vicinity of the building, save for its forays to the water, where it was observed several times feeding with the wild gulls of the vicinity.—Lewis O. Shelley, East Westmoreland, New Hampshire.

A Pair of White-breasted Nuthatches Mated for two Winter Seasons.—On October 25, 1937, I trapped a female White-breasted Nuthatch (*Sitta-carolinensis*) bearing band 194226. Five days later (October 30, 1937) I trapped a male bearing band 194229. Both of these birds have since repeated several times and are to be seen together almost constantly nearly every day (December 11th).

The female was originally banded by Ralph W. Goodale on November 21, 1936, and five days later (November 26, 1936) he also banded the male bird. Both were banded at his station which is less than a mile distant from my own.

Although the fact that the female preceded the male to the trap by five days in each instance is probably only an interesting coincidence, it is quite evident that we have here two birds which have been closely associated, possibly as mates, for almost a year.—G. Hapgood Parks, 141 Branford Street, Hartford, Connecticut.

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.

MIGRATION STUDIES

"Physiology of the Migration Drive."[1]—Discussion of migratory restlessness in relation to metabolism based on experiments on Whitethroats (*Sylvia communis*) and Redbreasts (*Erithacus rubecula*) in Breslau. The author believes the migratory urge is due to increased thyroid secretion. His birds showed restlessness only after they had reached a maximum weight; it disappeared after they had lost weight, but reappeared when they had gained weight. This is a matter on which banders can give us information by weighing their birds; the native sparrows that I have caught did not show high weight in the fall, nor did White-throated Sparrows (*Zonotrichia albicollis*) gain weight during stays of five to twenty-six days.

"Release of Spring Migration Restlessness through Warmth in Caged Redbreasts, *Erithacus rubecula* (L.)."[2]—On March 21st the temperature was reduced to 5° C., then raised on March 30th to 20° C.; lowered on April 3d and raised again April 6th. The sudden warming of the room brought on migration restlessness in all the birds.

"The Migration of Birds."[3]—A review of recent theories. M. Dupond disagrees with the ideas of Stimmelmayr and Cathelin, but quotes with approval Wachs and Rowan. On the subject of "way-finding" he mentions the notable experiments of Rüppell and Stresemann. He criticizes the glacial theory of the origin of migration, believing that life originated near the equator and spread to the north, the cold of winter causing a yearly retreat in the case of the birds. He cites Mayr's study of the Serin (*Serinus canarius serinus*), a permanent

resident along the Mediterranean, that has extended its range over much of central Europe since 1800; as it spread to the north it became migratory.

"The Irregular Migrations of the Crossbill, *Loxia c. curvirostra*, and their Relation to the Cone-crop of the Conifers."—A. Reinikainen. 1937. *Ornis Fennica*, 14:55–64. Censuses of breeding pairs of the Red Crossbill in Finland in March over one hundred twenty square kilometers showed striking agreement between the crop of spruce seeds and the number of birds, but no agreement with the crop of pine seeds. The birds breed wherever there is a rich cone crop, then wander to find another. "Two rich cone-crops seldom occur in exactly the same region in subsequent years."

"Banding Results on Central European Barn Owls (*Tyto alba guttata* Brehm.)"[4]—A résumé of 419 retakes of birds banded in Germany. Young birds wander in all directions, having been taken from 20 to 754 kilometers from their birthplaces, but there is no real migration. The adult birds are fairly stationary. Of two birds from the same brood one was killed in north Denmark, the other in central France. An owl only three-fourths of a year old was found incubating eight eggs. One pair were permanent mates from 1921 till their death in the severe winter of 1928–29. The chief causes of mortality were an epidemic of coccidiosis, starvation in 1928–29, shooting, overhead wires, and drowning in water-containers. The greatest age reached was nearly nine years. Of 97 Barn Owls banded by the author no less than 36 were taken.

"Migratory Behavior of Some Glaucous-winged Gulls in the Strait of Georgia, British Columbia." —G. D. Sprot. 1937. *Condor*, 39:238–242. Immature *Larus glaucescens* disperse in different directions in autumn and apparently stay in certain localities. "Minor territorial rights" are shown; a bird may claim a small craft and guard it "against all comers." "Should the boat put to sea for several months, on its return to the harbor it will often instantly be boarded by the same bird." The author stresses the value of color-banding.

[1] Merkel, F. W. 1937. Zur Physiologie des Vogelzugtriebes. *Zoologischer Anzeiger*, 117: 297-308.

[2] Palmgren, P. 1937. Auslösung der Frülingszugunruhe durch Wärme bei gekäfigten Rotkelchen, *Erithacus rubecula* (L.). *Ornis Fennica*, 14:71–73.

[3] Dupond, Ch. 1937. La Migration des Oiseaux. Extrait d' "*Ornithologie.*" No. 110:562–568, No. 111:577–584, No. 112:585–588.

[4] Schneider, W. 1937. Beringungs-Ergebnisse an der mitteleuropäischen Schleiereule (*Tyto alba guttata* Brehm). *Der Vogelzug*, 8:159–170.

LIFE HISTORY

"Life History of the Oven-bird in Southern Michigan."—H. W. Hann. 1937. *Wilson Bulletin*, 49:145-237.

