

carry regular aluminum bird-bands around their hind legs. Whenever a bat is captured or found dead, it is well worth while to examine it to see if it is banded. Full data on any recoveries of banded bats should be sent to the United States Biological Survey, Washington, D. C., or to the writer. Most of the American bat-banding work has been done in the Northeastern States, particularly Pennsylvania, Massachusetts, and Vermont. Consequently this request for coöperation is directed especially to ornithologists in this district.

It seems very desirable to locate all the large bat colonies in the New England region, in order that the bat-banding studies may be as complete as possible. If any of the readers of *Bird-Banding* know of caves where bats might hibernate in winter, or large summer colonies in buildings, they are urged to communicate with the writer.—DONALD R. GRIFFIN, Barnstable, Massachusetts.

RECENT LITERATURE

(Reviews by Margaret Morse Nice)

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 always are reviewed under their titles, other headings refer to general subjects or are abbreviated from titles in foreign languages. References to periodicals are given in italics.

It is a pleasure to announce that *Bird-Banding* has added a new associate editor to the staff, Mr. Thomas T. McCabe, 2593 Life Science Building, Berkeley, California, who, beginning with this number, will review some of the books and articles.

BIRD-BANDING

Twenty-five Years of Banding in Hungary.¹—Dr. Schenk was the third ornithologist to start banding on a regular scale, beginning in 1908, nine years after Mortensen in Denmark and five after Thienemann in Germany. He now sums up the results: 84,625 birds of 200 species ringed with 2507 recoveries—2.9 per cent. The birds ringed in greatest numbers have been Swallows, White Storks, Titmice, Herons, Glossy Ibis, Rose-colored Starling, and Red-backed Shrike. Alarming high percentages of recoveries are found with the Herons—from 5 to 8 per cent, and especially with the Egrets, 8.3 to 25.9 per cent, as 27 of 104 *Egretta alba* were killed. The percentages were also high with some of the Hawks, though not as bad as those given by Lincoln for this country in the January (1936) *Bird-Banding*, averaging 8 per cent for 19 species.

Banding has shown that about 80 per cent of the summer residents migrate southwest in winter, the others southeast, while a few species go in both directions. Although return to the vicinity of the birthplace was found in the majority of cases, yet a few birds have been found in the nesting season great distances from home: a Squacco Heron (*Ardella ralloides*) 300 kilometers, a Night Heron (*Nycticorax nycticorax*) 800 kilometers, a six-year-old Spoonbill (*Platalea leucorodea*) taken in Bulgaria, a five-year-old Red-footed Falcon (*Falco vespertina*) killed in Russia, and three Lapwings (*Vanellus vanellus*) as follows: one in Russia (1600 kilometers from home), one seven-year-old, 1000 kilometers from its birthplace, and a three-year-old bird taken in August in Siberia.

As to the time of reaching sexual maturity, many species besides small birds were found breeding at the age of one year: Starlings, Lapwings, Godwits, Black-headed Gulls, Black Terns, and Kentish Plover (*Charadrius a. alexandrinus*).

Interesting tables are given of the ages of the birds recovered. Birds ringed as nestlings that reached the age of ten or more years were: Black-headed Gull (*Larus*

ridibundus), 10 years; Glossy Ibis (*Plegadis falcinellus*), 10 years; White Stork (*Ciconia ciconia*), four of 10 years, one of 19 years; Purple Heron (*Ardea purpurea*), 13 and 16 years; and Kestrel (*Falco tinnunculus*), 10 years. Birds ringed as adults reached at least the following ages: Redshank (*Tringa totanus*), 15 years; Black-tailed Godwit (*Limosa limosa*), 12 and 17 years; and Black Tern (*Chlidonias n. niger*), 18 years.

"Bird-Banding."²—A fine résumé of the subject by the Vogelwarte of Rossitten. There are banding stations in North America, India, Turkey, and Japan, and 34 in 22 countries of Europe, only Austria, Albania, Rumania, and Greece being unrepresented. Recoveries average 3 to 4 per cent. The chief fields of research are: migration; return of birds to their homes; experiments on homing and the migratory impulse; age attained by birds; their ecology and behavior; their economic relations.

Report on the Activities of the Vogelwarte Rossitten.³—A brief account of the educational and research activities of one of the two banding stations in Germany. Since 1903, 413,500 birds have been banded; many lectures and courses are given, and studies of migration and homing carried on, while at present an extensive and intensive study of the White Stork is being made.

"Fourteenth Report of the Vogelwarte of the Government Biological Station at Helgoland."⁴—The many activities of the station, both educational and scientific, are described, special emphasis being placed on various phases of the problem of migration. On Helgoland itself 62,802 birds of 152 species had been banded up to the end of 1934, the grand total since 1910, with the addition of those banded by coöperators, reaching 579,722. Recoveries have come to 13,882 (2.4 per cent). The names of individuals banding more than one thousand birds and also more than four hundred in 1933 and 1934 are listed, and references given to the reports published on the results of banding 49 different species.

