GENERAL NOTES

A Return-5 Eastern Tree Sparrow and a note on a late migration of a Slate-colored Junco.—An Eastern Tree Sparrow (*Spizella a. arborea*), A140497, banded at my station in Amherst, Massachusetts, January 15, 1931, was a Return-1 February 17, 1932, a Return-2 on February 9, 1933, a Return-3 December 18, 1933, a Return-4 November 24, 1935 and a Return-5 March 13, 1937. This bird's age on the latter date (March 13, 1937), assuming that it was a juvenile in 1930, was six years old when last taken. If it was an adult in 1930 its age was seven years on the above date.

A Slate-colored Junco (*Junco h. hyemalis*), 37-24206, banded at the Austin Ornithological Research Station on Cape Cod, Massachusetts on November 1, 1936, was recovered by me in Amherst on December 5, 1936, and again on February 5, 1937. This record is of interest as it shows, (1) a migratory movement very late in the season and (2) a migration direction 17 degrees north of west. —Mrs. Frederick Morse Cutler, Amherst, Massachusetts.

A Case of Superparasitism.—Last summer two Eastern Cowbirds (*Molothrus a. ater*) were reported from the nest of a Black-capped Chickadee (*Penthestes a. atricapillus*) in a nest-box at the Austin Ornithological Research Station on Cape Cod (*Bird-Banding*, VII, 129). The nestling Cowbirds were removed to the laboratory and examined for ectoparasites. Both birds were infested with several hippoboscid flies (*Ornithomyia anchineuria*). Further study of these flies has revealed two Mallophaga attached to the sides of the abdomen of one of the hippoboscids. Such observations have been made by other investigators and C. W. Johnson (*Psyche* XXIX, 79–85) has suggested that this may be a means of transportation of the Mallophaga from one bird to another. However, the present case seems of particular interest because of the fact that we have a parasite (Mallophaga) on a parasite (fly) on a parasite (Cowbird).—Carlton M. Herman, North Eastham, Cape Cod, Massachusetts.

A Bronze Grackle (*Quiscalus quiscula aeneus*) **A Six-Year-Old Return at Peterborough, New Hampshire.**—At my station in Peterborough, Bronzed Grackle, B337440, was banded on April 14, 1932. The bird was one of a small flock arriving about this time, and as the species was seen about the town in the summer, no doubt they breed here. On May 6, 1937 the bird was found dead by Mrs. Mary Farrar in her garden situated approximately 1,200 feet from my banding station. It had evidently suffered severe injuries, presumably by a passing automobile, for one leg was broken. The bird was in an advanced stage of decomposition so that it no doubt had been dead possibly several weeks when found.—Jesse V. Miller, 99 Hillside Avenue, Manhasset, Long Island, New York.

RECENT LITERATURE

(Reviews by Margaret M. Nice and Thomas T. McCabe)

The articles have been selected and arranged under subjects of importance to students of the living bird, and also for the purpose of suggesting problems, or aspects of problems, to those banders who wish to make the most of their unique opportunities.

Headings in quotation marks are the exact titles of articles or literal translations of such titles. Except in the case of books, which are always reviewed under their titles, headings not in quotation marks refer to general subjects or are abbreviated from titles in foreign languages. References to periodicals are given in italics. Reviews by Mr. McCabe are signed with his initials.

BANDING AND MIGRATION

"The 'British Birds' Marking Scheme Progress for 1936."—H. F. Witherby. 1937. *British Birds*, 30:337–342. In 1936, 48,663 birds were ringed in great Britain, 19,235 of which were trapped, while 29,428 were nestlings. The grand total since 1909 has reached 530,733. Thirteen individuals and stations ringed over 1,000 birds last year. A list is given of the numbers of each species ringed and recovered during the 28 years. Recoveries are high with Titmice due to trapping 15.5–18.3 per cent, and with some other species due to shooting: Ducks 4.4–18.4 per cent, Cormorants 18.6 per cent, Hawks 5–23.6 per cent.

"Results of Ringing Coots in Switzerland."[1]—*Fulica a. atra* is both resident and winter resident in Switzerland; the latter breed to the northeast, one being taken 2,000 km. distant. They often return to the same lakes each winter. Speed of migration may reach 262 km. (160 miles) in a day. Age records of 5 to 9 years have been obtained. Of 656 Coots banded, 14 per cent were retaken, most of them having been shot.

"Researches on the Migration of the Quail (*Coturnix coturnix coturnix L.*) **in Italy."**[2]—Of 1,011 Quail ringed at Lago del Garda, between 1930 and 1933, 192 were retaken—19 per cent. Prince Chigi reports birds retaken in migration at Castel Fusano after one, two and three years. The last birds of the spring migration are adults that have nested in Africa and their young.

