

hyophlaeas, a Wood-Nymph, *Satyrus alope*, and *Lycaena* sp; Wood Pewee, *Contopus virens*, with *Grapta* sp. and Orange Sulphur, *Eurymus eurytheme*. Herrick also mentions that excellent photographs have been obtained in England of a young cuckoo being fed with the small garden white butterfly, *Pieris rapae*, notably when a Meadow Pipit acted as fosterer.—Oscar M. Root, Brooks School, North Andover, Massachusetts.

Male Junco "Weds" His Own Daughter.—On July 1, 1947 a return male *Junco hyemalis hyemalis* (Linn.) was captured in a government sparrow trap set very close to the back-steps of our isolated log cabin in the town of Millbridge, Maine. This male had been banded (no. 44-53134) during the summer of 1946 at exactly the same spot along with his mate and the four youngsters which they were very actively feeding. One of these youngsters, a very young bird which had evidently only recently left the nest, was released wearing band no. 44-53154.

On July 2, 1947 our trap also took return 44-53154. Although distinctly brownish in color this bird's plumage was typically that of a female. These two returns were very frequently observed together in the vicinity of our cabin, and a few days after their capture a nest containing four eggs was discovered secreted beneath the bottommost boughs of a tiny spruce nearby. Both of these birds were observed at this nest.

In spite of our vigil the young escaped from the nest unbanded, nor were we ever successful in capturing either of the two which we observed repeatedly during the remainder of the summer in the company of their parents. Beyond question of possible doubt this male junco fathered his own grandchildren.—G. Hapgood Parks, 99 Warrenton Avenue, Hartford 5, Connecticut.

RECENT LITERATURE

Reviews by Donald S. Farner and others

BANDING

1. Results of the Banding of Tits and Nuthatches in Switzerland. (Ergebnisse der Meisen und Kleiberberingung in der Schweiz [1929-1941].) Jakob Plattner with appendix by E. Sutter. 1946, 1947. *Der Ornithologische Beobachter*, 43 (6): 156-188 and 44(1): 1-35. This is a careful and detailed analysis of 1,765 recoveries and returns in eight species. The most significant are those on the Great Tit, *Parus major major* Linnaeus, for which 33,505 bandings yielded 1,273 (3.8 percent) recoveries and returns. Of these, 18,605 were banded as nestlings; 294 (1.5 percent) were recovered. Twelve were recovered during the summer in which they were banded, all at the banding locality or within three kilometers of the banding locality. Twenty-eight were recovered during the fall following banding, 24 at the banding locality and the remaining four within seven kilometers. During the first winter after banding 107 were recovered; 92 were recovered at the banding locality, the remainder at distances up to 45 kilometers from the banding locality. Eighty-one recovered during the second year of life showed a similar distribution, *i.e.* recoveries at the birthplace or displacements up to 25 kilometers. The data indicate that the Swiss population of the Great Tit has annual death rate of 46 percent. Maximum ages recorded were seven (two examples) and eight years (two examples). Up to 1945, 31 Great Tits were recovered at distances greater than 50 kilometers from the banding locality. These were, with one exception, recoveries to the south or west in fall or winter at distances up to 560 kilometers. Data on the other species have less statistical reliability but are nevertheless interesting. The banding of 6,353 Blue Tits, *Parus caeruleus caeruleus* Linnaeus, resulted in 131 recoveries and returns (2.1 percent). Of the 3,800 banded as nestlings only 21 were subsequently recovered.

Like the Great Tit, the Blue Tit is apparently a partial migrant. Maximum ages of seven and eight years were recorded. Mean annual death rate was calculated to be 54 percent. The banding of 2,478 Coal Tits, *Parus ater ater* Linnaeus, yielded 60 recoveries and returns (2.4 percent); of these 1,488 were nestlings of which 17 (1.1 percent) were recovered. These records indicate this species also to be partially migratory. The banding of 2,842 Marsh Tits, *Parus palustris communis* Baldenstein, yielded 205 recoveries and returns; 1,091 banded as nestlings yielded 16 recoveries and returns. All birds recovered were within a few kilometers of the banding locality indicating a highly sedentary population. Mean annual mortality rate is estimated to be 47 percent. The banding of 1,682 Nuthatches, *Sitta europaea* Linnaeus, yielded 76 records (4.5 percent); of these, 1,019 were banded as nestlings of which nine (0.9 percent) were recovered. The population is highly sedentary as indicated by a single recovery at an appreciable distance (105 kilometers east) from the banding localities. Mean annual death rate is calculated at 60 percent.—D.S.F.