Banding in Sweden.⁵—The report for 1934 of the banding of the Göteborg Natural History Museum shows 7,953 birds banded for that year, bringing the total since 1911 to 62,271 individuals of 163 species, the percentage of recoveries being 3.7. The birds ringed in greatest numbers are the Black-headed Gull (*Larus ridibundus*), Common Gull (*Larus canus*), Common, Arctic, and Sandwich Terns (*Sterna hirundo*, *macrura* (*paradisæo*), and *sandvicensis*), Starling (*Sturnus v. vulgaris*), and Lapwing (*Vanellus vanellus*). Longevity records include a Wood Pigeon (*Columba palumbus*) of 6 years, Common Gulls of 5 and 7 years, and Black-headed Gulls of 6, 7, 8, and 10½ years. A Common Curlew (*Numenius arquatus*) banded in Öland, June 26, 1927, was found in Lincolnshire, England, June 1, 1935.

"Where do the Migrating Birds Go?"⁶—W. I. Lyon, President of the Inland Bird Banding Association, has written an excellent popular account of bird-banding to interest our Latin-American neighbors. After emphasizing the great economic value of birds, he describes the objects of bird-banding and asks for reports on any banded birds that may come to the notice of his Rotarian readers, mentioning those species that have been banded in North America in considerable numbers and that migrate to South America.

"Trapping Cedar Waxwings in the San Joaquin Valley, California."—C. H. Feltes. 1936. *Condor*, 38:18-23. By means of specially designed traps placed on the roof of a raisin-packing plant, 4010 *Bombycilla cedrorum* were caught in 29 days; recoveries came to 5.17 per cent.

¹Schenk, J. 1934. Die Vogelberingungen des Kgl. Ungarischen Ornithologischen Institutes in den Jahren 1931-1932. *Aquila*, 38-41:46-114.

²Schüz, E. 1935. Vogelberingung. *Der Biologe*, 4(7):218-223.

³Schüz, E. 1935. Vogelwarte Rossitten der Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften. *Der Biologe*, 4(7):225-227.

⁴Drost, R. 1936. XIV. Bericht der Vogelwarte der Staatlichen Biologischen Anstalt Helgoland. *Vogelzug*, 7:34-51.

⁵Jägerskiöld, L. A. 1935. Göteborgs Naturhistoriska Museums ring-märkningar av flyttfåglar under 1934. *Göteborgs Musei Årstryck 1935:59-76*.

⁶Lyon, Wm. I. 1936. A donde Van las Aves Emigradoras? *Revista Rotaria*, 6(1):20-22.

MIGRATION

"Research on Migration."⁷—A good summing-up of the subject. Average distance flown per day is given in a few cases: a Redstart (*Phenicurus phenicurus*) 167 kilometers, a Blackcap (*Sylvia atricapilla*) 220 kilometers, and a White Stork 305 kilometers, but the greatest single record is that for a Turnstone (*Arenaria i. interpres*) that flew from Helgoland to northern France in twenty-four hours, a distance of 800 kilometers.

"The Migration of North American Birds."—F. C. Lincoln. 1935. U. S. Dept. Agriculture. Circ. No. 363. 72 p. 10 cents. A survey of the subject largely as it pertains to North American birds, following to some extent the lines of Wells W. Cooke's "Bird Migration" (Dept. Bull. 185, 47 pp.) published in 1915, but with much new data added, particularly from results from banding. Much valuable material is presented, but the treatment of the relation of migration to the weather is disappointing. The "common flying speed of ducks and geese is between 40 and 50 miles an hour." "Herons, hawks, horned larks, ravens, and shrikes, timed with the speedometer of an automobile, have been found to fly 22 to 28 miles an hour, while some of the flycatchers are such slow flyers that they attain only 10 to 17 miles an hour."

"The Early Summer Migration of the Starling on the Windenburger Ecke."⁸—Starlings begin to appear in large numbers on the Kurische Nehrung not far from Rossitten about the middle of June, at first adults only, but soon largely young birds. On clear days the flight begins a half-hour before sunrise, but in rainy weather may be delayed as much as three hours. On July 1st about a third of the birds are molting, while during the last three weeks of the month this is true of the majority. The weights of the young birds averaged 63 grams early in July, but gradually increased. On Helgoland the early migration of Starlings ends the last of July, while the late migration does not begin until September.

Migration of the Common Buzzard in Germany.⁹—A study of 669 recoveries of *Buteo b. buteo* shows that the birds of different regions have different migration routes and quarters. Young birds are more migratory than the old, but all return to the region of the birthplace to breed, the species apparently reaching sexual maturity at the age of one year. Recoveries reached 22 per cent. Buzzards, living as they do largely on mice, show high mortality in severe winters with much snow. The oldest bird recorded reached an age of fifteen and a half years.

⁷Drost, R. 1935. Vogelzugforschung. *Der Biologe*, 4(7):210-218.

⁸Krätzig, H. 1936. Der Frühlommerzug des Stars auf der Windenburger Ecke. *Vogelzug*, 7:1-16.

⁹Burr, F. 1936. Ueber die jahreszeitliche Verbreitung des Mäusebussards (*Buteo b. buteo* L.). *Vogelzug*, 7:17-34.