"Bird Banding Brevities—No. 10."—A. R. Laskey. 1937. *The Migrant*, 8:2–4. From her station at Nashville, Tennessee Mrs. Laskey reports a Return-5 of a Maryland Yellow-throat (*Geothlypis t. trichas*) banded September 9, 1932, retaken September 19, 1936 "his fifth season at the station"; and winter returns of the following: 3 White-crowned Sparrows (*Zonotrichia l. leucophrys*) "banded in 1933, returned this year for their fourth winter, one of which was banded as an adult and is now at least 5 years old"; a Gambel's Sparrow (*Zonotrichia l. gambeli*) for its third consecutive season and White-throated Sparrows (*Zonotrichia albicollis*) for three years. As to Mockingbirds (*Mimus p. polyglottos*), during this mild winter, the 3 "male territory holders have been more zealous in boundary line demonstrations than were the territory holders during the unusually severe winter of the previous year. This was particularly noticeable in the frequent dancing, (the hopping forward, backward, sideways, as the two participants face each other), the more frequent fights, and the earlier singing."

"'Migration' and 'Homing' of Salmon."—A. G. Huntsman. 1937. *Science*, 85 (March 26):313–314. In quite a number of instances "salmon tagged in one river have been recaptured in another, which constitutes definite evidence against homing." Salmon tend to remain in the zone of influence of their natal rivers; if a fish gets "very far from this zone of river influence there is little likelihood that it will in its random wanderings reach the place where the marked gradient occurs. It may then be said to be 'lost.' Such salmon may reach neighboring rivers or travel very far in the sea."

[1] Schifferli, A. 1937. Ergebnisse der Schweiz-Blässhuhnberingung. *Der Ornithologische Beobachter*, 34:93–99.

[2] Duse, A., F. Chigi, A. Agostini, M. Rotondi, C. Paolucci, and A. Toschi. 1935. Ricerche sulla Migrazione della Quaglia (*Coturnix coturnix coturnix L.*) in Italia. *Ricerche di Zool. Appl. alla Caccia*, 9:1–125.

LONGEVITY

"Further Notes on a Very Old Cardinal."—A. F. Ganier. 1937. *Wilson Bulletin*, 49:15–16. A male *Richmondena c. cardinalis* lived to be at least 13 and one-half years old. The winter of 1935–36 was one of the coldest of record yet he came through it well, although showing signs of age by crouching as he ate, and the molt was slow and tedious. He and his young mate of April, 1935 remained

constantly together through the winter; they made 3 attempts at nesting in 1936, the last of which was successful. On August 3d, a male Towhee drove the Cardinal from the feeding shelf where he had eaten for years, and he never returned there, taking up quarters at a different shelf, and paying no attention to his mate. He was last seen November 20, 1936, having been banded February 12, 1924.

A House Finch (*Carpodacus mexicanus fontalis*) over 10 years old was retaken by Mrs. J. R. Michener, (*News from the Bird Banders*, 12:8. 1937).

Other data on longevity may be found in Number 1 and in the paper on the Golden Eagle.

LIFE HISTORY

Further Increase in the White Stork in East Prussia.[3]—In the Insterburg region, in 1935, 692 pairs of *Ciconia c. ciconia* raised 1,070 young, an average of 1.5, but in 1936 749 pairs raised 1,726 young or 2.3 per pair. All but 11 of these young were banded. In 1935 there was snow in May which probably killed the animals on which the Storks prey; 30 per cent of the nests were empty, but in 1936 only 14 per cent. Birds banded in the nest were found breeding 5, 15, 160 and 180 km. from their birthplaces. Seven of these new breeders were four years old and two three years old.

"The Home-Life and Economic Status of the Double-Crested Cormorant *Phalacrocorax auritus auritus* **(Lesson)."**—University of Maine Studies, Sec. Ser. No. 38:1–159. $1.00. An excellent study based on careful prolonged observation from blinds for two seasons on Marblehead Island, Maine. Territory is "limited to the nest and a very small area surrounding it." "Cormorants are very jealous of their territories, but an intruder usually leaves at the appearance of the rightful occupant." Incubation lasts 24 and one-half to 25 days, and is performed by both sexes, the birds relieving each other at intervals of 1–3 hours. Parents continue to feed offspring long after flight is acquired. About 6 meals a day are served. An interesting account is given of the development of the young. Parents know their young, but young do not know their parents. However, a strange young bird is repulsed gently. "The affection shown by the paired birds for each other during courtship lasts throughout the breeding season." The picture is of an attractive, amiable, highly socialized bird, its general behavior based largely on instinct, each individual showing a surprising degree of individuality.

"Nesting Habits of the Brush-Turkey."—D. H. Fleay, 1937. *Emu*, 36:153–163. Another of Mr. Fleay's admirable accounts of the nesting of large and peculiar Australian birds in captivity, under conditions so adequate, in the Melbourne Zoo, and under so profoundly differentiated a pattern of behavior, that they must reflect the natural cycle unusually well. The strange basic factors in the breeding of *Alectura lathami* Gray begin with the immense industry of the male in building the huge incubation mound, unstimulated by, and indeed hostile to the female throughout. "In fact the hen bird has rather an uncomfortable lot except during the few brief moments when she is graciously permitted to place an egg in the 'incubator' provided by her egotistical lord and master." Unnatural intelligence is continually suggested, whether by judging temperature deep in the pile by the bare skin of the neck, or by uncanny ability to open the crater before rains. One wishes that a long and precise record of the latter feat might be kept and published. Copulation is exceedingly rare and occurs on the finished pile (insofar as the pile is ever finished). Almost all parental instinct is devoted to the pile. The male may, on rare occasions, display a strange mid-wifery by digging toward an emerging chick, but beyond that there exists only indifference or hostility on the part of both parents, though the male does not bully the small chicks as he does the hen and their older progeny. One wonders whether this reflects natural behavior with accuracy. It is true, certainly, that the chicks are precocial to an extreme degree. Another fact it would be interesting to check in

the wild is the breeding of a pair both in their first year. In 26 months one male on one mound, with one female and a daughter taken as an additional mate at the end of a year, produced 60 chicks, with many more eggs in the mound at the time of writing.—T. T. McC.

