did not rise any earlier from about the middle of May onward; a certain amount of sleep, about 2 to 3 hours, apparently is necessary." p. 11.

The male sings constantly until joined by a mate; song does not reappear until incubation starts. The warning function of the ceremonial flight was evidenced by the cowering of a trespassing male. p. 17. The male displayed his conspicuous markings before the female, as shown in one of the little sketches that give an excellent idea of the different attitudes assumed by the birds. The mated male is more aggressive than the unmated bird; his mate also fights but she fights females while he fights males. There was a peck-order between the pair, in all but one case the male dominating the female when it came to a question of food.

In keeping with their protected nest site, the young are noisy until they leave, when they use only the location note. The young wander to some distance, each parent caring for a part of the brood. One female that had been feeding young, suddenly joined a male—not her former mate—and deserted the young that soon perished; she laid three eggs in her second set.

The last half of the paper is taken up with an interesting discussion of fighting, territory, song and discrimination of the other sex. A very valuable paper.



**30. The Display of the Blackcock.** David Lack. 1939. *British Birds*, 32 : 290-303. Observations were made in Scotland in spring and fall at leks of *Iyrurus tetrrix britannicus*. "Each male defends with fighting, threat display and 'song' (rookooing) an exclusive territory on the lek, the function of which is probably to reduce interference with copulation." A territory may be only five by seven yards. "The crow and 'flutter-jump' seem social activities. The display is essentially communal, which may assist females and also other males in locating the leks." In spring the "male copulates with a female mount but either fights or ignores a male mount." In fall there is "well-marked aggressive display and crowing, but no sexual behaviour" at the leks. "Displaying adults violently attack" immature males and a trespassing adult with closed tail; if the latter displays in turn, "the attacker promptly changes over from true attack to 'display fighting'."

**31. The Chuck-will's-widow in the Okefinokee Region.** F. Harper. 1938. *The Oriole*, 3(2) : 9-13. The first song of *Antrostomus carolinensis* was heard on the same day as the first bellowing of the alligator and piping of the oak toad; it sings at dusk and daybreak, and on moonlit nights "indefinitely beyond dusk—once till midnight; once till 2.45 A.M." Interestingly enough a relationship was found between the rate of singing and temperature in 20 records from March 30 to May 3; there were 16 to 22 songs per minute at 60° F. and 22 to 29 at 76° F. My records in June and July in Oklahoma ranged from 27 to 31 songs per minute. Perhaps the date as well as the temperature has an influence; Red-eyed Vireos in August sing at about half the rate of earlier in the season. Increase in the rate of singing with rising temperature has been reported for the snowy tree cricket and LeConte's chorus frog (*Pseudacris ornata*) (*American Midland Naturalist*, 1937: 265).

**32. Color Vision and Function of the Cones in the Song Thrush.** (Farbensehen und Zapfenfunktion bei der Singdrossel, *Turdus e. ericetorum* Turton.) P. J. van Eck. 1939. Inaug. Diss. Leiden. 58 pp. Song Thrushes were trained to feed out of different colored dishes; they were found to be able to distinguish red, yellow, green and blue. Later some of the subjects were light adapted and others dark adapted, and histological sections made of the eyes. A good review of the literature is given.

**33. Social Hierarchy in Flocks of the Canary.** H. H. Shoemaker. 1939. *Auk*, 56 : 381-406. A very interesting article worked out with many charts and tables. Six advantages of social groups are mentioned, and a brief history of the studies on "peck-order" given. The "home-cage" effect is mentioned. "When strange birds were introduced into a pen with resident birds, the latter usually took the dominant position. While this phenomenon is not strictly comparable to 'territory' as used below, it is probably basically similar."

The author summarizes his findings as follows: "A social hierarchy of the 'peck-dominance' type exists among canaries, rather than the 'peck-right' type as described for fowl. Age, body weight, and problem-box behavior show no correlation with the position in the social hierarchy. Birds ranking high in dominance deal more pecks than lower-ranking birds. Males regularly dominate females except their own mates during time of breeding, when dominance is reversed for mated pairs. Position in the social hierarchy fluctuates with breeding activity. Male hormone is suggested as controlling the mechanism. Birds subordinate in neutral territory become dominant in their nesting territory. This factor alone would account for the 'peck-dominance' type of social organization." p. 404.

**34. Effect of Testosterone Proportionate on Behavior of the Female Canary.** H. H. Shoemaker. 1939. *Proc. Soc. Exp. Biol. & Med.*, 41 : 299-302. Male hormone was given to the three lowest of six females in peck order; 32 days later these were in first, second and third places. They sang like males, and courted and paired with unmated females.