HOMING

"Have Birds a Locality Sense?"¹⁰—In this important paper Dr. Stresemann states that he used to believe with the majority of ornithologists that homing depended on visual memory rather than on a locality sense, but the researches of his pupil W. Rüppell caused him to change his opinion. The first experiments with nesting Starlings were reviewed in *Bird-Banding* for October, 1935; later ones involved longer distances, up to 730 kilometers, while nesting Swallows (*Hirundo r. rustica*) and Martins (*Delichon urbica*) were taken from Bremen to England, 700 kilometers distant. (To eliminate the possibility of kinæsthetic impressions, some of the Starlings were rotated on Victrola disks during the journey.) Yet 50 to 60 per cent of the birds returned, homing as well or better from the greatest distance than from the shorter ones. The author concludes with Viguier (1882) that birds must be sensitive to terrestrial magnetism, and suggests that the sense of locality may be in the labyrinth of the ear.

Experiments with the Homing of Starlings.¹¹—In order to test whether kinæsthetic impressions influence homing of *Sturnus v. vulgaris*, Dr. Kluivjer sent thirty-three nesting Starlings from Wageninen to Groningen, 150 kilometers to the northeast and entirely outside the known range of the birds breeding at Wageningen; ten of these had been narcotized with Evipan-Natrium during the whole journey, the others being also dosed, but allowed to recover before the trip. Sixty per cent of the first group returned and only 22 per cent of the others. Although the experiment shows conclusively that kinæsthetic impressions can have nothing to do with homing, nevertheless I regret that the splendid population study with these Starlings was upset, some of the most interesting birds failing to return.

¹¹Stresemann, E. 1935. Haben die Vögel einen Ortsinn? *Ardea*, 24, 213-226.

¹¹Kluivjer, H. N. 1935. Ergebnisse eines Versuches über das Heimfindvermögen von Staren. *Ardea*, 24:227-239.

LONGEVITY

Oyster-catcher Twenty-two Years Old.¹²—A *Hematopus ostralegus* banded as a young bird on the Hallig Nooderoog July 9, 1914, was found dead in 1934 on the Minsener Oldoog, east of Wangerooge.

A Swift (*Apus a. apus*)¹³ was captured in England where it had been ringed as full-grown 13 years before.

"The Cardinal Now Twelve Years Old."—A. F. Ganier. 1935. *Wilson Bulletin*, 47:285-286. Although this male *Richmondia c. cardinalis* is at least twelve and a half years old, the only sign of age is a rather bedraggled appearance at molting time.

"A Herring Gull of Great Age."—T. G. Pearson. 1935. *Bird-Lore*, 37:412-413. A male *Larus argentatus* in adult plumage was wing-tipped in 1889 and kept as a pet until its death apparently of old age in July, 1935, at an age of at least 49 years. He is "survived by his mate, which is at least 45 years old, and by three descendants, all more than 30 years."

Other records on longevity will be found in Numbers 1, 5, 9 and 17. The attention of readers is called to the Osprey (*Pandion haliaëtus*) 21 years old reported by F. C. Lincoln in the January (1936) *Bird-Banding*, p. 42, this being the greatest known age reached by any bird banded in North America, and so far as I know, the highest record for one of the Falconiformes not in captivity.

¹²Weigold, H. 1936. Austernfischer (*Hematopus ostralegus*) 22 Jahre alt. *Vogelzug*, 7:52.

¹³Recovery of Marked Birds. 1936. *British Birds*, 29:277-283.

LIFE HISTORY

Polygamy in a Starling.¹⁴—Very interesting observations in Wetzler in Eastern Germany made possible through the use of colored bands. On April 12th the male Gelbring built with his first mate in box 2, both sleeping together in box 4, while the female Linksring built without a mate in box 1. On April 21st he carried material into 3 boxes and was mated with Linksring. He shared incubation with both wives, nevertheless, at box 4 he behaved like a bachelor, carrying in grass and green things, and singing and courting passing Starlings! On May 4th Linksring was captured and given a colored band, but she deserted her eggs and newly hatched young. May 10th she was back again, this time in box 4 and again Gelbring's mate. The young in box 2 flew on May 26th, and on June 2d the first mate started in with her second brood, which she raised along, the young leaving July 9th. Two other pairs had two broods each, both birds of the pair feeding the first broods, but one second brood was raised by the female alone, the other by the male alone.

Inbreeding Swallows.¹⁵—A male Swallow (*Hirundo r. rustica*) in Germany returned to his nest of the previous year and mated with his daughter. Cases of inbreeding in the wild are exceedingly uncommon. According to Schenk¹ there

had been no proved cases of inbreeding in the records of European banders, and only two undoubted cases in America (both of brother and sister)—Shelley's Downy Woodpeckers (*Dryobates pubescens*) in New Hampshire (*Bird-Banding*, 3:69-70) and my Song Sparrows (*Melospiza melodia*) (*Condor*, 35:219-224.)

Thrush Nightingale Nesting without a Mate.¹⁶—The Naturwarte at Mönne in Pomerania reports an alarming decrease among the nesting birds during the last three years, and finds a disinclination to breed in many different species. A female *Luscinia luscinia* nested without a mate, deserting her set of infertile eggs after several weeks of incubating.