"The Breeding Biology of Certain East African Hornbills (*Bucerotidae*)." —R. E. Moreau. 1936. *Jour. East Africa and Uganda Natural History Society*, 13:1–28. A very interesting study. Two nests of the Silvery-cheeked Hornbill (*Bycanistes cristatus*) were watched. The birds "probably pair for life," as couples are "seen together all round the year." The species is highly gregarious both in feeding and roosting; 200 birds may roost together for 13 hours out of the 24. The female builds the wall of the nesting chamber with pellets of dry earth brought her by her mate; in one day the male impregnated 33 cubic inches of soil with saliva. The pair worked usually from about 10 A.M. to 2 P.M. The female stayed in the nest 108 days; she and the single young bird came out at the same time. The male had made some 1,600 visits with food, bringing about 24,000 fruits. (A total of 26 all day records—twice each week—were made at this nest by African observers.) At first the male averaged 12 visits a day, later 21, decreasing near the end to 16–19. A large proportion of the birds do not breed every year; suitable holes must be hard to find and a male's saliva may be inadequate for the task of plastering.

With two other species (*Lophoceros deckeni* and *L. melanoleucos*) the female broke out of the hole when the young were partly grown and the latter—in each case two birds—repaired the plaster themselves.

"On the Behaviour of Male Mallards with Broods."—Bertram Lloyd. 1937. *British Birds*, 30:334–336. Although male *Anas p. platyrhynchos* customarily pay no attention to their offspring except occasionally to kill them, on Tring Reservoirs in 1936 five or six male Mallards were seen swimming with their mates and broods, some of which were young, others half grown. In four cases the males were swimming in the van of the brood.

"The Golden Eagle in San Diego County, California."—J. B. Dixon. 1937. *The Condor*, 39:49–56. *Aquila chrysaëtos* is a common resident in San Diego County, where the author has studied it since 1900. A map shows the territories of 27 pairs; these range from 19 to 59 square miles, averaging 36, or a township. One female is believed to be 30 years old. "Eggs of young eagles are larger and more heavily marked than eggs from older females, and the eggs gradually decrease in size and increase in thickness of shell." Eggs on one territory were always infertile. Area 1 had 4 distinct nesting locations and 11 nests; area 2 had 4 locations and 12 nests. Some nests are on cliffs, others are on trees. If the first laying is destroyed, the bird lays again in 28 days. Occasionally there may be as many as 3 or 4 layings when food conditions are good and the birds in the prime of life. "Nest building begins with the first heavy fall rains and continues through the winter." A new nest is not used the year it is built. Both sexes incubate. A female that has lost her mate may build and lay and then go to get a new mate! Old birds are sometimes banished and a new mate substituted. A very interesting article, but one wishes for more details on certain phases of behavior.

The Crowned Eagle.[4]—*Stephanoaëtos coronatus* is the king of forest birds in Africa. It nests high in trees and the young are not fledged until the age of 7 or 8 months. The female stays in the tree with the young bird, while the male brings food, but comes only once or twice a day despite the cries of the female. They are much attached to their young; the female of one pair had been captured and later the young; after this second loss, the male flew about for 8 days calling desperately. Each pair has a large territory. They prey on monkeys and capture them in this manner; the bird hides in the foliage near a band of monkeys and whistles softly; the females and young flee, but the old males approach threaten-

ingly. Suddenly he pounces on the nearest monkey. The author could attract enraged monkeys within a few meters by imitating the Eagle's whistle.

"Notes on Breeding-Habits of a Pair of Stock-Doves."—C. P. Freeman and G. L. Bates. 1937. *British Birds*, 30:302–304. Supposedly the same pair of *Columba oenas* bred in a hole in an elm tree for 4 years. The number of broods per year was 4–5; 33 eggs were laid and 24 young fledged. Incubation period was 18 days; fledging period 28–29. Twice "eggs were laid in the nest when it was still occupied by two young ones, on one occasion for as long as nine days or more."

"The Dance of the Prairie Chicken."—John S. Main. 1937. *Wilson Bulletin*, 49:37–42. This is a lively and detailed description of the dance of *Tympanuchus cupido americanus* as watched from a blind near Lake Mills, Wisconsin, followed by a discussion of the seeming purposelessness of this and so many generically similar performances by gallinaceous birds. In the case in point one female did come to the booming ground, which is apparently unusual, but displayed no interest and did not mate.—T. T. McC.