An outstanding example of conscientious, well-planned work, in which the latest techniques were employed—colored bands, weighing-machine, blinds, and itograph. Besides being a detailed study extending over three years on the life-history of *Seiurus aurocapillus*, the paper records much important information concerning the Cowbird (*Molothrus a. ater*). The only criticism that I have to offer is that Dr. Hann devotes too much space to quoting from the work of others, and hardly does justice to the unique value of his own findings. This is particularly true in two subjects—the relation of temperature to arrival in the spring and to the start of nesting, and the incubation rhythm. Figure 4 on p. 227 shows beautifully how temperature above normal brought the birds early—April 28th and 29th, while low temperature delayed them until May 8th. In warm weather nesting started at once, in cold weather it was delayed a week. The study of this chart is commended to those who insist that temperature has nothing to do with migration or the time of nesting.

Table 2 (p. 216) showing the number of minutes spent off the nest by three females in four nestings is of especial interest. Oven-birds have an exceptionally slow rhythm of incubation and feeding young for a Passerine bird. In 26 full-day records of incubation these birds left the nest from 5 to 13 times, the median

being 8.5 times. No. 9 averaged 7.3 absences, No. 6, 12.2, No. 15, 9.2 in 1935 and only 5.8 in 1936. The length of the periods off average 20 minutes with two of the birds, the temperature averaging 80° F. Eight days' record for No. 15 in 1935 gives an average period off the nest of 16 minutes (temperature 59° F.); ten days' record in 1936 gives 22 minutes (average temperature 63° F.). In analyzing the data with the use of daily average temperatures kindly sent me by Dr. Hann, I found that during the first five days in 1936 the temperature averaged 67.5° F., the average number of absences was 5.8, and their average length 27 minutes; during the last five days the temperature averaged 58.3° F., the average number of absences was again 5.8, but their average length was 16.6 minutes. Thus No. 15 stayed off the nest 16 minutes both years when the temperature averaged 58–59°, but stayed off longer during hotter weather.

Periods on the nest averaged as follows: No. 6, over two hours; No. 9, an hour; No. 15, an hour and a half in 1935, and over two hours and a half, in 1936. The total daylight time spent incubating averaged 86 per cent with No. 9, 73 per cent with No. 6, 85 per cent with No. 15 in 1935 and 86 per cent in 1936.

Records of all-day feedings are not common in the literature; in Table 5 Dr. Hann gives us 32; these are complete records on four nests taken from the itograph. There is a striking increase from the beginning to the end in every case, in three of the nests each day's count being higher than the one preceding. At two of the nests there was a sudden increase on the fifth day. At the nest that contained four Oven-birds and two Cowbirds the feedings ranged from 28 the first day to 160 the last, totalling 666; at the nest with five Oven-birds feedings rose from 27 to 123, totalling 548; at one with two Oven-birds they went from 16 to 67, totalling 304; at one with three Oven-birds they ranged from 20 to 61, totalling 289. These figures are very low in comparison with those for most Passerine birds (except those that feed by regurgitation); Oven-birds make few trips, but bring large loads each time.

Fifty-five per cent of adults survived one year; 31.5 per cent two years. Only one of 68 banded nestlings (a male) returned; he settled three hundred meters from his birthplace. There were two cases of remating two years in succession, two cases of bigamy, and a number of instances where a mated female copulated with neighboring males.

A second set of eggs is started five days after the first is destroyed. Incubation lasts twelve and one-fourth days; fledging eight days. Sometimes the female goes through "motions of feeding when it has no food" to lure young out of the nest or to induce them to follow her. Young are cared for till about thirty days of age.

As to nesting success, 24 females laid 161 eggs; 102 hatched (63.4 per cent), and 70 were fledged (43.5 per cent). Of these 70 fledged young, 39 survived to independence, 24.2 per cent of the 161 eggs, 56 per cent of the fledged young. An average of 1.6 young per female left the woods. Five of the females raised no young. Only one adult (a female) was known to have been killed during the nesting season.

Half of the nests were parasitized by Cowbirds, from one to four eggs being laid in a nest. The female Cowbirds watched the Oven-birds building (one doing so for 22 minutes at a distance of 4.5 to 10 meters); the Oven-birds did not recognize the Cowbirds as enemies. Eggs were laid at dawn. Eggs of the host were taken in the forenoon, but never at the time of laying, in contrast to the Cuckoo as found by Chance; 10 eggs were taken on the day before the Cowbird laid, 10 on the same day, and 3 on the following day. The incubation period was 11.1-11.8 days, .6 of a day less than that of the Oven-bird. The survival rate of 40 eggs was 25 per cent, in contrast to 43.5 per cent of the host.

There are excellent observations on territory, growth and development of the young, behavior of adults and young, and many other points. This paper should be in the possession of every student of life-history; it will well repay careful study. Dr. Stephens has earned our thanks by devoting almost the whole of the September issue of the *Wilson Bulletin* to this notable piece of work.

"The Return of the White Stork in 1937."[5]—The majority of *Ciconia c.*

ciconia reached Germany three to four weeks late; many of these failed to raise young. In one locality where 2.42 young had been raised per pair in 1936, less than one per pair was raised in 1937. Dr. Schüz believes the trouble lay in South Africa; the Storks may have suffered from parasites in flooded areas that killed many and weakened others. There were reports that many died from eating poisoned grasshoppers.

"The East Prussian Stork Population also Decreases in 1937."[6]—In 1936 there was high fecundity, with four and five young fledged in many nests, and an average of 2.5 young raised per pair. In 1937 most of the Storks failed to appear at the usual time; in some localities there was only one fifth of the normal numbers. At a few nests there were three Storks. In May other birds came; fights were staged and eggs and young destroyed. Second layings contained only one and two eggs, while the young suffered from heat, drought, and lack of food. Only 0.7 young were raised per pair.