2. Results of Bird Banding at the Ornithological Observatory at Garda, Italy, in the Years, 1936-1940. (Risulti degli inanellamenti dell' Osservatorio Ornitologico del Garda negli anni 1936, 1937, 1938, 1939, 1940.) Antonio Duse. 1941. *Ricerche di Zoologia Applicata alla Caccia*, 26. 61 pp. During the period 1936-1940, 11,252 were banded; there were 269 recoveries and returns (2.4 percent); 76 species were banded. Species banded in greatest numbers were the Chaffinch, *Fringilla coelebs* Linnaeus, 1,692; Siskin, *Carduelis spinus* (Linnaeus), 897; Reed Bunting, *Emberiza schoeniclus schoeniclus* (Linnaeus), 5,192; Tree Sparrow, *Passer montanus montanus* (Linnaeus), 509; European Robin, *Erithacus rubecula rubecula* (Linnaeus), 629; Tree Pipit, *Anthus trivialis* (Linnaeus), 1,093; Quail, *Coturnix coturnix coturnix* (Linnaeus), 756; Starling, *Sturnus vulgaris* Linnaeus 671; Song Thrush, *Turdus philomelos* Brehm, 877. Species recovered most frequently were the Chaffinch, 22; Tree Sparrow, 40; the Quail, 57; Starling, 26; Song Thrush, 24. A systematic list is annotated with listing and discussion of each recovery and return together with migratory dates. A Sky Lark, *Alauda arvensis arvensis* Linnaeus, was banded 17 May, 1932 at Amadei and recovered 15 September, 1938, at Cremona. There is an age record of six years for the Garden Warbler, *Sylvia borin borin* (Boddaert). There are migratory speed records for the Crossbills, *Loxia curvirostra curvirostra* Linnaeus, of 79 kilometers in three hours and fifteen minutes and 134 kilometers in a day, and an age record of seven years and two months. A Chaffinch banded at Monte Spino, 10 October, 1931, was shot 30 September, 1938 in Pavia. A Chaffinch migrated 510 kilometers in eleven days. A European Blackbird, *Turdus merula merula* Linnaeus, was recorded as migrating 295 kilometers in 13 days.—D.S.F.

3. The Ornithological Observatory in Pisa, Italy, for 1936-1940. (L'Osservatorio ornitologico di Pisa nel quinquennio 1936-1940.) Francesco Caterini. 1941. *Ricerche di Zoologia Applicata alla Caccia*, 15. 38 pp. During this period 8,835 birds of 68 species were banded; 604 of these are recorded as returns or recoveries. For the period 1933-1940, 13,197 birds of 88 species were banded, 871 of which are recorded as recoveries or returns. For the latter period species banded in greatest numbers were the Starling, *Sturnus vulgaris* Linnaeus, 3,180; Chaffinch, *Fringilla coelebs* Linnaeus, 1,609; Black Tern, *Hydrochelidon nigra* (Linnaeus), 2,039; Lapwing, *Vanellus vanellus* (Linnaeus), 838. Species with greatest number of recoveries were the Starling, 249; Chaffinch, 49; Lapwing, 88; Ruff, *Philomachus pugnax* (Linnaeus), 62. The records are listed individually by species.—D.S.F.

4. Record of Activity of the Swiss Vogelwarte at Sempach for 1945 and 1946. (Tätigkeitsbericht der Schweiz. Vogelwarte Sempach für Jahre 1945 und 1946.) A. Schifferli. 1947. *Der Ornithologische Beobachter*, 44(3): 69-83. During

1945, 2,385 birds were trapped and banded; 2,889 nestlings were banded. During 1946, 1,706 birds were trapped and banded; 3,021 nestlings were banded. During this period 126 species were banded. The reports of recoveries, returns, and retakes for the same two-year period contains 345 records for 52 species. Species banded in greatest numbers for this two-year period include the Starling, *Sturnus vulgaris* Linnaeus, 457; Great Tit, *Parus major* Linnaeus, 978; Pied Flycatcher, *Muscicapa hypoleuca* Pallas, 442; European Redstart, *Phoenicurus phoenicurus* (Linnaeus), 588; the Swallow, *Hirundo rustica* Linnaeus, 879; Alpine Swift, *Apus melba* (Linnaeus), 817. Greatest numbers of recoveries and returns are recorded for the Alpine Swift; the Swift, *Apus apus* (Linnaeus); Mute Swan, *Cygnus olor* (Gmelin), including a record of nineteen years of age; and the Black-headed Gull, *Larus ridibundus* Linnaeus, including recoveries of nine birds banded in Czechoslovakia. There is the record of a Goshawk, *Accipiter gentilis* (Linnaeus), banded as a juvenile, 12 September, 1943, at Fulenbach and recovered at the banding locality 20 May, 1946. Most valuable appear to be the data on the two species of swifts.—D.S.F.

MIGRATION

(See also Numbers 1, 2, 3, 4, and 49.)

5. The Course of Spring Migration of the Nightingale and the Thrush Nightingale. (Der zeitliche Ablauf des Frühjahrzuges bei Nachtigall und Sprosser.) Erwin Stresemann, 1947. *Ornithologische Berichte*, March 1947: 1-10. This paper, in general, deals with a comparison of the spring migration of the Nightingale, *Luscinia megarhynchos megarhynchos* Brehm, and the Thrush Nightingale, *Luscinia luscinia* (Linnaeus), with attention to biologic differences of a specific degree. The course and calendar of the spring migration of the Nightingale is fairly well known. The positions of the April isotherms are of considerable importance in the progress of spring migration. Nightingales reach the plain of northern Germany 25-29 April, but reach the same latitude in south-eastern England about eight days earlier (18-20 April). The migration of the Thrush Nightingale is less uniform than that of the Nightingale. It arrives in Denmark and Sweden, 7-9 days and 12 days, respectively, later than in East Prussia. This is explainable by the fact that the Thrush Nightingale is an eastern species whose spring migration is from the southeast whereas the Nightingale is a western species which comes from the south to western and central Europe. The Thrush Nightingale is apparently still expanding its range westward. It winters in eastern Africa and migrates through Asia Minor, Syria, Arabia, and the Balkan Peninsula. The author believes that ecologic factors other than inter-specific competition between these species govern the distribution of these two species.—D.S.F.