"Life-History of the Black-chinned Jacamar."—A. F. Skutch. 1937. *Auk*, 54:127–146. A charming article on a beautiful bird, describing its vivid plumage, attractive notes, "delicacy of form, grace and dash of movement," and the "mutual affection of the mated pair." *Galbula melanogenia* belongs to the order Piciformes. Nesting holes are excavated in banks. The female of a pair that Mr. Skutch watched in Guatemala did most of the work at first, but later her mate took an almost equal share, at the same time bringing her dragonflies and Morphio butterflies to eat. The birds incubated in two to two and one-half hour shifts, the female spending the night on the nest.

"Recent Observations of the Ivory-billed Woodpecker."—A. A. Allen and P. P. Kellogg. 1937. *Auk*, 54:164–184. Very interesting paper on this, one of the rarest of American birds. Several pairs of *Campephilus principalis* in Louisiana were studied, motion pictures taken of them, and their calls recorded on film. They were found to be strikingly sedentary and local in distribution. The male incubates at night; during the day the birds exchange places, often staying 2–3 hours at a time, but sometimes only 25 minutes. Theories as to reasons for the great scarcity of the species are suggested. The paper is illustrated with magnificent photographs.

"The Life of the Great Spotted Woodpecker."[5]—Although *Dryobates major* is solitary most of the year, Titmice and others often associate with him, their highly developed sociability making him "leader" despite himself. Both sexes drum in late fall, winter and spring. Dr. Steinfatt watched 12 nests, spending 109 hours at one hole. The male incubated at night and more in the day time than the female. Periods on the nest were short. On the 6th day of incubation the male was caring for the nest alone from 5.30 P.M. till dark at 7.43; he incubated in stretches of 4–25 minutes, averaging 10 minutes, a total of 79 minutes on the nest and 54 off. Incubation lasted 12 days. The male did all the brooding at night and most of it in the day time. The nest was watched all day just after the young hatched. The female came 10 times and brooded a total of 115 minutes, staying from 3–28 minutes at a stretch. The male made 41 trips and brooded 446 minutes from 1–28 minutes at a time. He was away 418 minutes from 2–65 minutes at a time. The young were brooded 561 minutes, or 65 per cent of the day.

"The Male Flicker's Part in Incubation."—A. F. Skutch. 1937. *Bird-Lore*, 39:112–114. The male incubates at night and also the greater share of the day. On a nest that was watched all day the male incubated 501 minutes and his mate 327 minutes in 3 sessions. The author mentions 4 Central American species where the male incubates at night: White-billed Pileated Woodpecker (*Clophloeus lineatus similis*), Truxillo Woodpecker (*Centurus sanctacruzi pauper*), Guatemalan

Flicker (*Colaptes m. mexicanoides*) and Guatemalan Hairy Woodpecker (*Dryobates villosus sanctorum*), and also the Red-bellied Woodpecker (*Centurus carolinus*). The same is true of the Ivory-billed and Great Spotted Woodpeckers as just related and also of the Lesser Spotted Woodpecker (*Dryobates minor*) as reported by Schuster (see *Bird-Banding*, January, 1937).

"The Song of the Mistle-Thrush."—George Marples. 1937. *British Birds*, 30:305–306. For 3 years a pair of *Turdus v. viscivorus* built in the same fork of the same tree in Hampshire. The male was "first heard to sing on January 24th and from that date he sang throughout the day from dawn to dark until the middle of May, a singing period of three and a half months." His "daily average singing time was just over 11 hours during which he sang almost continuously."

"Nesting Distribution of the Tricolored Redwing."—J. A. Neff. 1937. *Condor*, 39:61–81. *Agelaius tricolor* exhibits an "extremely erratic nature" "both in winter and in summer." Sometimes colonies are scattered widely over most of California, in other years there are great concentrations in a few places. They are intensely gregarious. "It has sometimes been definitely known that no Tri-colors frequented a certain marsh for weeks. Suddenly—within a few hours —a horde of the birds arrives and deploys to feed; within a few hours of arrival the entire band has been busily engaged in gathering nesting material, and by the end of the second day eggs have been noted in the nests. Indeed, on several occasions the birds appear to have dallied along the way, and eggs were deposited in unfinished nests, and in a few instances upon the ground close to the marsh." High winds sometimes cause desertion of nests. "Cooper's Hawks fed upon the adults of one colony until it deserted the nests."

"A Nest-Building Male Song Sparrow."—William E. Schantz. 1937. *Auk*, 54:189–191. Normally in Columbus, Ohio, the male *Melospiza melodia* takes no part in building the nest. Another departure from rule was the raising of 4 broods in one nest during one year. The male, which was very tame, showed three types of behavior when his young were held captive by the author: attempts to lure them away, to intimidate the enemy, and finally typical injury-feigning or nest-protecting display. In 1936 the female was very despotic towards her mate.

[3] Hornberger, F. 1937. Neue Feststellungen über Brutbestand, Ortstreue und Reife der Ostpreussischen Weiss-Störche im Ermittlungskreis der Vogelwarte Rossitten. *Beiträge Fortpflanzungsbiologie der Vögel*, 13:56–62.

[4] Maclatchy, A. R. 1937. Contribution a l'Étude des Oiseaux du Gabon Meridional (Suite.) *L'Oiseau et Rev. Franç. d'Ornithologie*, 7:60–80.