"Observations on the Amethyst Sunbird, *Chalcomitra amethystina amethystina* (Shaw)."—R. B. Cowles. 1936. *The Auk*, 53:28-30. Nest-building with this Sunbird in Natal, South Africa, was a prolonged process, the female working from about 10 A.M. to 3 P.M. each day from September 7th to 19th, after which a few finishing touches were added, and the first egg laid September 29th.

"Nesting of the Sierra Nevada Rosy Finch."—J. B. Dixon. 1936. *Condor*, 38:3-8. At a colony of *Leucosticte tephrocotis dawsoni* in California the females incubated, staying on the nest for 45 to 50 minutes and leaving for 15 minutes at which time the pair fed close together. Each pair had a "regular feeding ground" and any trespassing resulted in a battle. The female "rules with an iron hand during the period of nest building, egg-laying, and incubation," but the male does more than half the feeding of the young.

"The Family Relations of the Plain Titmouse."¹⁷—A fine study based on extensive banding of a nesting population in southern California. *Baeolophus inornatus* is permanently resident; it "usually raises only one brood a season, and is usually seen in pairs." The sexes are similar, but only the female develops a brood patch, and she alone incubates. The oldest bird is at least 7 years old, three are at least 5 and eight at least 4. There have been 33 cases of renesting in the same box, 17 at a distance of 43-90 yards, one 200 yards away, but none farther. Of 145 young banded, only two have been retaken (1.3 per cent) one 700 yards from its birthplace, the other one and a half miles. As to the "returns" of adults, this figure is 45.3 per cent if each bird is counted only once, but 52.5 per cent if each is counted each year. Eleven pairs were mated for two years, and two pairs for three years, there having been only one possible "divorcee." "If a bird lost its mate the survivor, whether male or female, remained in the nesting territory and secured a new mate."

Biology of the British Stonechat.¹⁸—*Saxicola torquata hibernans* in Brittany is permanently resident, remaining in pairs throughout the year. Territories are taken up in October, at which time the male sings, later becoming silent until March. As to replacements, a male was killed in November, but his mate stayed in the territory and in February secured a new mate. A male killed March 11th was replaced the 24th; this bird was captured the next day and replaced six days later. Another male, killed January 10th, was replaced March 20th. The birds nest early, the female building the nest on the ground, accompanied by her mate, but in one case a male assisted in the building, the first egg being laid four days after the nest was started. Three nests in the same region weighed as follows: 15.3 grams, 41 grams, 67 grams. Five to six eggs are laid and a second brood is raised.

"The Enigma of the Cuckoo."¹⁹—The author, who does not believe in the existence of instincts, insists that the nestling Cuckoo does not "voluntarily" eject its fellow occupants; it is simply a matter of the smallness of the nest and largeness of the Cuckoo. "C'est une équation algébrique de la plus élémentaire solution." We can test this with our Cowbird, whose eggs are practically the same size as those of *Cuculus canorus*; the young *Molothrus ater* does not throw out its host's eggs or young, but in the majority of cases some of the host's young are raised along with the parasite.

Nesting of the Rose-colored Starling in Hungary.²⁰—*Pastor roseus* winters in India, but in "grasshopper years" appears in flocks in Russia and Hungary and breeds in great companies in walls and rocky places. In one place they nested under the roofs of houses, appropriating the nests of *Passer domesticus* after they had thrown out the young! About a thousand pairs settled near the brick-works in Karcag, Hungary, in 1933; and owing to an over-supply of males, polyandry resulted. Sets contained 5 to 8 eggs, but as many were added, not more than 4.2 young were raised per nest. The birds arrived June 5th, young began to hatch June 23d, and all the birds left from July 14th to 28th. Although great numbers have been banded, none of these have been noted in later years in Hungary, but a few young have been recovered in Italy, Greece, and Asia Minor. The behavior of another Starling that lives on grasshoppers is mentioned in No. 29.

The Feeding of Young by a Pair of Great Tits.²¹—A record was kept for sixteen hours of the number of trips made by a pair of *Parus major* in Budapest from the time the ten young were six to twenty-one days old. A third of the tail of the female was cut off as an aid to rapid identification. At first the male fed more than his mate, but at the end the count was equal—248 trips for each bird, an average of 31 trips per hour for both, the different hours varying from 7 to 49. Each bird carried off excrement 60 times. The author says that the normal time of fledging is fourteen days, but Longstaff and Jourdain²² give eighteen to twenty-one days. L. Schuster watched a pair of this species feed about nine hundred times in the course of a day of fifteen hours—an average of sixty times an hour! (*Journal für Ornithologie*, 1923, p. 327.)

Nesting Data on the European Nuthatch.²³—The fledging period of *Sitta europæa* is very long—four weeks according to Heinroth; Salmen thinks the incubation period must also be long—perhaps twenty days. I can find no data on either matter for our American Nuthatches.