6. Non-periodic Migration of Flamingos in USSR. (Неperiodические Миграции (Залеты) Фламинго в СССР.) U. A. Isakov and A. N. Formozov, 1946. *Zoologicheskii Zhurnal*, 25(5): 473-480. This is a review of the recorded movements of Flamingos in the USSR with information derived from 58 Russian papers and other publications. The movements are irregular, often at intervals of several years. The tabulation shows 66 records of such movements between 1836 and 1935. Correlation is made with periodic reduction of lake levels in the nesting areas of the Flamingos. Mortality in these mass movements to avoid drought is very high.—D.S.F.

7. Accidental Flights of the Flamingo in France. (Les passages accidentels de Flamants Roses, *Phoenicopterus ruber roseus* Pallas, en France.) Noël Mayaud, 1945. *L'Oiseau et la Revue Française d'Ornithologie*, 15: 107-110. This species occurs more or less regularly in the marshy areas along the Mediterranean Sea. Only accidentally does it appear in other parts of France. This paper

is a review of such records, the most remarkable of which is a flock of about sixty seen 13 May 1942 at Lake Geneva.—D.S.F.

PHYSIOLOGY

(See Numbers 44 and 53.)

FOOD HABITS

(See also Numbers 13, 26, 37, 39, 57.)

8. Food and Feeding Habits of Mexican Hummingbirds. Helmuth O. Wagner. 1946. *Wilson Bulletin*, 58(2): 69-93. Hummingbirds, commonly regarded as primarily nectarivorous, feed extensively on insects, especially in sub-tropical and temperate regions. The food habits and feeding behavior of 19 species were studied in various parts of México by the author of this paper. Species native to the tropical zones find a continuous supply of nectar-producing flowers; those from farther north and from higher altitudes encounter seasonal changes in food supply to which they respond either by migration or by switching at least seasonally to an insect diet. Nectar appears to be the preferred food for all species when it is available, but when the supply dwindles insects are sought on flowers, on vegetation, in crevices, or in the air. Descriptions and illustrations are presented showing the insect-feeding methods of various species. In all cases insects are caught while hovering; a considerable variety, including spiders up to 5.4 mm. in length are taken. Undigestible material, particularly the chitinous exoskeletons of insects are formed into pellets in the stomach for expulsion through the mouth. Hummingbirds drink and bathe frequently, especially during the dry season. The latter act is accomplished by alighting on the water and splashing with the wings. Pollination of plants by hummingbirds is less common in México than in South America. Ornithophilous plants, like the hummingbirds, are believed to be of South American origin. Insect eating is regarded as a recent development in the evolution of the group, having arisen with a fairly recent colonization by the hummingbirds of the sub-tropical and temperate zones. The specialization of the bill and tongue for nectar feeding in all species, and the hovering technique of insect catching suggestive of nectar feeding behavior, are cited as evidence favoring this hypothesis.—John T. Emlen, Jr.

9. Investigation of the Food of the Crow. (Underøskelser over kråkas næring.) Ove Meidell. 1943. *Nytt Magazin for Naturvidenskapene*, 84:1-91. (*Statens Viltundersøkelser*. Meddelelse nr. 12.) This paper is based on data derived from the examination of the stomachs of 94 crows, *Corvus cornix* Linnaeus. These crows were collected from 1926 to 1937 in Gudbrandsdalen in central Norway. Young crows (up to 150 grams) are fed principally on insects, particularly during the first three or four days. The insects fed are apparently in proportion to their availability. Beetles of several families as well as crane flies were used; also spiders were an appreciable item. Next to insects small rodents are an important source of food even in years when small rodents are scarce. Frogs are also fed to young birds. Eggs and young of other birds are not important items in the food of young crows. Fish are of variable importance as a food source. Crows, from the weight of 150 grams to leaving the nest, show a change in diet which involves a reduction in the quantity of insects and an increase in the larger organisms such as fish, frogs, birds' eggs, young birds, and small mammals. Carrion and vegetable foods become appreciable items. After the young leave the nest they soon begin to procure their own food. The diet consists, to a great part, of insects and eventually small rodents, shrews, and tadpoles. Berries, when ripe, become a source of food also. Adults in autumn use largely insects, small rodents, and some small birds. Early in fall corn and corn are

important. In winter the food consists almost exclusively of corn, offal, and carrion. In spring the diet is similar although potatoes may become an important item.—D.S.F.

10. The Distribution and Feeding Habits of the Rook as well as its Agricultural Significance in Hungary. (A vetési varjú elterjedése, táplálkozása és mezőgazdasági jelentősége Magyarországon.) Alberte Vertse. 1944. *Aquila*, 1943:142-208 (condensed version in German, 208-248). The data on which this paper is based were gathered by Dr. Titus Csörgey and the author. In 1942 there were 423 colonies of *Corvus frugilegus* Linnaeus in 296 localities in Hungary; the total recorded number of breeding pairs was 281,701. It is estimated that the total number of breeding pairs was about 300,000. The estimated number in 1898 in Germany, a much larger area, was 200,000. There is a monthly summary and discussion of the food habits of this species based on the examination of the contents of 3,555 stomachs. In winter three-fourths of the food is of plant origin, primarily waste seeds including wheat, corn, barley, and oats. Animal food consists of field mice, insects and insect larvae. Towards spring as insects become active they increase in importance as food items. In spring the food is predominately of animal origin. In April animal food constitutes 72 percent of the diet; this includes various insects, mice and lizards. In May the diet consists of 77 percent items of animal origin. Examination of 348 young yielded one-fourth kilogram of corn and 4,373 insects of which 3,886 were of species detrimental to agriculture. In summer the food is also predominantly of animal origin, 72.5 percent in June. Principal items are crickets, grasshoppers, and snails; also other insects are of importance. Animal food drops to 70 percent in July and 61 percent in August. In October it is 65 percent and 51 percent in November. From the standpoint of the entire year's diet, 60 percent is of animal origin and 40 percent is of plant origin. The latter increases in colder weather. It is calculated that, in the course of the year, 46 percent of the food habits are beneficial to agriculture and 14 percent are harmful.—D.S.F.