[5] Steinfatt, O. 1937. Aus dem Leben des Grossbuntspechtes. *Beiträge Fortpflanzungsbiologie der Vögel*, 13:45–54.

BIRD BEHAVIOR

"Observations and Investigations of the Biology of the Herring Gull (*Larus a. argentatus* Pontopp.) on the Bird Island of Memmertsand."[6]—The burden of this splendid study of the five or six thousand gulls of a dune and grassland islet off the German North Sea coast is breeding behavior and its psychological mechanism, the observation of response, the confident, almost naive, search for primary and integral stimuli, the groping ambition to weld the whole into an organic pattern. A running commentary on parallel studies amounts to a critique or check of many papers by Lorenz, Portielje, Leege, Leverkühn, Steinbacher, Culemann, Dircksen, Heinroth, Naumann, Noll, Strong, Watson and Lashley, and others. The work was largely carried on (with the aid of an assistant) from a dwelling cabin at the edge of the colony and from blinds a few feet from the nests. Manipulation of nests, eggs, young, and natural or artificial local detail amounted to an ambitious experimental program. Colony behavior, thought to differ from that of the same species in captivity or isolation, was the object emphasized.

Many of the birds arrived paired, though they are not believed to remain paired all winter, and at once took territories on April 22d. Copulation was common by April 27. Play nests appeared at once, real nests from May 9th on. Laying was general after May 10th; most young hatched from the middle to the end of June. Rhythmic general movements to and from the feeding grounds cease, except for the foot-loose birds, with the beginning of brooding. No birds bred in immature plumage. The vocal utterances are divided into twelve types, about half of which possess highly specialized significance. Several recognizable pairs were known to have bred for years on the same site.

There are numerous spectacular elements in the approach to breeding. 1. The assumption and defense of rigid small territories, in which the all-important element is the even more fixed "Standplatz," or post, of the male (during brooding of the unoccupied bird) which is to become the center of activity for old and young; 2. The extremely common "plucking game," usually between male and invading male, suggesting a trial of strength by plucking grass or sod, advancing, retreating, varying with temperament and stage of cycle, rarely inflamed to actual combat, and, if so, usually degenerating again to "plucking;" 3. The nest-ceremony, believed by the author, though not by others, quite distinct from the plucking game, though it sometimes involves pecking at the ground. It seems essentially distinct from territorialism and other elements of breeding biology, and may occur far from the nest, though some connection with nest cavity or sand-baths is rather regular, and mock-copulation may, rarely, enter into it. Many purposes, such as advertisement of possession or even repulsion of invaders may occasionally be served. The author sees in it a certain vague intensification of unity, and "expression of like-mindedness." It occurs most often at the meeting of a pair at the post, and consists in rushing together, standing with the hinder parts raised, squatting, with characteristic utterances, nodding, gulping, and apparent thickening of the neck. Spasms of both (2) and (3) may run over the colony like wildfire; 4. Building up to as many as four play-nests, usually abandoned, sometimes finally used, often used as resting nests by the female; 5. Decoration of the nest site with odd objects like shells or bones; 6. Begging by the female and responsive regurgitation by the male, undoubtedly sexual and independent of hunger; 7. Copulation-rehearsal, in which the interest of the female (and this is true even through actual copulation) lies in the bill of the male and in begging as for food, which the male pretends to feed her but never does. Unlike most birds, stimulation is undoubtedly of the female by the male. Copulation is usually at the post, sometimes on the beach, and stolen matings are rare. Here also, waves run over the colony.

Mates undoubtedly know one another, even flying over, and without voice. There is eternal fear of *spread wings*; of the *arrival* and *departure* of closest permanent neighbors, or even mates, while one bird, in a defensive frenzy, was seen to bite his own outstread wing. As an example of crowding, in one case three nests, around a protective shrub, lay within a square meter. Tolerance of approach, before laying, varies with the stage of the cycle. The female does not commonly fight in defense.

Nest construction usually takes about three days; material and site are enormously variable. Even when the ground is alike, the margins of the colony are far more crowded than the center. The inter-egg interval is most often two days (from 24 hours to three days). The male broods about one-third as much as the female. Removed eggs are recovered only if within some 15 centimeters, and then may have a new nest built around them. Very slight movement of the nest makes the pair disown it. Egg-theft is a prevalent vice originating with bold, unpaired thieves and spreading, through the taste of the eggs so broken, to respectable breeding pairs. Rival thieves at an unprotected nest may use the plucking game or other elements of breeding behavior. Most of the colony loses at least one clutch.

Owners of more crowded nests begin—perhaps are forced to begin—brooding more promptly than isolated pairs. From the first pip to escape from the shell takes from two to three days, and the cries of earlier-hatched young seem to

stimulate the struggle. In spite of decided preponderance of non-breeding adult males, the sex-ratio at hatching is close to 1 : 1. The first pecking at moving objects, which is thought to represent first hunger, may be in ten hours after hatching. The young stop begging and squat at the alarm call within twenty hours. The call was equally well-heeded by a house-hatched downy young placed in a nest. An elaborate demonstration of the importance of the red bill-spot to the begging young is of extraordinary interest. There is a sudden general change in food, notably from mollusks to crabs, at hatching time. The young begin to wander very early and have amazing ability to get back home through the hostile colony both by their own senses and habits and by recognition of the "help calls" of their parents.