**35. Induction of Singing in Female Canaries by Injections of Male Hormone.** S. L. Leonard. 1939. *Proc. Soc. Exp. Biol. & Med.*, 41 : 229-230. Testosterone proportionate was injected into five females; four sang the typical male song; three of them were later mated, built nests and laid eggs.

**36. Modification of the Social Order in Flocks of Hens by the Injection of Testosterone Proportionate.** W. C. Allee, N. E. Collias and C. Z. Lutherman. 1939. *Physiological Zoölogy*, 12 : 412-440. A review is given of studies on social order. "Dominant hens are characterized by the lack of any attempt to avoid other members of the flock; they may ignore the others, or they may chase and peck them. . . . Subordinates low in the social order tend to avoid birds of higher rank." p. 413. Testosterone proportionate "injected into low-ranking individuals in these flocks of white leghorn hens, produced a rise in social status in each adult that was treated; and an injected individual eventually occupied the top position in each flock." p. 439. "In initial pair-contacts with strange birds, the hen or pullet with the larger comb had decidedly the better chance of dominating the situation; comb size is generally considered to be an index of the amount of male hormone present." p. 439. Change in size of comb came first, then decrease in egg-laying, then crowing, then sometimes courtship, and "finally changes in social position." After injections stopped, these changes vanished, except for social position, which, "once won, was retained."

**37. The Social Behavior of the Jewel Fish, *Hemichromis bimaculatus* Gill.** G. K. Noble and B. Curtis. 1939. *Bull. American Museum Natural History*, 76 : 1-46. An admirable paper based on a great number of carefully planned experiments. Schooling behavior, sex recognition, territory, sexual selection, dominance and color, and responses of parents to eggs and young are some of the topics investigated. The young have an inherited preference for red which is strengthened by association with their parents. "Strange surroundings and a variety of external irritations will induce schooling." The male usually claims territory first. "A territory-holding fish is dominant to those without territory but until nuptial bonds have been formed between members of a pair the male usually attacks only males, and the female only females. After the bonds are formed each fish recognizes its mate by details of its color pattern, especially those on the head, and then the driving of other fish occurs regardless of sex." "Nuptial colors make intimidatory gestures conspicuous and hence are of value in guarding territory or young." Females choose the reddest males. "It is of advantage for the female to select a well-colored male because his intimidation display will insure greater protection to the young."

**38. Neural Basis of Social Behavior in Vertebrates.** G. K. Noble. 1939. *Collecting Net*, 14(6). 2 p. A summary of experiments. "Although complete loss of the forebrain in fish will result in the loss of all dominance, brooding and sexual behavior, such fish may seem in other respects more effective organisms than fish with intact brains." "It can learn new food signals more readily, it exhibits much greater vigor in its flight reactions and it exhibits less caution and maintains its aggregations longer." The "operation seems to have improved its personality, but its social relations" are almost entirely lost.

#### BIRD NUMBERS

**39. Fluctuations in Numbers of Birds in the Toronto Region.** J. M. Spiers. 1939. *Auk*, 56 : 411-419. Peaks of numbers in Rough-legged Hawks (*Buteo lagopus s. johannis*), Snowy Owls (*Nyctea nyctea*), and Northern Shrikes (*Lanius b. borealis*) have occurred at three to five year intervals, of Pine Grosbeaks (*Pinicola enucleator*) at five or six years, and of Goshawks (*Astur atricapillus*) and Horned Owls (*Bubo virginianus*) at nine to eleven years. "The peaks have occurred in the years immediately following the maximum abundance of their food in the north. No evidence has been detected to suggest that lack of food drove the birds south."

**40. Bird-Lore's Third Breeding-Bird Census.** J. J. Hickey. 1939. *Bird-Lore, Suppl.*, Sept.-Oct. : 13-31. "It takes one bird census to set up a tentative density for an area; two censuses to check the numbers reported; and three censuses to indicate the degree of stability or fluctuation present." In a stable environment some areas have shown a stable population. There are 42 censuses (20 from Ohio); habitats are divided into bogs and marshes, fields, woodlands, and man-made environments. Great variations are shown in the numbers present in different localities. A valuable project.

**41. Cooing Activity and Censusing of the Mourning Dove.** H. E. McClure. 1939. *Journal of Wildlife Management*, 3 : 323-328. An elaborate method of counting the population of *Zenaidura macroura*, based on the number of doves heard cooing during five minutes, in relation to time of day, temperature, weather, wind speed and distance of birds cooing. The author states that at Lewis in southwestern Iowa "the population averaged two birds to an acre and at the end of the summer the spring population had increased two and a half times," but he does not state how he reached this conclusion, nor does he explain fully the basis of his technique. Nowhere does he state the elementary fact that the males incubate or brood from about 8:30 in the morning to about 4 in the afternoon. He writes, "Both the male and female coo, but the note of the female is weak and not melodious. The calling as heard at a distance is that of the male." Apparently this means that he is counting only males. I have never heard a female coo, so far as I am aware.