11. Contents of a Food-pellet of the Alpine Swift in Autumn. (Inhalt eines Alpenseglerfutterballens im Herbst.) G. Blatti. 1947. *Der Ornithologische Beobachter*, 44(1):37. Report of an examination of the food-pellet secured when one of these birds was surprised feeding its young late in the evening on Sept. 26. Eleven large moths, five of which were *Plusia gamma* Linnaeus and six perhaps *Plusia*, two mosquitoes, and a small moth the size of a clothes moth comprised the contents of the pellet.—R. O. Bender.

EMBRYOLOGY AND POST EMBRYONIC DEVELOPMENT

12. Growth and Youth of a Cuckoo. (Wachstum und Jugendzeit eines Kuckucks.) J. Bussmann. 1947. *Der Ornithologische Beobachter*, 44(2):41-49. Discovery of a newly-hatched young and a broken egg of the White Wagtail, *Motacilla alba* Linnaeus, underneath a nest-box attached to a windowledge of the author's home led to the discovery of a newly hatched Cuckoo, *Cuculus canorus* Linnaeus, in the box with two unhatched eggs of the Wagtail. This was a second nesting of the host and, from the weight of the dead young and the reported incubation periods of the Wagtail and Cuckoo, the author concluded that the Cuckoo could not have been hatched for very many hours. Only one adult Wagtail could be observed in attendance. A description of the fledgling, as found, is given supplemented by two photographs, one showing the prominent nasal openings which give the bird an odd appearance, and the other illustrating a peculiar deltoid depression in the lumbar region which the author believes is of assistance in throwing out nestlings of the host. A description of the feather development and measurements of bill and tarsus are given for the nestling period. After the ninth day, the arrangement of the feathers gives it a curious

double-headed appearance. Response to feeding was passive compared with that of nestlings of other species. (No competition?) Feeding rates varied from three times an hour on the third day to five to eight times per hour on the 11th day. In 15 days it multiplied its hatching weight 38 times compared to 18 times for the next fastest gaining bird of five shown in the author's table. This high rate of gain is associated by the author with the action of the newly-hatched bird in ejecting its "stepsisters."

Eyes and ears opened on the seventh day compared with nine for most fledglings. The first vocal utterance was noted on the ninth day, increasing in intensity after the 16th day when the high-pitched hiss was audible at a distance of ten meters. It was uttered in response to the "place-call" of the host or on handling. An interesting defense mechanism consisted of the slow defecation of a slimy, thinly liquid, brown material, having an odor of tobacco juice! It left the nest at 6 P.M. on the 19th day on a maiden flight of 20 meters, landing in high grass. During this flight it was attacked by Chaffinches, Redstarts, and Flycatchers. Being returned to the nest, it left after half an hour on a second flight, landing this time in a tree-top. Care by the host continued for another three weeks. This is an interesting paper.—R. O. Bender.

BEHAVIOR

(See also Number 25)

13. Behavior and Food Habits of the Red-tailed Hawk. Henry S. Fitch, F. Swenson & D. F. Tillotson. 1946. *Condor*, 48(5):205-237. This well executed and thorough study of the Red-tailed Hawk, *Buteo borealis calurus* Cassin, population of a six-square-mile area in the Sierra Nevada foothills of California contains a wealth of new and provocative observations. Adult birds, permanently paired, occupied territories throughout the year which they defended against other Red-tails and against eagles. These territories generally covered about one-half square mile of area and were characterized by a considerable number of lookout perches. Territorial defense varied with the situation, the pre-occupation of the birds and the season; it was most pronounced in spring and fall. Unpaired young hawks held no territories and were continually harassed by territorial adults.

Courtship flights in which both members of a pair took part were observed at all seasons, but were most common in early spring. Copulation, observed on eight occasions all between February 16 and March 2, occurred at the conclusion of courtship flights and was typically preceded by posturing by the female. Hunger calls resembling those of fledglings were commonly uttered by females during this mating period.

Of 18 clutches, eight contained two eggs, five contained three eggs and five contained a single egg. The incubation period is not given. Young showed aggressive behavior at ten days, started exercising their wings at one month and left the nest at from 45 to 46 days. Parents fed the young for four or five weeks but later merely deposited the food on the nest. Unused prey was removed if it had not been eaten within a day, and a fresh supply was maintained on the nest.

From 38 eggs laid in 19 nests during the three seasons, 16 fledglings were produced. Nest destruction, reported in five instances, was followed by re-nesting in one. California Jays were believed to be a major cause of egg destruction; a jay was observed in the act of eating the eggs in one nest. A blood sucking fly (*Eusimulium clarum*) was the principal cause of mortality in nestlings, killing the young in seven nests.