There is great individual variation in the development of faculties such as defensive biting, notes of protest, and fear of man. Mutual recognition is amazingly sure and is the subject of much experiment and speculation. Even in the least prevalent section of the colony the theft and killing, and often eating, of young by adults amounts to from 5 to 10 per cent. Here again, parents may acquire the habit, but do not kill their own young. The female parent, at first solicitous of the young, rapidly loses interest, while the lasting defensive behavior of the male may reach actual fury. The most extensive experimentation dealt with the power to find their own nests and posts of the adults, which are almost impossible to deceive, far more difficult than Watson and Lashley found in the case of *Sterna fuliginosa*. Knowledge of detail and of the "lay of the land," optic and kinaesthetic senses at least, reach complex interplay, while the search for lost (removed) nests displays unexpected psychological plasticity. Although the population is not migratory, of the many adults carried away, alongshore or inland, up to distances of 450 kilometers, 84 per cent returned.

It is hard to praise the effort too highly, yet the lesson may be that with the pyramiding of modern information and the ramification of the old ornithology into a dozen fields of scientific specialization, even so well-delimited a study is too great for one man in one season to attain any single objective of the type and caliber to which the paper aspires.—T. T. McC.

"A Study of Nocturnal Behavior of Some Wild Birds."[7]—Roosting habits of many birds in France are described. Some diurnal birds see fairly well at night, others poorly.

"A Contribution to the Question of the Driving Away of Grown Young By the Adults."[8]—Do adults drive off their young, or do the latter wander away? The author banded a pair of Nuthatches (*Sitta europea*) and their six 10-day-old young on May 19th with colored bands; on June 12th he noted one young bird at a distance of 1.5 km., but the rest were still with their parents and still being fed. He concludes that no force had been used in this case. The reviewer has seen parent Song Sparrows drive off their own grown young.

"Injury-feigning by a Wood Duck."—A. A. Saunders. 1937. *Auk*, 54:202–203. A female *Aix sponsa* that had a brood of 9 young was attacked by a Red-shouldered Hawk (*Buteo lineatus*); the ducklings scattered and their mother "turned on one side, flapped one wing in the air and paddled about in circles as though quite helpless. The hawk immediately turned and struck at her," but she evaded him. Four or five times she "deliberately came out into the open," "evidently enticing the hawk gradually away from the vicinity of the young."

[6] Goethe, F. 1937. Beobachtungen und Untersuchungen zur Biologie der Silbermöwe (*Larus a. argentatus Pontopp.*) auf der Vogelinsel Memmertsand. *Journal für Ornithologie*, 85:1–119.

[7] Labitte, A. 1937. Étude sur le Comportement Nocturne in Natura de quelques Oiseaux. *L'Oiseau et la Rev. franç. d'Ornithologie*, 7:85–104.

[8] Stechow, J. 1937. Ein Beitrag zur Frage des Vertriebenwerdens der erwachsenen Jungvögel durch die Alten. *Beiträge Fortpflanzungsbiologie Vögel*, 13:54–55.

ECOLOGY AND CENSUSES

"Ecology of the Birds of Quaker Run Valley, Allegany State Park, New York."—A. A. Saunders. 1936. New York State Museum Handbook 16:1–174. On 15,276 acres of forest and 1,691 acres of open couuntry the author mapped the habitats and censused the nesting birds by counting the singing males over sample areas during the early mornings of the first two weeks in July in 1930 and 1931. He does not clearly explain his methods, but states that he easily covered 100 to 200 acres a morning, counting singing birds within 50 paces on either side. The foundation for the study is well conceived and the flora of the habitats thoroughly described, but I feel that he must have gravely underestimated the bird population. Moreover, my experience leads me to believe that this underestimation did not operate evenly in the different areas, and hence that doubt is thrown on a number of the author's conclusions. In many species singing of the male is irregular after nesting has started; indeed, Mr. Saunders himself has pointed this out for the Field Sparrow, writing that many individuals "are silent for much longer periods than a week, even right in the midst of the song period" (*Auk*, 1922, p. 397), and again, "Every Field Sparrow I have studied individually has exhibited it" (irregularity in song period), and finally, "It is common in many other species as well" (*Auk*, 1924, p. 248). With Song Sparrows in early July probably less than a half of the males might be expected to be singing, and I have found that (except in early spring) Robins sing very little after sunrise. Indigo Buntings and Northern Yellow-throats have also been undependable in their singing.

It is interesting to note that Mr. Saunders' most abundant breeders are the Black-throated Green Warbler, Red-eyed Vireo and Ovenbird, all notable for their tireless singing. I believe that his censuses in open areas suffered more from underestimation than those in the woods, because many of the dominant species of the former habitats are irregular in their singing, while those of the latter sing uninterruptedly. The highest population was found in mature maple-beech, namely 182 pairs per 100 acres. A. B. Williams (*Ecol. Mon.* 6:1–92, see *Bird-Banding*, April, 1937) with his careful weekly counts throughout the season on 65 acres of such forest in northern Ohio found from 2.0 to 2.7 pairs per acre over a series of four years.