"Observations on the White-tailed Eagle."[7]—*Haliæetus albicilla* is Germany's largest bird of prey; its food consists of fish, wounded or molting ducks, and large numbers of Coots (*Fulica atra*). The latter show an interesting social reaction when threatened by an Eagle; they all jam together, and the Eagle seems confused and unable to individualize one to capture it. The young Eagles are social, hunting and roosting together; the author once saw as many as ten together. Adults are not unfriendly to one another; in the few places where several nest near together, they may be seen sitting on rocks or piles near one another waiting for prey. The author warns against disturbance of the nesting pairs by photographers. The birds are protected by law.

"The Virginia Rail in Michigan."—Lawrence H. Walkinshaw. 1937. *Auk*. 54:464-475. This study of *Rallus l. limicola* is heavy with sound material on dates of arrival and nesting, incubation period (20 days), hatching, leaving the nest, adjustment of nest to water-level, and descriptions and weights of nests, eggs, and young. It contains relatively little on daily behavior, though there was some observation from a blind, and the scattered details of so unfamiliar a pattern are of rare interest. Such are the episodes of working dead rushes under the eggs to raise them from rising water; the rescue and carrying off by a parent of a newly hatched downy young which had escaped from the nest only to be caught in the weeds; the leaping from the nest of an adult, when a hand was stretched out from the blind, not to flee, but viciously to attack the hand; at least temporary brooding by two adults at one time; and the difficulty of the male in covering the eggs during a rainstorm.—T. T. McC.

"Biological Observations on the Development of the Barn Owl."[8]—A study of feather-development, weight, and numbers of feedings of six young *Tyto alba* in Switzerland. By means of the terragraph it was found that from three to fifteen meals were brought per night, the median of twenty-eight nights being eight. The weight of the young owls increased to a maximum of 360 to 400 grams about the thirtieth day; decreased after that in connection with the growth of the feathers, increased somewhat again, finally decreasing once more with the activity of the young owls, until at two months the birds left the nest, when it reached about 320 grams, an average adult weight. The female does the incubating and broods the young for the first ten to eleven days, while the male provides food.

"Report of the Little Owl Inquiry 1936–37. (Organized by the British Trust for Ornithology.)" Alice Hibbert-Ware. 1937. *British Birds*, 31:162-187. Another example of the coöperative work of British ornithologists. *Athene noctua vidalii* was introduced into England in Northamptonshire and Kent from Europe between 1874 and 1889. By 1900 it had become abundant, having spread over most of England and Wales. "It rapidly became a bird of evil repute and widespread charges were made against it of serious depredations on song birds and game and poultry chicks." The investigation of 2460 pellets, 76 nests,

and 28 gizzards does not substantiate these accusations. The bird is less common now than it was a few years ago even where it is not persecuted. Smaller clutches are found now than thirty years ago, when the average set contained four to five eggs; now it contains three.

"Observations on the Nest Life of the White-backed Woodpecker."[9]—*Dryobates l. leucotos* is a rare bird in the Bavarian Alps. It prefers old, rotted stumps for feeding and for nest-sites. The author suggests that this preference may be one reason for the bird's rarity. The tree containing the nest which he studied was blown over in a storm, and the young were killed. A few days earlier he had watched the nest from noon till night; the two young, which were about five to seven days old, received 27 meals from the male and 17 from the female. The next day he watched from dawn till dark, the first meal being given at 4:41, the last at 7:56; the male brought 46 meals, the female 54. The male spent the night in the hole.

"The Swallows at the Life Sciences Building."—J. Grinnell. 1937. *Condor*, 49:206-210. This building on the campus of the University of California was finished in 1929, but not until 1935 did Swallows make use of it; that year about June 1st twenty pairs of Cliff Swallows (*Petrochelidon albifrons*) appeared and started to nest. In 1936 the first birds came April 16th, starting to build on the southeast corner. On May 12th 128 pairs were established, and on June 4th 161 pairs, as well as 11 pairs of English Sparrows (*Passer domesticus*), which had first appeared on May 27th and had at once started throwing out the eggs and young of the Swallows. On June 12th the first young Swallows were out, 48 days after the first arrival of the adults. It was thought that 95 pairs were successful and that they raised about 190 young. Fifteen nests were occupied by Sparrows. The white throat of the young Swallow appeared to be a "directing device, facilitating quick and accurately aimed delivery of food to the young by the parents." The northwest section of the building was avoided; perhaps the birds needed the sun for quick drying of the mud. Dr. Grinnell states that colonies of Cliff Swallows usually last only two or three years, and he asks whether the reason can be parasites, increasing predation by other birds, or, since young may establish new sites, does each colony last "only so long as the lifetime of a generation of swallows?"

"Breeding Biology of the Dipper (*Cinclus cinclus aquaticus* (Bechst))."[10]—A fascinating tale of two pairs of banded *Cinclus cinclus aquaticus* in Thuringia. Observations were made on the building of the elaborate nest by the female, and each pair was watched all day during the tenth day of incubation and the ninth day of feeding young. On the first date the female of the first pair left the nest 21 times, staying away from 3.5 to 21.5 minutes, averaging 8.5; her periods on the nest ranged from 14 to 82.5 minutes, averaging 32. The other female came off 28 times, staying off from 2 to 14 minutes, averaging 7.8 minutes; she incubated from 5 to 115 minutes at a time, averaging 29.8 minutes. The first bird spent 78.9 per cent of daylight hours on the nest, the second 76.5 per cent. The first male visited the nest 18 times, bringing food to his mate 8 times; the second came 24 times, feeding his mate 13 times.