Studies of the feeding habits of these birds included examination of food items brought to the nests and analyses of pellets collected under roosting trees and elsewhere. Mammals comprised 559 of the 625 prey items brought to the nests,

and ground squirrels were most heavily represented. Pellet analyses gave a similar picture. Birds and reptiles occurred in numbers in both pellet and nest collections but insects were notably lacking from the nest items. Their presence in the pellets, the authors believe, may be attributed to their release from the stomachs of consumed bird and reptile prey rather than to direct consumption by the hawk. Some interesting variations in the items at different nests strongly suggest that individual preferences and perhaps individual hunting characteristics feature prominently in the selection of prey. Variations in availability were also prominently reflected in the material. The spring appearance of young ground squirrels out of their burrows resulted in an 18-fold increase of these animals at one nest. Pellets collected from a nearby ranch where ground squirrels were controlled showed a much lower incidence and a consequent increase in other items. Reptiles comprised 46 percent of the summer items in one area of controlled squirrel population. A higher incidence of adult quail in the diet during the nesting season is interpreted as indicating a greater vulnerability of single or scattered birds as compared with massed groups in the winter coveys.

A captive adult Red-tail ate 140 grams of food daily or roughly one-sixth of its body weight and ejected 23 pellets in 61 days. A single pellet often contained material from several meals. A free-living young hawk, followed closely in the field for 21 days ate somewhat less than 100 grams per day; it was observed to return on successive days to kills too large to be consumed in a single meal. Computations suggest that the two birds of a pair would eliminate approximately 144 ground squirrels from their 320 acre territory each year. The Red-tail is, nevertheless, considered to be only a minor factor in the local ecology of this animal.—John T. Emlen, Jr.

14. Nest Winning and Nest Possession of the White Stork. (Nest-Erwerb und Nest-Besitz beim Weissen Storch.) E. Schüz. 1944. *Zeitschrift für Tierpsychologie*, 6(1): 1-25. A valuable paper with many photographs, particularly of fights on the nests. In 28 cases in 14 years at Rossitten males came first 14 times, females first five times and both on the same day nine times. Fights for possession of nests are frequent and occasionally disastrous, when occurring after eggs or young have appeared; some conflicts are mild, while others may end in the death of one of the participants. Although usually members of a pair meet for the first time at the nest, occasionally pair formation takes place without a nest. Comparisons are made with the Grey Heron, *Ardea cinerea* Linnaeus, as studied by Verwey (1930); the heron is less dependent on a firm foundation for its nest than the stork; the male heron always takes up the nest-site first; herons breed at one year, storks not till three or four years of age; herons are colonial, storks strongly territorial, although occasionally nesting close together.—M. M. Nice.

15. The White Stork's Care of the Young. (Ueber die Jungen aufzucht des Weissen Storches [*C. ciconia*].) E. Schüz. 1943. *Zeitschrift für Morphologie und Oekologie der Tiere*, 40:181-237. A very interesting, detailed study with charts showing parental care at a nest, a map of the Institute at Rossitten showing the three nests, and 67 photographs of storks at the nest. Behavior of young and old at feeding is described; at first food is brought about once an hour, but later once every two hours. Occasionally water is given the young. Development of instinctive actions in the young is chronicled: sitting, standing, scratching, voice and bill "clapping", wing fanning; and the two escape reactions—cowering and threat. The female parent was an eight-year-old bird, while the male was probably nesting for the first time. He started to mistreat the youngest nestling when it was 17 days old, biting and shaking it as if it were large prey, injuring its wing permanently. The nestling was removed and after three days returned, whereupon the father again attacked it, so it was taken away and raised by hand. In 1934 a three-year-old father killed and swallowed one of his four young and

apparently later killed another. Dr. Schüz believes such behavior is evidence that the parent is not fully adult and the instinctive behavior towards the young had become confused with that towards prey. An illuminating example of place-conditioned dominance is given in the series of photographs 49-54; the 10-week-old hand-raised nestling "C" was in his artificial nest and showed strong hostility when a strange hand-raised stork slightly younger than he was brought to the nest; C was removed and Stranger made himself at home in the nest and paid no attention, when, shortly after, C was returned; but the latter cowered so intensely that he made no move even when Stranger stood on his back!—M. M. Nice.

16. Motor Coordinations of the White Stork. (Bewegungsnormen des Weissen Storchs.) E. Schüz. 1942. *Zeitschrift für Tierpsychologie*: 5(1):1-37. Detailed descriptions of movements of *Ciconia ciconia* (Linnaeus) illustrated with 80 photographs. The adult White Stork is almost voiceless, but utilizes clapping with the beak as a greeting to its mate and as a warning to intruders. Two other almost voiceless birds use other means: the Ruff, *Philomachus pugnax* (Linnaeus), great variability in plumage and striking courtship, the Mute Swan, *Cygnus olor* (Gmelin), wing movements for defense. There is no dominance between mates. (p. 34.) The pair lives closely together, the great bond being the nest.—M. M. Nice.