#### ECOLOGY

**42. Habitat Selection among Birds in a Lapland Birch Wood.** H. N. Southern and L. S. V. Venables. 1939. *Journal of Animal Ecology*, 8 : 114-119. The major habitats are defined; the types favored by each species mentioned and limiting factors noted. The most adaptable species are the commonest. Tree nesters start earlier than ground nesters that have to wait for the snow to melt and the ground to dry.

**43. On the Nature of Cover.** Charles Elton. 1939. *Journal of Wildlife Management*, 3 : 332-338. A theoretical discussion on the three phases in the process of a predator searching for prey: Random searching, Pursuit, and Refuge, the author stressing the different kinds of cover needed for each phase.

**44. The Effect of Predator Control on Ruffed Grouse Populations in New York.** F. C. Edminster. 1939. *Journal of Wildlife Management*, 3 : 345-352. Experiments on different areas showed that complete and selective control of predators, although reducing destruction of nests of *Bonasa umbellus* "did not produce a higher shootable fall population of grouse during years of high grouse abundance." During "the upswing of the cycle . . . predator control may appreciably increase the fall grouse population. But . . . with the grouse population increasing anyway, the justification for predator control is very doubtful." On the controlled areas, grouse nest mortality was 24 and 39 per cent, on the no-control areas 51 and 72 per cent. As to brood mortality it was 57 and 54 per cent on the control areas and 67 and 55 per cent on the no-control areas. Predator control reduced nesting losses, but had little effect on brood losses, while adult losses were "greatest on the complete-control sub-area, and least on the no-control sections." p. 351.

**45. The Role of the Predator.** P. A. Taverner. 1939. *Canadian Field Naturalist*, 53 : 88-90. The stock-raiser disposes of weaklings in herds; the predators capture "the weaklings and least efficient" of the wild creatures. "The sportsman, on the contrary, endeavors to take the best of the hunted." "The natural predator is a strengthening element in wild-life economy, the sportsman a weakening one and it is questionable whether any compensation that he initiates makes up for his degenerating influence." The author concludes,

"Probably one of the greatest disservices man can do for the game he hunts is to destroy his rivals, the predators, the agents that exercise the only selection that compensates for his own deteriorating influence."

**46. The Control of Fish Predators at Hatcheries and Rearing Stations.** Karl F. Lagler. 1939. *Journal of Wildlife Management*, 3 : 169-179. Based on returns to questionnaires from 228 hatcheries. "Fish culture during 1937 in the United States entailed an unestimated total sacrifice of animals and a recorded extermination of 2,474 reptiles, 12,442 birds, and 307 mammals." It is shocking to read of the slaughter of 4,350 herons, egrets and bitterns, 278 ospreys, 306 water ouzels and 5,568 kingfishers. The author stresses the need of "wider use of control methods that exclude or frighten away predatory animals."

#### BOOKS

**47. Birds as Animals.** James Fisher. Heineman, London, Toronto. 281 pp. 12s 6d. A compendium of bird biology, written chiefly for the amateur in the British Isles who is doing such fine field work in ornithology. [There are twelve chapters, each starting with "Bird": historians, history, adaptation and habitat selection, variation and distribution, environment, habitat, numbers, migration, colours and display, territory, and reproduction, with a final chapter on "Birds and Man." The book is well annotated with some six or seven hundred references. There is an index of species, but no index of subjects. On the whole the work has been admirably done and a vast amount of information is presented in informal style. "Birds as Animals" will be a valuable reference book.

**48. The Geese Fly High.** Florence P. Jacques. Illustrations by Francis Lee Jacques. 1939. University of Minnesota Press. 102 pp. \$3.00. This time, instead of canoeing and camping in the northern wilderness, the Jacques take their folding kayak to the desolate swamps of Arkansas and the thrilling marshes of the Rainey Sanctuary on the coast of Louisiana. Mrs. Jacques' lively telling carries us from one adventure to another; we share with her her uneasiness in the murky swamps, her delight in the ducks and geese, her rapture over the beauty and color in the coastal marshes. For the first time she hears the cry of wild geese.

"I knew it was one of the most stirring sounds in the world, but I hadn't realized how it would besiege the spirit. It is to bird song what the trumpet call is to music, a gallant challenge and a desperate cry, lifting the heart, disturbing it."