When it came to feeding young, in both cases the females did the greater share. At the first nest the female had no time to oil her feathers and became wet and bedraggled before the day was over. She fed the three young 196 times, while the male fed 129 times in 960 minutes. She attacked her lazy mate several times, with the result that for a while his zeal increased! These attacks were always accompanied by singing, the female singing 28 times during the day and the male 6 times. This pair was watched again on the twenty-third day of feeding the young; the female fed 217 times, the male 107 times. The male was more indolent than ever, but only once did his mate punish him. The female sang 37 times, the male 15 times; apparently they were in the courtship stage, preparatory for a second brood. The male tried to drive off a pair of Grey Wagtails and Kingfishes, but the female ignored them.

The other pair fed their young on the ninth day 596 times, the female bringing

432 meals. The author considers the difference between the activity of the two pairs as due to better feeding conditions on the second stream, but there probably were more young in the second nest, since five eggs were laid. This female was never aggressive towards her mate; she sang 5 times, he 45 times. She kept the nest scrupulously clean, while he never touched a dropping; he sometimes started to pick one up, but drew back and went to the stream and cleaned his bill just as his mate did after she had really carried off a sac.

The young of the first pair left when 23 days old; one of these when 40 days old was watched as he ran along the bank picking up flower petals and other small objects, none of which proved to be edible. The adults stayed under water usually five to seven seconds at one time; the longest observed period being fifteen seconds. All in all, an admirable study.

Report on the Breeding Biology of the Wood Warbler (*Phylloscopus sibilatrix.*")[11]—A high proportion of unmated males was found in a locality in Mecklenberg, 12 out of 35; these bachelors defended their territories even after their mated neighbors had raised their first broods. Two songs and nine calls of the male are described, four calls of the female, and four of the young. The female builds and incubates, leaving the nest after periods of 45 to 80 minutes on the nest. The male had difficulty in finding the nest during the first day of feeding the young. The author does not state how many hours were spent watching the nest each day, but gives a curve showing average hourly feedings; the male's rate increased from 2.9 the first day to 7.4 the second, 11.2 the fifth; and 19.2 the eighth day, dropping somewhat after that; the female's increased from 2.2 the first day to 5.4 the fifth, 10.6 the seventh, 20.9 the ninth, and 27.3 the eleventh, the day before the six young left.

"Observations on the Nest Life of the Wood Warbler on the Rominter Heide."[12]—Incubation period is 12 days, the female leaving the nest after 23 to 39 minutes, and staying off from 7 to 10 minutes.

"Observations on the Nest Life of the Spotted Flycatcher, *Muscicapa str. striata,* **on the Rominter Heide."**[13]—Another of Dr. Steinfatt's excellent studies. Incubation is by the female and lasts 14 days; periods on the nest lasted 46 to 59 minutes, and off the nest, 5 to 8 minutes. The male occasionally fed her. A nest with four young was watched from 4 A.M. till evening July 15th, all day July 16th, and in the morning of July 17th, during which time the young left. On the 15th—a clear, warm day—237 meals were recorded; on the 16th, which was cloudy and windy, 217 from 2:58 A.M. to 8:31 P.M. Both parents appeared to feed equally. On the 15th the young received food once every four minutes, on the 16th once every five minutes, and on the 17th once every three minutes. The parents tolled the last young bird out of the nest by putting food into its bill and taking it out again.

"Some Domestic Habits of a Pair of Spotted Flycatchers."—Stanley Lewis. 1937. *British Birds,* 31:194–196. Two years in succession a pair nested in an old tea-kettle, raising two broods in it in 1935, but only one in 1936. In 1935 building started on May 21st, and the young left on June 27th; the family returned on July 6th, added some material to the nest while still feeding the young, the female laying the first egg July 8th. This brood was fledged August 7th The next year the cycle lasted from May 19th to July 3d, the first egg not being laid till fourteen days after the start of building in contrast to seven days in 1935. Incubation (performed by the female) lasted 13 days, fledging 13–14 days

"The Breeding Biology of the Grey Wagtail."[14]—A pair of *Motacilla c. cinerea* were watched for six hours on three consecutive days five to seven days after the eggs had been laid. The female incubated from 65 to 74 per cent of the time, the male from 17 to 19 per cent, while the eggs were left uncovered from 10 to 17 per cent of the time. The female incubated at night.

"Nesting of the Bay-breasted Warbler."—Howard L. Mendenhall. 1937. *Auk*, 54:429–439. It is a pity that the desire to take pictures made this a tale of disturbances rather than of systematic watching. Yet the pictures are rare and lovely, and that of the female *Dendroica castanea* shading the young very important. If the time is to come when we can work out the systematics of physiology and of behavior as we now do those of form, such accounts will have to be boiled down to some semblance of comparable pattern. This nest is a rare one, and the observation keen but incomplete and a trifle happen-chance, for the author felt it safer to keep away during most of the incubation period, and squirrels broke up the show at fledging-time. Substantially established for the period of observation are the all-female brooding, the manner and something of the rate of feeding by both sexes (26.4 times an hour by the female, 13 times an hour by the male), certain reactions like "injury-feigning," and sheltering the young from rain and sun by the female. Incubation seems to have begun with early eggs of the five-egg clutch.—T. T. McC.

"The Nesting Life of the Scarlet Finch."[15]—From nests of *Carpodacus e. erythrinus* observed in East Prussia, the incubation period was found to be twelve days, and fledging the same length. One nest was watched all day during incubation: the female left 17 times, staying away 2 to 19 minutes, averaging 9.2; her periods on the nest lasted from 38 to 152 minutes, averaging 48.5 minutes. She incubated 84 per cent of the time during daylight hours. The male fed her occasionally. This was an expression of heightened excitement. She often left the nest in answer to his song or call. The brood of four young were watched all day when one and two days old and when nine and ten days old; on the first date the female made 32 trips with food, the male 6; on the second the female made 18, the male 12 trips. Feeding was by regurgitation, and at each session from 5 to 24 feedings were made.