The Terragraph at the Nest of Hoopoe and Barn Owl.—J. Bussmann has continued his valuable studies of nesting behavior by the help of the instrument which he described in the April, 1933, *Bird-Banding*. *Upupa e. epops*²⁴, a rare bird in Luzern Canton, Switzerland, was found nesting in a disused hut; the terragraph showed that the two young when about fourteen days old, were fed 18 times in 9 hours. A nest of *Tyto alba guttata*²⁵ with four young some ten days old was studied for over a month, from 4 to 32 feedings being registered a night, with an average of 13. No relation could be found between the number of feedings and the phase of the moon or the state of the weather.

"The Sex Ratio in Ducks."—O. C. Furniss. 1935. *Wilson Bulletin*, 48:277-278. Observations on fourteen species of nesting ducks were carried on daily from April 29th to May 18th, 1935, over five square miles containing eighty-three sloughs near Prince Albert, Saskatchewan. The average totals resulted in 192 males and 122 females, a sex ration of 1.6:1.

¹⁴Freitag, F. 1936. Aus dem Leben beringter Stare zur Fortpflanzungszeit. *Vogelring*, 8(1):8-15.

¹⁵Clobes, D. 1936. Rauchschnalbenberingung. *Vogelring*, 8(1):23-24.

¹⁶Robien, P. 1935. Brutstudien an pommerschen Vögeln. *Ornithologische Monatsberichte*, 43:183-186.

¹⁷Price, J. B. 1936. *Condor*, 38:23-28.

¹⁸Lebeurier, E. et J. Rapine. 1936. Ornithologie de la Basse-Bretagne. (Suite.) *Saxicola torquata hibernans* (Hartert) 1910. Le Traquet patre britannique. *L'Oiseau et la Rev. française d'Ornithologie*, 6(1):86-103.

¹⁹Cathelin, F. 1936. L'Enigme du Coucou. *L'Oiseau et la Rev. française d'Ornithologie*, 6(1), 71-76.

²⁰Schenk, J. 1934. Die Brutinvasion des Rosenstares in Ungarn in den Jahren 1932 und 1933. *Aquila*, 38-41:136-153.

²¹Warga, K. 1934. Positive Beobachtungen über die Fütterung der Jungen bei einem Kohlmeisenpaar. *Aquila*, 38-41:261-268.

²²1926. *British Birds*, 20:173-176.

²³Salmen, H. 1934. Beiträge zur Fortpflanzungsbiologie des Kleibers. (*Sitta europæa cæsiæ* Wolf.). *Aquila*, 38-41:270-273.

²⁴1934. Der Wiedehopf im Brutreservat Baldegg-Nord. Studie am Nest. *Der Ornithologische Beobachter*, 32:17-24.

²⁵1935. Der Terragraph am Schleiereulenhorst. *Der Ornithologische Beobachter*, 32:175-179.

SONG

"A Chart of Bird Song."—H. G. Alexander. 1935. *British Birds*, 29:190-198. A valuable chart showing the seasons of regular, irregular, and occasional song for birds in Southern and Midland England. Similar charts should be worked out for the different regions of our country.

"The Daily Rhythm of Birds in the Arctic Summer."²⁶—Although many observers have noted the astonishing punctuality in relation to sunrise of the early morning singing of most birds, no one hitherto has worked on the problem of the daily rhythm of birds in far northern latitudes, where the light is greater all night than the "awakening light" of the latest species farther south. Dr. Palmgren found the birds in Lapland most inactive from 6 to 11 P.M., this period of rest following the hottest and driest part of the twenty-four hours. An important paper with a good bibliography.

Is Bird Song Deteriorating in the Cities?—Decidedly so, say two German ornithologists. E. Christoleit²⁷ gives a gloomy list of the evil effects of civilization on birds: decreasing size (Gulls), albinism, weakening of the breeding instinct, smallness of sets, non-functioning of the migratory urge, etc., etc. The species whose songs have degenerated are Blackcap (*Sylvia atricapilla*), Thrush Nightingale (*Luscinia luscinia*), Song Thrush (*Turdus philomelos*), and Chaffinch (*Fringilla caelebs*). H. Frieling²⁸ attributes the deterioration in song to the lessened need for territory defence, due to increased food in gardens and parks, a point of view assuming the paramount importance of the food value of territory. What is the experience of other students?

²⁶Palmgren, P. 1935. Über den Tagesrhythmus der Vögel im arktischen Sommer. *Ornis Fennica*, 12:107-121.

²⁷1935. Einige Beispiele dauernde Veränderungen im Vogelgesange. *Beiträge zur Fortpflanzungsbiologie der Vögel*, 11:210-214.

²⁸1936. Gesangsartentung bei Stadtvögeln. *Beiträge zur Fortpflanzungsbiologie der Vögel*, 12:12-14.

ECOLOGY

Effects of Rain and Drought in Southwestern Africa.²⁹—A drought of several years was broken by heavy rains from October, 1933, to April, 1934; almost tropical vegetation appeared and insects increased enormously. Many species of birds laid larger sets during this rainy nesting season than the following dry one. In the three previous years the Wattled Starling (*Creatophora carunculata*) had been very rare and had never bred in this region, but great flocks arrived in the wake of the grasshoppers, and after these had laid their first eggs the Starlings began to build, raising two broods and feeding the young on the nymphs. The next year brought little rain and no egg-laying of the grasshoppers, nor building of the Starlings until the end of January. But the young grasshoppers were wiped out by a disease, and the Starlings let their young die of starvation, even though there were plenty of other insects. Many Ploceidæ, Sturnidæ, and Laniidæ started to build in the fall of 1934 upon the appearance of the first rains, but deserted their nests when no more rains fell.