Mr. Saunders says, "Let us assume, as a hypothesis, that any natural area supports all the bird life that can live there and that over an area where conditions are uniform the species of birds found and the proportions of those species will be the same." p. 26. I would not agree with this; I would rather say that the number of birds fluctuate below an optimum. Dr. Williams found marked fluctuations in the numbers of breeding birds, although conditions that might effect the birds remained practically unchanged.

An excellent discussion is given of "Succession in the Maple-Beech forest following cutting," as well as an interesting study of the ecology of the Ruby-throated Hummingbird (*Archilochus colubris*) which is dependent on the blossoming of the bee balm (*Monarda didyma*), and delays its arrival and nesting until the second week of July, when this flower is in bloom.

This very interesting paper is worth careful study. Mr. Saunders well says, "We must first base our knowledge on the ecological distribution of birds on natural areas, and make these studies before the natural areas are all gone."

"A Statistical Survey of the Winter Bird Life of Southeastern Ohio-Muskingum County."—L. E. Hicks and C. A. Dambach. 1936. *Wilson Bulletin*, 48:273–275. A survey of birds recorded on 25 all-day censuses between December 15th and February 15th, a typical trip lasting 8 hours and covering 6–7 miles on foot and 60 miles by car. Roosts of 32,000 Starlings (*Sturnus v vulgaris*) and 12,000 Crows (*Corvus brachyrhynchos*) were located in the county; these birds "have made a decided drain upon many winter food resources ordinarily available to other species." Sixty-five species were recorded. The authors give total numbers seen, per cent of days on which seen, average number seen per

day, and rank of species in Ohio, which was found by a study of the Christmas census throughout the state and "taking into equal consideration (1) the numbers occurring and (2) the percentage of trips upon which each was found."

"Bird-Lore's First Breeding-Bird Census."—1937. *Bird-Lore*, 39:147–150. An admirable plan for a start on a scientific study of breeding bird populations.

SEXUAL PERIODICITY AND LIGHT

"Sexual Periodicity and the Causes Which Determine It."—F. H. A. Marshall. 1936. *Phil Trans. Roy. Soc. London.* Ser. B. Biol. Ser. No. 539. Vol. 226:423–456. A valuable historical review of the whole subject, discussing the gonads, anterior pituitary, effects of light, other exteroceptive factors (relations between the sexes, removal of eggs, etc.) and meaning of sexual display. Some of the authorities on bird habits seem rather ancient—1882, 1848, and 1842. The purpose of sexual display is considered to be mutual stimulation and synchronization (the author does not refer to A. A. Allen's paper in *The Auk*, 1934, pp. 180–199). Interesting quotations are given from the Marquess of Tavistock as to the adaptibility of various species brought to England from the Southern Hemisphere in the matter of breeding seasons. "The emu shows little willingness to adapt itself to our seasons," but the Rheas always do so and the Ostrich usually. "Birds from North Australia are markedly more inclined to stick obstinately to their own breeding season (October)." Parrakeets from Southern and Central Australia adapt themselves to our seasons at once.

"Light and the Sexual Cycle of Game Birds."—L. B. Clark, S. L. Leonard and G. Bump. 1937. *Science*, 85:339–340. Absence of light inhibited the onset of sexual activity in Ruffed Grouse and Pheasants. Continuous illumination during the winter months stimulated egg laying a month early (after three and a half weeks of light treatment), but did not prevent its cessation, the bird laying 14 eggs and then stopping.

BOOKS

Adventures in Bird Protection.—T. Gilbert Pearson. 1937. New York. Appleton-Century. 459 p. $3.50. This is a tale of heroic labors, the chronicle of a self-made man who started from humble beginnings with no advantages of books or teachers, and became a power for conservation. It is a story of battles against game hogs, politicians, and milliners, in which the author's eloquence, knowledge of human nature, unflagging zeal and dogged determination brought victory for the birds. This is an important history of bird protection in America, well documented and well written.

Vertebrate Animals of Point Lobos Reserve, 1934–35. Joseph Grinnell and Jean M. Linsdale. Carnegie Inst. Washington, Pub. No. 481. 159 p. A survey of the vertebrates, treating of their environmental relations and discussing each species in some detail as to its occurrence and something of its behavior. Life history notes are given on various birds, as polygamous behavior of Redwings, antagonism between Pygmy Nuthatches and Western Bluebirds, location, contents, and dates of nests of many species, etc. The authors emphasize the prime necessity of leaving nature undisturbed in this reserve. "Here is a rare and much needed opportunity to cultivate a high order of discriminating appreciation of nature by, it is hoped, an ever increasing portion of Californians and visitors from elsewhere."

Cleveland Nature Trails.—A. B. Williams. *The Cleveland Press.* Public Service Bureau. 10c. A series of 13 articles on nature topics, birds, flowers, trees, and mammals, illustrated with many photographs, and a map of the reservations around Cleveland, Ohio. This is an excellent educational project and could well be copied by newspapers in other cities.