"Field Notes on the Corsican Citril Finch."—John Armitage. 1937. *British Birds*, 31:98–100. *Carduelis citrinella corsicana* nests in the mountains of Corsica. The parents fly a mile below the nesting-grounds to collect seeds and feed the young by regurgitation at intervals of three quarters of an hour to nearly two hours.

[5] Schüz, E. 1937. Vom Heimzug des Weissen Storchs 1937. *Der Vogelzug*, 8:175–183.
[6] Hornberger, F. 1937. Auch der ostpreussische Storchbestand geht 1937 zurück. *Ornithologische Monatsberichte*, 45:168–169
[7] Wendland, V. 1937. Beobachtungen über den Seeadler. *Beiträge Fortpflanzungsbiologie der Vögel*, 13:175–182; 224–227.
[8] Bussmann, J. 1937. Biologische Beobachtungen über die Entwicklung der Schleiereule. *Arch. suisses d'Ornithologie*, 1(9):370–390.
[9] Jost, F. 1937. Beobachtungen über das Brutleben des Weissrückenspechtes. *Beiträge Fortp flanzungsbiologie der Vögel*, 13:165–174.
[10] Eggebrecht, E. 1937. Brutbiologie der Wasseramsel (*Cinclus cinclus aquaticus* (Bechst.). *Journal für Ornithologie*, 85:636–676.
[11] Treuenfels, H. v. 1937. Beitrag zur Brutbiologie des Waldlaubsängers (*Phylloscopus sibilatrix*). *Journal für Ornithologie*, 85:605–623.
[12] Steinfatt, Otto. 1937. Beobachtungen über das Brutleben des Waldlaubsängers in der Rominter Heide. *Beiträge Fortpflanzungsbiologie der Vögel*, 13:182–189.
[13] Steinfatt, O. 1937. Beobachtungen über das Brutleben des Grauschnäppers, *Muscicapa str. striata* in der Rominter Heide. *Journal für Ornithologie*, 85:624–635.
[14] Vollbrecht, K. 1937. Zur Brutbiologie der Gebirgsbachstelze. *Beiträge Fortpflanzungsbiologie der Vögel*, 13:193–194.
[15] Steinfatt, O. 1937. Das Brutleben des Karmingimpels. *Beiträge Fortpflanzungsbiologie der Vögel*, 13:210–223.

BIRD BEHAVIOR

"Aggressive Display of Birds before a Looking-Glass."—George Brown. 1937. *British Birds*, 31:137–138. In early April a looking-glass placed on the lawn was attacked for hours at a time by a male Pied Wagtail (*Motacilla alba yarrellii*), a male Blackbird (*Turdus m. merula*), and a male Great Tit (*Parus major newtoni*), all three running around behind to find the rival. The females were indifferent. All the males had much black on them and displayed it before the mirror. A male Robin (*Erithacus rubecula melophilus*) paid no attention to it. At the end of April there was little interest, and in May none at all.

"Nesting Habits of the Spotted Sandpiper."—Henry Mousley. 1937. *Auk*, 54:445–451. This corrects the statement of the incubation period of *Actitis macularia* (given in Bent's *Life Histories* as 15 days) to 20 or 21 days, and shows that the male incubated and cared for the young in two instances, but the burden of the paper is support of Dewar's and Friedmann's interpretation of demonstrations of the "injury-feigning" type by the adults as the result of partial incapacitation by nervous shock and confusion. The author simply feels that the variety and extremity of "demented" behavior by the parents when the hidden young were threatened were too extreme to be explicable otherwise. In reviewing the recent discussions of the subject he seems not to have appreciated the diametrically opposite central idea of Jourdain, that such fear is unreasonable and not born out by closer scrutiny of the bird.—T. T. McC.

"Winter Habits of the White-throated Swift."—Gayle Pickwell. 1937. *Condor*, 39:187–188. A flock of *Aëronautes saxatalis* streamed into a niche through a crevice two or three inches wide after sunset at a canyon in California. This bird's "method of going to bed remains as one of the most amazing spectacles of the bird world."

"Observations on Mixed Flocks in Autumn."—George Mayfield. 1937. *Migrant*, 8:47–49. Flocks start to form about September 1st (in Tennessee); they move about one and one-half miles in two hours and then leisurely return to the start. "The permanent residents seem to fix the time, the area to be covered and the rate of travel." "A change to cooler weather often marks the end of one flock and the formation of a new one" around the nucleus of Carolina Chickadees and Tufted Titmice.

STUDY OF MOLT

"The Juvenal Plumage and Post-juvenal Molt of the Chipping Sparrow."—G. M. Sutton. 1937. Occasional Papers of the Museum of Zoology; No. 355. Univ. Michigan. 5p. Another excellent paper by Dr. Sutton on this subject that is so eminently suited to study by means of banding. An eight-day-old *Spizella p. passerina* was raised in captivity and its plumage changes were noted; the post-juvenal molt started when the bird was about thirty days old.

POPULATION STUDIES

"Bird-Lore's First Breeding-Bird Census."—Edited by J. J. Hickey. 1937. *Bird-Lore*, 39 (5):373–386. Thirty censuses from Quebec to California are reported in detail, with data on the ecology of the habitat and number of pairs of each species. In terms of adults per hundred acres the results range from 6 on a new fill on salt marsh to 130 in bog forest, 216 and 276 in pine-hemlock, 536 in second-growth oak-hickory, 760 in an old river bottom (southern Texas), 1240 on an estate in Ohio, and 1680 in a cattail swamp. A splendid beginning on a most important undertaking.