²⁹Hoesch, W. 1936. Nester und Gelege aus dem Damaraland. II. *Journal für Ornithologie*, 84:3-20.

BIRD BEHAVIOR

"Social Behavior of Birds."—T. Schjelderup-Ebbe. 1935. In C. Murchison's "Handbook of Social Psychology," Clark Univ. Press. 947-972. The author has done pioneer work on the matter of despotism and peck-order in the domestic fowl, and it is a fine thing to have a summary of his studies in English. Very many of his observations are illuminating, not only in regard to the psychology of chickens, but of mankind as well. He makes the mistake, however, of applying his findings too widely, as Allee has shown, and as, indeed, will be evident to any careful student of the behavior of wild birds.

Polygamy in a Mute Swan.²⁰—An interesting paper with considerable discussion of the psychology of breeding behavior in birds and mention of various instances of polygamy in normally monogamous birds. A male *Cygnus olor* in the

Zoölogical Garden at Amsterdam took no share in incubation, but occupied his leisure in acquiring an extra mate, which built a nest only nine meters from that of the first mate.

³⁰Portielje, A. F. J. 1936. Ein bemerkenswerter Grenzfall von Polygamie bzw. accessorischer Promiskuität beim Höckerschwan, zugleich ein Beitrag zur Ethologie bzw. Psychologie von *Cygnus olor* (Gm.). *Journal für Ornithologie*, 84:140-158.

BOOKS

Distribution of the Breeding Birds of Ohio.—Lawrence E. Hicks. 1935. Ohio Biol. Survey Bull. 32. Columbus. pp. 125-190. 75cents.. In this unique bulletin a map of Ohio is given in which the number of breeding birds known from each county is shown. The status of each of the 181 forms recorded is considered, details being given as to the distribution of those found in all eighty-eight counties, while at the end are listed the two hundred twenty-four species known to breed in Ohio and the surrounding States. This publication represents an extraordinary amount of well-planned work, both by the author and a large number of other bird-students, and will certainly stimulate further work in Ohio, as well as serving as a model for similar undertakings in other States. Such a project presents a fascinating object for local ornithological endeavor, and has the larger value of serving as a foundation for studies on the ecological requirements of each species and the underlying causes of distribution. Finally, such knowledge is indispensable if we are going to *manage* animal populations intelligently, and care for our wild-life resources in such a way as to "result in perpetual conservation."

The Juvenal Plumage and Postjuvenal Molt in Several Species of Michigan Sparrows.—George Miksch Sutton. 1935. Cranbrook Inst. Science, Bull. 3:1-36. This scholarly paper shows how little has been known in regard to the juvenal plumages and molts of some of our commonest birds. And although descriptions are given here of eleven species (including Cardinal, Indigo Bunting, and Red-eyed Towhee), as well as eight beautiful colored plates from paintings by the author, yet Dr. Sutton makes it plain how many problems remain unsolved. For instance, how long is the juvenal plumage worn? I heartily commend this bulletin to all banders who have the opportunity of capturing young birds, for such people can add substantially to our knowledge with this paper as a guide.

Bird Portraits in Color.—T. S. Roberts. 1934. Univ. Minn. Press, Minneapolis. Quarto; 206 p. Cloth, \$3.50; limp cloth, \$2.50; plates alone, \$1.50. The colored plates by Brooks, Sutton, and others that appeared in "Birds of Minnesota" have been reissued with an abbreviated text telling something of field characters as well as the status of the birds throughout their range, so that this book serves as an illustrated manual for the northern United States east of the Rockies. It will be particularly helpful to bird-students in the Mississippi Valley, illustrating as it does a number of Middle Western species that are omitted from the plates of birds of Eastern States. Both plates and text can be highly commended.

Bird Flight.—Gordon Aymar. 1935. Dodd, Mead. N. Y. 234 p. \$4.00. The two hundred splendid photographs gathered from a great many sources constitute the *raison d'être* of this volume. It would have been better to have let them stand alone and omitted the text, which is put together, entirely uncritically, from a miscellaneous set of books, many of them out of date. The author has not consulted the recent and most authoritative writings on his subject (for instance, K. Lorenz, *Journal für Ornithologie*, 1933), and even on the matter of aerodynamics, his theories are incorrect. It is a pity that such a handsomely got up book, with such superb illustrations, should prove a false guide to the many who will buy it.

Dwellers of the Silences.—Alexander Sprunt, Jr. 1935. (1st ed. 1928). Dodd, Mead. N. Y. \$2.50. The heroes of these stories are herons, swans, owls, a raven, eagle, turtle, wolverine, and others. The author succeeds in arousing enthusiasm for, and a protective interest in, the wild creatures and at the same time avoids surprisingly well the pitfall of anthropomorphism. His stories would have a wider appeal, especially to children, who constitute his largest potential audience, if his descriptions were shorter and his language simpler.