As fascinating as the text are the black and white illustrations by Mr. Jacques, for he has captured for us the very spirit of the different ducks and geese. "The Geese Fly High" is a treasure of a book.

**49. Quetzal Quest.** Wolfgang von Hagen and Quail Hawkins. Harcourt, Brace. N. Y. 198 pp. \$1.75. An attractive book for children telling in lively, simple style and with amusing sketches of ultimate success after many difficulties in finding the nests of the brilliant Trogon, *Pharomachrus mocinno*, in Honduras, of raising the young and finally bringing them safely to the coast and on ship-board.

**50. The Private Life of Birds.** Henry Smith Williams. 1939. McBride. N. Y. 270 pp. \$3.00. The spectacular results obtained by the Williams by providing abundance of bright colored yarns for their Baltimore Orioles, Kingbirds and Cedar Waxwings have already been mentioned in this journal. Now Dr. Williams writes a book on bird life illustrated not with color prints of these gay nests—more's the pity—, but with the well known prints of the National Audubon Society. There is sound information here on bird life, but also much that is anthropomorphic. If the author had joined the Eastern Bird-Banding Association and color banded his birds, his results would have been greatly enhanced in value. If he had joined the American Ornithologists' Union and the Wilson Ornithological Club, and read the journals of all three societies, he would have been saved many errors.

**51. Working with Nature.** Eleanor King and Wellmer Pessells. Harpers. N. Y. 181 pp. \$1.20. Too often conservation is a sad subject. The greed and stupidity of mankind in relation to nature are only too obvious, and the odds against those of us who care are so great that we nearly despair. This little book, designed for children in the 7th and 8th grades, uses a different principle. It opens its readers' eyes to the world about them: earthworms, snails and insects in the backyard; the fascinating denizens of the ponds; mice, rabbits, birds. The emphasis is on what the animals do and their relationships with other forms of life. Suggestions are thrown out for study, observation, and the keeping of a variety of creatures as pets. Finally, the subject of "Saving the Ducks" brings out the fact that this means saving the water, and incidentally the soil. A sane, cheerful, intriguing book, full of suggestions of things the child can do.

**52. Natural History of the Birds of Eastern and Central North America.** By Edward Howe Forbush. Revised and Abridged with the Addition of More than One Hundred Species by John B. May. 1939. Houghton Mifflin. Boston. 554 pp. 97 color plates by Fuertes, Brooks, and Peterson. \$4.95. This is a reprint of much of the text of Mr. Forbush's "Birds of Massachusetts and Other New England States", 1925-1929, and of the plates with the addition of four by Mr. Peterson figuring southern species, and the addition also of brief accounts of over a hundred species occurring to the south and west, since the scope of the present book reaches to the 95th meridian. The species have been rearranged in the order of the Fourth Checklist. What has chiefly been omitted to bring the three volumes down to one are the detailed descriptions of plumages and molts, one of the most valuable features of the original books. "Haunts and Habits" have been greatly curtailed in some instances; it is a shock to find the classic account of the Heath Hen replaced by one brief paragraph of Dr. May's.

Doubtless many people will find the present volume a convenient and attractive book that gives them colored plates and a popular account of the birds in the eastern United States. Nevertheless, one wonders about the value of such a book. With Peterson's revised "Field Guide" and "The Portraits of New England Birds" (which might well have been reprinted), one would have everything offered here, but the curtailed "Haunts and Habits" of Mr. Forbush. These accounts are charming, nevertheless they are "out-of-date", since they are distinctly pre-territorial. Of course they are available in full in public, school, and private libraries. The title of the book is misleading; it does not give an up-to-date account of what we know on the "natural history" of these birds.

Instead of spending energy on more and more popular books, I wish we would aim for something of outstanding value to bird students and biologists like Nie-thammer's "Handbuch der Deutschen Vogelkunde" and Witherby's "Handbook of British Birds", where no words are spent on "appreciation", but a wealth of accurate information is given on plumages, molt, migration, weight, courtship, song, share of sexes in nesting behavior, length of incubation and fledging, etc., etc. Such an enterprise should stimulate bird students in this country to come to really know our birds.

#### ANNOUNCEMENT

Dr. Gordon M. Meade, Assistant Director, Strong Memorial Hospital, University of Rochester, 260 Crittenden Boulevard, Rochester, New York, announces his desire to cooperate in the Disease Study Project of the Eastern Bird Banding Association. Bird banders in his territory are invited to ship birds which die or are accidentally killed at their stations to him for post mortem examination. Refrigeration (up to the time of shipment) and speed in transit are essential to accurate diagnosis.—C. BROOKE WORTH, *Chairman*, Disease Study Project.