"Breeding Birds of Unglaciated Ohio."—L. E. Hicks. 1937. *Cardinal*, 4 (6):125–141. A discussion of the ecology and breeding bird population in the twenty-two southeastern counties of Ohio. The 130 breeding birds are listed for each county on a scale of ten from "no records" to "extremely abundant." An excellent contribution based on a great deal of careful field work and daily counts of numbers of birds seen.

ECOLOGY

"Some Ecological Aspects of Bird Life."—N. L. Roberts. 1937. *Emu*, 37:48–55. Six instances are given from Australia and one from Africa of the dependence of nesting on rainfall; in one case smaller clutches are reported in drought years, but in the others the birds fail to nest until the coming of rain.

"The Psychological Factor in Bird Distribution."—D. Lack. 1937. *British Birds*, 31:130–136. "In birds each species (instinctively) selects its

habitat, in contradistinction to plants, in which the habitat selects the species." The author believes that in this selection the bird "is probably influenced by the visually prominent, not necessarily the essential, features." He stresses the importance of psychological factors, saying that "they severely complicate all investigations of the factors limiting bird distribution."

"Willow Ptarmigan at the Quebec Zoological Gardens."—J. A. Brassard and Richard Bernard. 1937. *Auk.* 54. 514–515. As an aid to keeping *Lagopus lagopus* in captivity a stomach examination was made of some thirty spring and summer specimens taken in Quebec during the invasion of 1932–33, which is expected to be repeated when a seven-year interval has passed. Ninety per cent of the stomach-contents consisted of twigs, buds, and catkins, in order of quantity, of four species of willow.—T. T. McC.

"On the Changes in the Avifauna of Finland during the Last Decades and the Factors that have Influenced Them."[16]—Since the 70's and 80's southern birds have pushed their ranges northward—Ducks, Coots, Gulls, the Lapwing, Wood Warbler, Tawny Owl, Blackbird, and Blue Tit. At the same time many northern birds have withdrawn, while some species, formerly summer residents, now remain throughout the year—Mallard, Gulls, Hooded Crow, Starling, Chaffinch, Greenfinch, and White Wagtail. The authors have studied the records of the weather bureau for the last hundred years and find a marked increase in mean annual temperature during the last fifty years. Late fall, winter, and spring are considerably warmer at present than from 1830 to 1880.

[16] Siivonen, L. & O. Kalela. 1937. Ueber die Veränderungen in der Vogelfauna Finnlands während der letzten Jahrzehnte und die darauf einwirkenden Faktoren. *Acta Soc. pro Fauna et Flora Fenn. 60:* 606–634.

CONSERVATION

"Thirst on the Land. A Plea for water Conservation for the Benefit of Man and Wild Life."—William Vogt. 1937. National Assoc. Audubon Soc. Circ. 32. 32p. A masterly presentation of the utter folly of drainage, well documented and convincingly written. The chapter-headings discuss: "Why Worry about Marshes and Swamps?" "The Living Swamp." "The Devastation of Our Swamps and Marshes." "Mosquito and 'Malaria' Control through drainage." "What Price Drainage.." "Drainage Control a Necessity." The author concludes: "Thus, in essence, the zeal for drainage has ravaged the face of the North American Continent like some form of terrestrial erysipelas. Wild life and vegetation have been killed, and the earth has dried up, only to erode and blow away in dust blizzards that are disastrous to man and beast alike." This pamphlet deserves the widest possible circulation. It may be obtained free from the National Association of Audubon Societies, 1775 Broadway, New York

"Preservation of Birds in California."—J. M. Linsdale. 1937. *Condor,* 39:198–203. A plea for more zeal for bird protection on the part of ornithologists. Since settlement there has been a small decrease in the number of species; some are gone, while others are greatly reduced. "A few species, common ones already, have increased greatly in numbers." Park managers are over-enthusiastic and attract too many visitors.

"Cleveland Nature Trails."—A. B. Williams. The Cleveland Press. 15 cents. Ten additional leaflets have been added to this excellent set of educational pamphlets, the first of which were mentioned in *Bird-Banding* for July, 1937. The new material (costing five cents post-paid) deals with fall and winter, migrating birds, squirrels, mushrooms, "Why the Leaves Fall," "Nature Prepares for Winter," "Winter Bird Companies," "Records in the Snow," etc, and finally a "Spring Bird Timetable," all well and interestingly written and admirably suited to interest children and adults in the out-of-doors. Mr. Omar Ranney, Cleveland Press Nature Editor, and Dr. A. B. Williams, park naturalist of the Metropolitan Park System, have set an example that should be followed all over the country.

BOOKS

Der Brutparasitismus der Kuckucksvögel.—Wolfgang Makatsch. 1937. Leipzig. Quelle & Meyer. 10 RM. 152p. A useful compilation of information on the parasitic Cuckoos. A total of 592 titles are given in the bibliography, yet one at least of the authors mentioned in the text is omitted. There are four sections to the book: parasites outside the Cuciliformes; the Cuculiformes; adaptation of eggs and young to those of the host; and origin of parasitism. An interesting list is given of parasitic birds—the African Indicators and Viduinæ, the South American duck *Heteronetta atricapilla*, the Central American Tyrant *Legatus leucophaius*, and the American Cowbirds, although, curiously enough, *Molothrus ater ater* is not even mentioned! The author thinks that our Mourning Dove is on the road to becoming a parasite on the strength of its sometimes using old nests of other birds and on the report of one case where it ousted a Robin from a new nest.