Oceanic Birds of South America.—Robert Cushman Murphy. 1936. 2 vols. American Museum of Natural History, N. Y. Qto. 1245, p. \$10.50. To the stay-at-home bird-student, these wonderful volumes open vistas of new and unknown lands with strange and fascinating birds. They are a monument to the zeal and tireless labor of the author, of the "Field Worker," Rollo H. Beck, and the artist, Francis Jaques, and besides they are a joy to look at and a delight to read.

Broad geographical and ecological factors are treated in the preliminary chapters on meteorology and hydrology, dealing with ocean currents, winds, rainfall, and hurricanes. In "The Nutritional Basis of Marine Life" we learn that "water temperature, rather than air temperature, may be said to govern the distribution of sea birds," and that "diatoms are the connecting link between the energy of the sun and the oceanic animal world, including birds" (page 62). Low temperature and the accompanying low salinity "in the southern oceans make for an abundance of life far in excess of that found in warm sea water," partly because the longevity of cold-blooded animals is much greater at cold than at warm temperatures (Loeb, 1908).

Two hundred and ten pages are devoted to a most valuable "Ornithological Circumnavigation of South America," describing the shoreline and islands even as distant as St. Helena, the Galapagos, and the American quadrant of Antarctica, and giving geographical and faunal details. This narrative is of great interest and variety, but a sad thread runs through most of it, for almost everywhere man has despoiled nature, either by direct killing or by the introduction of his satellites—rats being one of the greatest enemies to nesting seabirds. An interesting observation was made by the author as to the fauna of the Galapagos: "Introduced mammals living in a completely feral state include cattle, horses, asses, hogs, goats, and dogs. The last are highly destructive to the native fauna." The wildness of these descendants of domesticated animals "contrasts amazingly with the utter confidence and lack of sophistication shown by nearly all the autochthonous animals."

The life-histories of the 185 species and subspecies prove of absorbing interest. Penguins are popularly regarded as particularly "intelligent" creatures, but Dr. Murphy judges "that they become conditioned to new stimuli much less readily than the majority of higher birds," and that unfamiliar situations "present problems which they solve slowly if at all," their obstinacy in following original yet unsuitable routes over the ice "even though better and safer paths lie directly under their eyes," being a case in point. An interesting suggestion is given in regard to the "hooligan" Adélie Penguins (*Pygoscelis adeliæ*) described by Levick: "If such rogue penguins are assumed to be unmated birds in a great flock composed mainly of couples with reduced outside contacts, their behavior can be interpreted as that of individuals which [have not been able to sublimate their pugnacious and dominating urge, which is at one stage a necessary element in the courting and mating pattern]" (page 339).

In the matter of parental care, penguins show an astonishing variety of different behavior patterns. With the Emperor Penguins (*Aptenodytes forsteri*) only a few birds lay during one season, but all wish to brood and will fight for the privilege. "So avid and blind, indeed, is the interest of parents and foster parents alike in eggs and chicks that the resulting struggles work entirely gratuitous hardship upon the offspring, many of which are literally killed by kindness" (page 360). King Penguins (*Aptenodytes patagonicus*) are much more conventional in their behavior: "After the chicks are large enough to be left alone, a control-mechanism common among colonial seabirds tends to keep them from going astray. This is the reaction which impels every brooding adult to jab and strike at any chick within reach except its own" (page 351). The Gentoo Penguins (*Pygoscelis papua*), although rearing their young at first in this individualistic manner, later go "communistic," the chicks congregating together "always under the guard of adult nurses," which "dashed at any skua that alighted near-by," while other adults "transported bellyfuls of food which, presumably, was no longer intended for their own particular offspring" (page 379).

When the chicks of the Wandering Albatross (*Diomedea e. exulans*) are some four months old, "something happens which is so extraordinary and spectacular that the early accounts of it found little credence, although we now know that it is paralleled in greater or less degree among all Procellariiform birds. With the setting-in of the Antarctic autumn, the adult albatrosses completely abandon their nestling offspring, not for a matter of days or weeks, but forever. Off on their Odyssean wanderings go the old birds, leaving the obese, well-muffled youngsters sitting on the trampled tops of their nests, where they remain quietly no matter how the wind howls or the snow beats down upon them. . . . For three months or longer the young albatrosses receive no visits from the adults and subsist entirely without food. Toward the end of this time, they begin at last to amble down off their nests and to try their legs and afterwards their wings." (page 560).

The quotations will give an idea of the wealth of valuable material in the biographies, and it is a matter of regret that limitations of space forbid telling of the Giant Fulmars, the Mutton Birds, Guanays, Blue-footed Boobies, the Skuas, and many others.

Dr. Murphy's book is a treasure trove of information in the fields of geography, ecology, and bird behavior, and will prove a guide to a better understanding of the ways of the little-known birds of the sea.