17. The Application of 'Territory and the Breeding Cycle' to some Australian Birds. Angus Robinson. 1945. *The Emu*, 45(2):100-109. The concept of territory has, with a few notable exceptions, received little attention from Australian ornithologists; it has even been suggested that, because of the long song periods, the concept of territory be inapplicable to Australian birds. The author's definition of territory is: "Whenever a restricted area on land or water is defended by one bird, a pair of birds, or a group of birds, against other members of the same species for the purpose of ensuring uninterrupted some part or all of the breeding cycle and/or an adequate food supply, that area is a territory. Defence includes the air above the territory in most species." (p. 101.) [In the opinion of the reviewer it might have been better had *function* been used instead of *purpose* in this definition.] Territories of four Australian species are discussed. The Rufous Whistler, *Pachycephala rufiventris* (Latham), is a migratory species in eastern Australia but a "local wanderer" in the area observed by the author. "The male Rufous Whistler takes up his territory, which he might have held for a number of years, about July, and sings occasionally until a female joins him." Only the male sings and defends territory and only against other males. Food probably has nothing to do with the territory since both sexes go far beyond the limits of the territory to feed. In the case of the Magpie-Lark, *Grallina cyanoleuca* (Latham), mating apparently is for life. The territory is held year after year except for a brief period when the birds flock. Both sexes, equally vocal, defend territory but only against their own sex. The author believes that territory here has both the function of insuring the completion of the breeding cycle and insuring an adequate food supply. The Western Magpie, *Gymnorhina dorsalis* Campbell, "is unorthodox in its territory life. Instead of a single bird or a pair of birds holding territory, we have a group of birds defending a well-defined area. The number of birds in a group ranges from six to twelve, or even more, and the area held is approximately 100 acres. Every bird helps defend the territory although they are not all breeding birds." (p. 104.) There is no pairing; polygamy and promiscuity are common; sex ratio varies from group to group. Observations were also made on ducks, particularly the Grey Duck, *Anas superciliosa* Gmelin; Grey Teal, *Anas gibberifrons* S. Müller, and the Blue-winged Shoveller, *Spatula rhynchotis* (Latham), all of which hold territory in the same way. "The males defend a certain area of water during the mating period for upwards of a week or more. The territory covers an area of up to seven acres."

(p. 105.) This territory is variable and might involve a different area of water each day. The male drives out all other males of his species but will allow both sexes of other species to enter.—D.S.F.

18. "Displacement Reactions" in the Three-spined Stickleback. N. Tinbergen and J. J. A. van Iersel. 1947. *Behaviour*, 1(1):56-63. It is proposed that what was formerly named "substitute activity" (Kirkman, 1937; Tinbergen, 1939) or "sparking over" (Makkink, 1936; Kortlandt, 1940) shall now be named "displacement reaction." In some cases a displacement reaction appears to be a mere outlet for an obstructed drive. In other cases it has a secondary function as a social signal or releaser, e.g., a threat in fighting, or a sexual stimulus in mating; in such cases the reaction becomes somewhat altered and ritualized.—Wallace Craig.

19. A Method for Comparative Study of the Capacity for Visual Perception in Higher Animals. (Eine Methode zum vergleichenden Studium der optischen Wahrnehmungsfähigkeit höherer Tiere.) Lars von Haartman. 1947. *Behaviour*, 1:35-55. Using the Yerkes multiple-choice method, the author finds (as did also Sadovinkova in 1923) that birds (passerines) are superior even to apes. Birds can learn to choose the second or even the third door from the left end. Von Haartman seeks to explain this astonishing result on the ground that the multiple-choice problem is one not of manipulation (in which mammals excel) but of perception and orientation (in which birds excel).—Wallace Craig.

20. The Psychology of Fright and Escape in Birds. (Paon psykologiaa lintujen piirissä.) Pontus Palmgren. 1947. *Ornis Fennica*, 24(1):22-26. Although birds can learn to flee under certain specific conditions, the fundamental reaction of escape nevertheless develops on an instinctive basis. This inherited instinctive basis is lost, apparently through mutations, in insular populations, where there are no raptorial species. The author points out the value that could come from a systematic study of "flight distances."—D.S.F.

21. The Orientation of the Pied Flycatcher, *Muscicapa h. hypoleuca* (Pall.) to the Nest Entrance in a Nesting Box with Many Openings. (Die Orientierung des Trauerfliegensehnäppers, *Muscicapa h. hypoleuca* (Pall.) zum Nesteingang in einem Nistkasten mit mehreren Öffnungen.) Lars von Haartman. 1944. *Ornis Fennica*, 21(3):69-89. A description of experiments in which the orientation of the nesting birds to the entrance to their nest in a nesting box containing from six to eight entrances. Changes were made in the immediate environment of the nest including removal of the platform in front of and beneath the nest entrances and the response of the birds to these changes observed. As a result of these experiments the author concludes that the birds possessed "psychic" qualities which enabled them to solve the orientation problems presented. Recognition of "landmarks" in the immediate vicinity of the nesting box was the most important factor, which was quickly learned by the birds. A male and a female behaved quite differently in a series of experiments designed to check this point. Even when there were no "landmarks" (Merkmale) in the front of the nesting box the birds learned to orient themselves to the nest entrance from among six to eight entrances. The birds had an apparent recognition of the general arrangement (Raumbeziehungen) of the nesting box. Orientation to flight lines (Peillinien) played a relatively unimportant role. All experiments to prove the possession of a kinesthetic sense were fruitless. The existence of this sense in free-living birds does not appear to be definitely proven. Freedom from error was achieved by the female after from 900-1000 trials; the male achieved it still more slowly.—R. O. Bender.

(See also Review No. 23, *Bird-Banding*, 18(3):138. July, 1947.)