A great deal of information is given on *Cuculus canorus* and some on other Cuckoos. In several cases the decrease of favored hosts has been reported. As to theories, the author mentions a great many, but inclines to none.

The Birds of America.—By John James Audubon. With an Introduction and Descriptive Text by William Vogt. 1937. Macmillan. N. Y. $12.50. An exciting event for the bird-lovers of America was the appearance of this volume containing reproductions in color of the five hundred plates of Audubon. Although some of the birds are stiff and their colors unnatural, others have a life and beauty and dramatic appeal that is amazing. Mr. Vogt has managed to condense into eight lines beneath each plate a deal of significant material on range, habitat, identification, breeding, etc., with every now and then a trenchant thrust for conservation. In his introduction, also, he gives a maximum of information in minimum space on Audubon, bird-study, and bird-protection. The publishers and editor have done a distinct service to nature-lovers in bringing out this gorgeous book.

The Book of Birds.—2 Vols. Edited by G. Grosvenor and Alexander Wetmore. Washington, D. C. National Geographic Society. $5.00. An excellent popular book on birds, picturing in color, from paintings by Allan Brooks, the majority of species (633) that occur in the United States and Canada; the arrangement of "eastern and western varieties" "side by side" is a decided convenience at times. Besides chapters on the different orders and families, there are articles on encouraging birds around the home, on bird foods, on the Eagle's eyrie by Herrick, on banding by Lincoln and on "Hunting with a Microphone" by A. A. Allen. Two hundred and twenty-eight photographs, mostly by Dr. Allen, add to the interest and value of the volumes.

Birds of the Connecticut Valley in Massachusetts.—Aaron Bagg and S. A. Eliot, Jr. 1937. Northampton, Mass. Hampshire Bookshop. $8.50. This quarto volume of some nine hundred pages is almost entirely devoted to an account of the occurrence of 297 species of birds in three counties in central Massachusetts. The authors have done an immense amount of work "migration-watching" both in spring and fall, and have worked up the history of ornithology in their region in painstaking manner. Field identification is stressed, and sensible observations made on the matter of sanctuaries. Lists are given of migration and hatching dates. Certain northern birds are extending their range to the south—Yellow-bellied Sapsucker, Hermit Thrush, and White-throated Sparrow.

The authors have a thorough knowledge of the occurrence of birds in their region, but they fail to build on this foundation; they do not correlate the distribution of the nesting birds with the ecology of the habitats, nor do they correlate migration with weather. There is some anthropomorphizing in the noting of "scouts" in the case of Cliff Swallows and Purple Martins, a bird that comes early, "makes sure that conditions are unchanged, spends a night in an old nest, departs, and a few days later reappears, gradually assembling companions,"

(page 381) and also in the case of Crows "when a delinquent (a negligent sentry, for example) is 'tried' and condemned" (page 400). It is most surprising to read, "None of our older ornithologists mention the Jay's supposed proclivity to eat the eggs and young of smaller birds, nor have we any positive evidence of this habit," (page 396). One needs only to look at Audubon's plate of the Blue Jay or to read Wilson's account of its habits to see that the contrary was true. In modern times instances have been published of this trait.

Two other features should be mentioned. The sequence of many of the birds has been changed, so one has to consult the index instead of finding the bird by knowing the Check-List order. There is no bibliography, and the text suffers from a most unfortunate lack of references.

Aviculture. A Treatise on the Management of Foreign and British Birds in Captivity.—Jean Delacour. Vol. I. 1936. Hertford, England. Austin. 298p. 20s. 9d. "Aviculture is a scientific pursuit and a source of unending interest and pleasure. It should not be undertaken unless it is intended to give the necessary time and trouble so important to the proper care of birds in captivity." The present volume deals with the Passeriformes as cage-birds. There are short chapters on housing and care, but the main part is taken up with brief descriptions of the appearance, native home, and habits in captivity of an astonishing number of birds. Interesting details are given of the display of the different Birds of Paradise. As to the Greater Bird of Paradise (*Paradisea apoda*), the males are supposed to breed at the age of four or five years, although not attaining full plumage till the age of eight years. Each year every full-plumed bird is slaughtered. Little seems to be known as to details of the parasitic habits of the Whydahs (Viduinæ). A "hand-reared hen" Crested Lark (*Galerida cristata*) "sang as well as any cock." The book is illustrated with twenty-seven plates, nine in color, showing an array of bewilderingly gorgeous birds.

Wanderings of a Bird-Lover in Africa.—Madeline Alston. 1937. London, Witherby. 256p. 8s. 6d. Mrs. Alston's clear and lively descriptions of birds, animals, and countryside reveal South Africa not as the austere wilderness many Americans imagine it, but as a beautiful, varied, and settled land. As to conservation, "the ruthless slaying and slaughtering is bad enough, but the killing of birds has not been wholesale as in South America. And in South Africa the effort to preserve our wild life is growing, and bird sanctuaries are being talked of besides those already proclaimed in Zululand and on the vleis of the Cape." The sanction by the government of the slaughter of big game, under the excuse of the tsetse-fly menace (!), has ceased, and a beginning in its preservation is being made. Mrs. Alston's sympathetic writings should arouse in South Africans a pride in their native wild life and a desire to protect it. The pencil drawings by Moubray Leigh are delightful. A map with itineraries and a list of scientific names would have been helpful to outside readers.—CONSTANCE NICE.

The Bird-Lovers' Book of Verse. Collected by Christina Chapin. 1937. London. Witherby. 188p. 6s. This little book, whose predominantly English authors show more acquaintance with classic literature than with living birds, is illustrated with attractive linotypes by Raphael Nelson.—CONSTANCE NICE.