(Reviews by Thomas T. McCabe)

Animal Life in Palestine. F. S. Bodenheimer. 1935. Jerusalem, L. Mayer. v-506-i. This volume, a product of the Hebrew University at Jerusalem, contains excellent chapters on animal ecology, and a good chapter on the distribution of the birds, but the former are not brought into very direct bearing upon the latter. In regard to the higher vertebrates we are led to expect, rather than told, that the author inclines to a belief in the effectiveness of basic physical factors acting directly, rather than upon secondary agencies such as the character of the vegetation. Obviously in such a land "the precipitations are a limiting factor of paramount importance for plant distribution," but it is not quite so clear a generality that "the most important climatic factors which influence animal mortality are the combination of temperature and humidity." Kendeigh, for example, has recently suggested a different combination. Palestine, like California in various respects, including its geographic position in relation to two continents, is a land of spectacular life-zones, but nothing like rationalized zonation or precise ecological dissection is suggested. The theory of modern ecological research is admirably understood but not wedded to description of country or of vertebrate distribution. The latter is analyzed on a purely faunal basis into classical "subkingdoms" and "regions" with local subdivisions called "territories," which are briefly described in very general terms. Perhaps in no spot on earth can this be done more effectively, for through the narrow land pass side by side the faunas of three "regions," narrowed and crystallized into contrast, and surrounded islands or "enclaves" of two others. The result is a known total of some 413 bird forms, which is very large if we consider the small area, the lack of high mountains or a real forest belt, that exploration is hardly complete, and that the science of nomenclature has as yet by no means done its worst.—T. T. McC.

A Life History of the California Quail, with Recommendations for its Conservation and Management. Part I. E. Lowell Sumner, Jr. 1935. California Fish and Game, XXI, 3. This is a compact mass of evenly distributed information, the product of three years of watching, collecting, and examining wild birds and of watching birds under wire and under seminatural conditions. No one, I believe, has put so many first-hand facts about a living animal into a smaller space, and with this economy goes a sense of judgment and choice.

As a result of an economic objective, the paper opens with intensive studies of food, based on stomach analyses and carried out by the author himself at the cost of much time and labor. It is singular how small a part of modern studies of life-

history the great public and private food-records of this sort have played. Even here in the interesting later paragraphs on factors of suitability and unsuitability of foods and on general ecological requirements it is notable how little use can be made of the long botanical analyses, though in the second or purely economic part of the paper, not reviewed here, there is a list of desirable food plants. The water requirement of Quail in the West is a subject of perennial controversy. These studies were not made in a desert, but in a country burnt brown for many months, and the long seasons of use or absolute disuse of free water correlate precisely with absence or presence of succulent green vegetation. As to more general ecological requirements, "so long as suitable food, cover, and water are present the California Quail is able to live with equal facility [?] in all regions from the humid coast belt to the margins of the deserts"—of course, to be understood, within the main range, but which, if any, of these or other factors delimit the range itself, is only casually touched upon, with suggestions, on different boundaries, of drouth and snow. Vocal calls are numerous, often of unusually narrow significance, and admirably analyzed. The best paragraphs in the paper deal with "imitativeness as a basis for mass action" and various forms of coöperative, if not altruistic, behavior. In consideration of breeding and of covey formation and range the word territory and its concepts are rather studiously avoided. The covey composition is not very permanent, the "homing instinct" weak. "The covey is analogous to a river, which constantly maintains itself, although the individual drops of which it is composed continually pass onward." Not much information was obtainable as to reasons for nest failures, evidently some sixty per cent on the average. Food supply and drouth are evidently far more important factors for later mortality than natural enemies, at least under normal conditions.

It is only when we draw breath after the frequently brilliant treatment of so many details that we become conscious of a sense of suspension—of a lack of anything to grapple with or follow up, a sense for which the conditions of the undertaking, not the author, is responsible.

The conception of such a plan lies in the idea that science consists in examining the matter of a problem so completely that one can list all its attributes once and forever, so that, in whatever controversy or investigation it may become involved, the parties interested need only dip into this full reservoir and take out the required information. Now, no one is ever going to list all the facts about a bird's life, any more than he is going to describe all the variations of a species of bird, insect, or plant, and label them with tri-, tetra-, or pentanomial, or collect all the information about human beings, so as to make it unnecessary for anyone ever to write another volume of psychology or another novel. It would seem a truism to say that research has value just in so far as it has an object, but in practical application, especially in the vertebrate field, this is not a truism but a most obscure departure.

The weakness of the paper lies in its conscientious symmetry. If the author had correlated a more minutely analyzed physiological cycle with an exhaustive investigation of the macro- and micro-climates of the habitat, we might have approached an understanding of the environmental control of the cycle. If pursuit of the ecological requirements further afield and marginally had only run away with the paper and been tied into the rich physical data available for the range in question, or into considerations of recent geologic history, we might be initiated into some of the mysteries of distribution. If the author had stolen time to follow up his finely intuitive hints and leads as to the mind-story and its place in the variegated series of mental types among birds, we might achieve something like a subjective grasp of the bases of Quail behavior.

But Mr. Sumner was under orders from a State agency to work out the complete life-history of the California Quail for economic purposes, and when the word economic comes in at the door such opportunities fly out at the window. What a pity it was not an ornithologist instead of a mathematician who proposed the immortal toast "Pure mathematics, and eternal perdition to whomsoever . . ." etc., etc.—T. T. McC.