22. Drumming Flight in the Blue Grouse and Courtship Characters of the Tetraonidae. L. Wing. 1946. *Condor*, 48(4):154-157. Observations on

the rarely witnessed drumming flight of the Blue Grouse, *Dendragapus obscurus* (Say), are described. The bird typically leaps into the air with a whirr of wings, coasts briefly and then descends with a second loud whirr, landing only a few yards from the take-off point. The various dancing, drumming, hooting and display characteristics of the seven American genera of grouse are compared. The communal courting grouse (*Tympanuchus*, *Centrocercus*, and *Pedioecetes*) dance and hoot but do not drum. *Dendragapus*, *Canachites*, and *Lagopus* drum on the wing, employ hooting or other vocal notes but do not dance. The ruffed grouse (*Bonasa*) drums from a fixed position and neither hoots nor dances.—John T. Emlen, Jr.

23. Colored Rodent Baits and their Value in Safeguarding Birds. E. R. Kalmbach and J. F. Welch. 1946. *Journal of Wildlife Management*, 10(4):353-360. The principle that birds are able to distinguish colors while rodents in general are not has been utilized by the Fish and Wildlife Service as a means of protecting birds in rodent poisoning programs. A series of experiments clearly showed the aversion which birds of various species have towards colored grains. Colors near the center of the visible spectrum seem to be most deterrent, particularly green. Large quantities of uncolored grains were eaten by birds in all tests while with one or two exceptions green-colored grains offered in equal quantities were strictly avoided. Problems still to be solved are listed at the end of the article. The problem of whether a bird continuously or repeatedly exposed to a green-colored bait will eventually break this natural aversion is missing from the list. It might be well to keep in mind that birds which initially refuse a strange food often learn to accept it after a period of continuous exposure. The exploratory gestures which lead to this acceptance might prove fatal in the case of birds on an area treated with green-colored, poisoned grains.—John T. Emlen, Jr.

LIFE HISTORY

(See also Numbers 13, 14, 15 and 52.)

24. Fledging Periods of the Razorbill, Guillemot and Kittiwake. J. Keighley and R. M. Lockley. 1947. *British Birds*, 40(6):165-171. Small colonies of *Alca torda britannica* Ticehurst, *Uria aalge albionis* Witherby and *Rissa tridactyla tridactyla* (Linnaeus) nesting on exposed ledges on the north coast of Skomer Island, Wales, were watched during the summer of 1946. Mortality was high, chiefly due to egg-robbing by Herring Gulls, *Larus argentatus argentatus* Pontoppidan, and to predation on chicks by the Great Black-backed Gull, *Larus marinus* Linnaeus; 24 pairs of Razorbills fledged 16 young, 20 pairs of Guillemots 6 young, 10 pairs of Kittiwakes 2 young. The fledging period of the Razorbills ranged from 10 to 18 days, averaging 15.2; of the Guillemots 15 to 17 days, averaging 15.8; of the Kittiwakes 44 and 45 days. Young Razorbills joined calling adults at sea; young Guillemots were attended by parents from July through September and "we have found full-grown chicks uttering the typical 'weeoo' note following adults in October and November at sea."—M. M. Nice.

25. Winter Life of the Whooping Crane. J. O. Stevenson and R. E. Griffith. 1946. *Condor*, 48(4):160-178. The wintering population of Whooping Cranes, *Grus americana* Linnaeus, was studied on the Aransas refuge on the southern Texas coast from 1938-39 to 1944-45. A brackish-water flat roughly twelve miles long and one mile wide on this 47,000 acre refuge supports one of the few remaining wintering colonies of this once common species. The number of birds present during the winters of study varied from 18 to 26 and showed no tendency to increase under the protection afforded. The number of young birds in juvenile plumage ranged from two to seven. One family group remained during the summer of 1941 but did not breed. The birds were typically found as isolated pairs or small family groups and rarely in flocks except during migration. Fami-

lies remained together through the winter and appeared to set up territories on their feeding grounds which they defended against neighboring family groups. Large birds, presumably males, were repeatedly observed driving away intruders. Courtship dancing was observed in the spring prior to the seasonal departure. One performance is described in which the male displayed rather elaborately while the female remained relatively passive, except to "fly to the male when he seemed to ignore her." The adults of the summering family in 1941 displayed from May 16 to June 30. During this period the male repeatedly drove back the immature member of the group forcing it to remain about a quarter of a mile away.—John T. Emlen, Jr.

26. Observations on the Breeding Habits of the Little Owl. Fr. Haver-schmidt. 1946. *Ardea*, 34(1-3):214-246. The author observed a pair of *Athene noctua vidalii* Brehm in 1939 and 1941 in his garden and obtained the data on which this interesting paper is based. The owls were in the neighborhood of the garden throughout the year. Seven different calls are described. Copulation occurs in mid-winter and early spring although the eggs are not laid until later in spring. In 1939, 59 copulations (or attempts) were observed between 31 January and 19 April. Only the female incubated the eggs and during that period she was fed by the male. Both parents fed the young from the moment they were hatched. Hunting was done either by perch hunting or by ground hunting "just like thrushes catching worms." Food consisted of small mammals and earthworms. Only one young survived to leave the nest, the other being cannibalistically consumed. The surviving young bird left at 35 days and was at that time unable to fly well. It remained twelve days near the nesting tree. It was fed by the parents until it was about 70 days old.—D.S.F.