The Distribution and Habits of Madagascar Birds. Summary of the Field Notes of the Mission Zoologique Franco-Anglo-Americain à Madagascar.—A. L. Rand. 1936. *Bull. Amer. Mus. Nat. Hist.* 72:143–499. On the basis of two years spent in study and collecting on the Island, the author discusses distribution of birds in relationship to the three chief faunal areas, the humid forest in the east, the savanna districts, and the sub-desert. "The breeding season corresponds with the austral summer which is the rainy season. . . . A few birds breed throughout the year." In the forests outside of the breeding season, birds were concentrated in large flocks of various species that moved rapidly and fed "from the tree tops to the ground-cover." It is suggested that "mutual starting into activity of the world of organisms on which the birds prey may be a factor from which the members of the flock derive a mutual advantage." Notes are given on habits of some of the peculiar birds of Madagascar. Bensch's Rail (*Monias benschi*) appeared never to fly; one female was often found in company with several males, and it is the latter that incubate the single egg and care for the young.

Studies in the Life History of the Song Sparrow I,—[9]This book is the report of an extremely intensive study of a Song Sparrow population conducted at Columbus, Ohio during the eight years 1929–1936. This reviewer concurs with the verbal statement made by several ornithologists most familiar with the work —"the finest and most comprehensive study ever made of any North American bird." The scope is much broader than that of the usual study of a single species. Data concerning 126 other species from all parts of the world are compared with Song Sparrow events. In fact, this book can well serve as the best available text on life history-population problems. The subject index with 385 study topics and the bibliography with 269 selected references on life history reports, should be of inestimable value to any student in this field.

Through trapping, banding, and continued search, individuals were traced through their lives, and family histories established, the place of residence of relatives determined and the inheritance of migratory behavior, song characteristics, egg color, etc., investigated. This volume deals with the Song Sparrow and its environment, its ecology, migration, territory, and reproduction, all from a statistical point of view, and finally with survival problems. A second volume is planned which will deal with behavior and the details of territory establishment, "courtship" and song.

This work is a splendid example of modern study techniques based on banding, the unique advantages of which are the opportunity to study the subjects in the hand, weighing, measuring and noting details of condition, and the possibility of absolute identification in the field through the means of colored bands. It is a most convincing demonstration of the wealth of untouched research opportunities which exist in the "backyard" of every ornithologist—of the nearly universal blindness to significant bird events. Other common species should prove equally rewarding to other investigators.

The climatic and biotic factors governing Song Sparrow populations are carefully reviewed. The next chapter reveals that the chief life events are faithfully reflected in shifting body weights. The birds studied fell into four categories: transients, winter residents, summer residents and permanent residents. The section on the relation of the expression of the migratory instinct to environmental and hereditary influences, makes a real contribution to that subject. The portions which contain the most significant creative work are probably those which deal with territory and the development of a "life quotient" through an exhaustive analysis of reproduction and survival data.

The chapter on "The Cowbird in Relation to the Song Sparrow" is a classic treatise on the difficult topic of species interrelationships and should be of great interest to any student of species parasitized by the Cowbird. Data are presented which show that Cowbrids are "not specialized for parasitism." Sixty-six successful non-parasitized nests raised an average of 3.4 Song Sparrows, while 28 successful parasitized nests raised an average of 2.4 Song Sparrows. "Hence,

each Cowbird would seem to have been raised at the expense of one Song Sparrow." Cowbird reproduction was slightly less successful, considering the number of eggs laid, than that of the Song Sparrow.

The survival of adult breeding males averaged 60 per cent from one April to the next, while that of adult females was considerably less. Breeding males outnumbered breeding females by 5 per cent to 50 per cent. An average of 12.6 per cent of the fledged nestlings was later found as breeders near the place of their birth. Data would indicate that one-half to three-fifths of those that survive return to the place of their birth. To maintain a stable population, from 15 per cent to 25 per cent (average of 20 per cent) of all fledged young would have to survive to breeding age. It is calculated that the average adult male Song Sparrow lives to be 2 and a half years of age, but several banded individuals reached 7 years. The study indicated that well-situated populations are almost immune to predation and substantiated Errington's principle that survival is "largely determined by the carrying capacity of the land."

Throughout the book the author has demonstrated a remarkable familiarity with the literature pertinent to the problems and thus has been able to make most valuable comparisons with other population studies. The evaluations of the data at hand have been so carefully made that there are few places where contrary conclusions could have been reached. The write-up is a model for clarity. The table of contents and species and subject indices enable one to readily find any topic desired. Although the author had previously published no less than 15 papers on the Song Sparrow study, the majority of the material in this book is new, with previous reports summarized and re-evaluated. The investigation techniques are also reviewed. Particularly to be commended are the concise ways in which quantitative data have been presented in numerous charts, tables and appendices.

Unfortunately the single Song Sparrow color plate loaned for use in the book is quite inferior both as to context and reproduction.—LAWRENCE E. HICKS.

[9] Nice, Margaret Morse. April, 1937. Transactions of the Linnaean Society of New York. Vol. IV. A Population Study of the Song Sparrow. pp. I–VI, 1–247, Charts 18, Tables 33, Maps 14, Appendices 5, one color plate. Price, $1.50.