Check-List of the Birds of the World. Vol. III. James L. Peters. Cambridge, Massachusetts, Harvard University Press. 311p. $3.50. The third volume of this excellent and authoritative check-list deals with the orders Columbiformes and Psittaciformes—the Sandgrouse, Pigeons, and Parrots—142 genera and 1675 forms in all. The plan of Mr. Peters's volumes is to list every valid species and subspecies, with the original quotation, the type locality, and synonyms proposed since the publication of Sharpe's "Hand-List" in 1909. The range of each form, is given, as well as wintering quarters of migratory forms. Mr. Peters deserves the highest praise for his painstaking labors in this important field.

DISEASES OF BIRDS

Reviews by Carlton M. Herman

"Diseases of Birds."[17]—This is the most comprehensive work which has yet been published on the diseases of birds. It is an extensive treatise dealing with the etiology, diagnosis, pathology, and treatment of all the known diseases of the avifauna. Numerous figures illustrate many of the pathological conditions, both microscopic sections and gross material. Although a few errors appear in the text and tables—as might be expected in the first edition of such an undertaking—these are relatively insignificant in view of the comprehensiveness of the work. The material is very well arranged. Each disease is discussed separately and classified according to its etiological agent. The subject matter is completely indexed. The greatest value of the monograph is to be found in the extensive bibliography placed at the conclusion of the discussion of each disease. Although the text is written in Portuguese, the extensiveness of the bibliography serves to introduce those interested to the literature on the subject in many languages.

"Notes on Avian Coccidiosis."[18]—Coccidiosis is a disease caused by Coccidia —one-celled animals (Protozoa)—which live as parasites in the intestines of vertebrates. These Coccidia may cause destruction of the intestinal epithelium, with subsequent loss of appetite, emaciation, droopiness, diarrhea, and finally death due to acute enteritis. Nestlings have been found with severe infections; sometimes (because of these infections) they are pushed from the nests and left to die. Boughton points out that, unless it is brought to our attention in epidemic form, coccidiosis might go unnoticed as a "natural" cause of death for birds in nature.

Two genera of Coccidia occur in birds, *Isospora* and *Eimeria*. Immature spores are discharged from the bird in the fecal material. In the course of several hours or a few days, depending on the coccidian species involved, these spores undergo changes which result in mature forms containing the infective sporozoites. Birds become infected by eating the cysts which contain these sporozoites. The disease may be diagnosed by microscopic examination of a fecal smear. It is emphasized that *Eimeria* occur in the lower orders of Aves, and *Isospora* in the higher. Coccidia have been reported from twelve orders of birds. Boughton concludes that the genus *Isospora* can be considered as a pathogenic parasite of small birds and as such it should be studied with an aim toward treatment and control.

Check-lists of Malaria [19, 20, 21].—These three papers contain a complete list of all the species of *Hæmoproteus*, *Plasmodium*, and *Leucocytozoön*, together with a list of the birds and other animals from which these blood parasites have been reported. There is a complete bibliography of the source of all these records. *Hæmoproteus* is a parasite of birds and reptiles, *Plasmodium* is a parasite of reptiles, birds, and mammals, and *Leucocytozoön* is a parasite which has only been reported from birds. *Hæmoproteus* is listed from 638 species of birds, *Plasmodium* from 236 species, and *Leucocytozoön* from 272 species.

Hippoboscid Flies[22].—Four species of bird-flies are reported to be common on birds in Germany. Swallows (*Hirundo r. rustica* and *Delichon u. urbica*) are common hosts. (The reviewer is aware of no reports of hippoboscid flies from North American swallows, and it is interesting that this group of birds should be heavily infested in Europe.) The genus *Stenepteryx*—a wingless form—is reported to be common on swallows in western Germany but rare in the eastern part of that country. This paper also contains a key to the Hippoboscidæ which occur in Germany.

Nutrition and Place of Egg-laying of Mallophaga[23].—Most Mallophaga obtain their nourishment from feather parts but others may live on dust, skin particles, blood of the host, or even on the eye-fluid. Evidence of cannibalism is also given. These parasites lay their eggs on the feather-shafts and various other parts of the feathers, and in some species the eggs are deposited inside the feather-

shaft. The Mallophaga of mammals usually attach on, feed on, and lay their eggs on the hair of the host. Extensive references are given and the bibliography contains eighty-six citations. A classification of the genera of Mallophaga is also includ d.

[17] Doencas das Aves. J. Reis and P. Nobrega. 1936. Instituto Biologico, São Paulo, Brazil. 468 pp.

[18] Boughton, D. C. *Auk* (1937) *54:* (4): 500-509.

[19] Coatney, G. R. (1936) "A check-list and host-index of the genus *Haemoproteus*." *Jour. Parasit.* *22* (1): 88–105.

[20] Coatney, G. R. and Roudabush, R. L. (1936) "A catalog and host-index of the genus *Plasmodium*." *Jour. Parasit.* *22* (4): 338–353.

[21] Coatney, G. R. (1937) "A catalog and host-index of the genus *Leucocytozoon*." *Jour. Parasit.* *23* (2): 202–313.

[22] Eichler, W. Wo kommt die Mehlschwalbenlausfliege vor? Nebst Bestimmungsübersicht deutscher lausfliegen. Mitteil. Vereins sachs. Ornith. V, 3. Heft (April 1937).

[23] Eichler, W. Einige Bemerkungen zur Ernährung und Eiablage der Mallophagen. Sitzensberichte Gellsch. natur. Freunde. March 16, 1937.