27. The Life History of the Western Magpie. Hugh Wilson. 1946. *The Emu*, 45(3):233-244 and 45(4):271-286. This study of *Gymnorhina dorsalis* Campbell was conducted in King's Park, an area of 1,000 acres of natural bush land "almost in the heart of Perth." The total Magpie population (nine flocks) was 84 individuals which included eleven first-year birds, eight second-year birds, seven third-year birds, 26 adult males and 32 adult females. This represents an annual death rate of 12 percent; however, the death rate during the first year is presumably much higher. The author estimates in the year of his study that probably no more than half of the young would survive to the following year. The food of this species consists mostly of insects taken on the ground. Both males and females sing with the approach of the nesting season. Throughout the year each flock confined its wanderings to a delimited area; there seems to be a permanent territory maintained by the flock. "As the number of Magpies in a flock is never large the sexes are often unequal, which gives rise to polygamy and other unusual relationships." (p. 241.) However, the species is usually monogamous.

Nests were usually 20 to 30 feet from the ground in "a scrubby" jarrah. There was no attempt to conceal the nest. Clutch size varied from two to five but most of the nests had three or four eggs. However, the author did not see a nest with more than two young. The extent to which the males shared the nesting duties varied, but none were observed near the nest before the young were hatched. There are also data on the distribution and density of this species in Australia.—D.S.F.

CENSUS AND POPULATION STUDIES

(See also Numbers 38 and 57.)

28. Environmental Influences Regulating Populations of the White Stork. (Bestandsregelnde Einflüsse in der Umwelt des Weissen Storchs (*Ciconia*)). E. Schütz. 1942. *Zoologische Jahrbücher*, 75:103-120. Stork censuses

were taken for many years in Germany and other countries; a map shows the count of nesting pairs, number per 100 square kilometers, total number of fledged young and number per nesting pair for the provinces of Germany and for neighboring countries in 1934. It is estimated that there were then 77,000 pairs in Europe (outside of Russia) and in North Africa. Since Storks incubate from the first egg, the young hatch at different times; in years with plenty of food all can be raised, but in years of scarcity, the smaller ones perish. In Oldenburg Storks are favored in dry Junes, in Hungary in wet Junes. Migrating Storks are shot in large numbers in France and Spain; they sometimes become exhausted in crossing the Sahara. Both old and young suffer from infestations by trematodes.—M. M. Nice

29. The Peregrine Population of Western North America. Richard M. Bond. 1946. *Condor*, 48(3):101-116. Published records, personal observations by the author and the reports of about fifty other observers revealed 328 eyries of the Peregrine Falcon, *Falco peregrinus anatum* Bonaparte and *pealei* Ridgway, west of the continental divide. Of these 78 were located in Alaska, 67 in Canada, 136 in the United States and 47 in México. Because of incomplete coverage it is estimated that this count represents only about one half of the total number present. Eyries are generally widely spaced, although instances are reported of nests of *pealei* as close as 200 yards apart. Four eggs constitute the usual clutch, but sets of three are common. Second clutches are generally laid when the first is taken. Infertile eggs are common but less so than in the East as reported by Hickey. Ducks constitute only a minor item in the food of these birds. Legal protection, not now afforded in the West, is urged.—John T. Emlen, Jr.

30. A Census Study of Birds in Albany Open Sour Grassveld. C. J. Skead. 1946. *The Ostrich*, 17(4):222-231. Three to five counts per month were made from December 1944 to November 1945 in a 37-acre area of Rooigras with only an occasional bush. The area was "on what is known as the Kariega Rand, a low hill rising out of the Kariega River Valley near Highlands in the Albany District, Cape." Densities were found to vary 0.23 birds per acre in June to 1.10 birds per acre in February. The species observed per month varied from 12 in December to 27 in March; 55 were recorded in the course of the year. The species seen most frequently was the Fiscal Shrike, *Fiscus collaris collaris* (Linnaeus). Pipits ("probably mostly Tawny Pipits") were seen in greatest abundance.—D.S.F.

31. A Census and Study of Birds in Albany open Thornbushveld. C. J. Skead. 1946. *The Ostrich*, 17(4):213-221. The censuses were made three to five times per month, December 1944 to November 1945, in a 28-acre Rooigras veld interspersed with Mimosa and with few other species of trees. This area was "in the Kariega River Valley near Highlands in the Albany District." The density was found to vary from 0.62 birds per acre in September to 1.10 birds per acre in February. The number of species observed varied from 18 in September to 31 in March; 61 were included in the censuses in the course of the year. The Neddicky, *Dryodromas fulvicapilla fulvicapilla* (Vieillot); and the Fiscal Shrike, *Fiscus collaris collaris* Linnaeus, were observed most frequently. The Neddicky and the Fiscal Flycatcher, *Sigelus silens* (Shaw), were seen in the greatest numbers.—D.S.F.

32. One Year's Census Study of Birds in 2½ acres of Albany Bushveld, April 1944 to March 1945. C. J. Skead. 1946. *The Ostrich*, 17(2):87-100. From five to ten censuses were made each month. The density as calculated from the census data varied from a mean of 7.3 birds per acre for May to 18.0 per acre for September. The number of species observed varied from 19 in April, to 34 in September. Through the course of the year 40 species were included in the census. The species seen most frequently was the Sombre Bulbul, *Andro-*

padus importunus importunus (Vieillot); the species seen in greatest numbers was the Speckled Coly, *Rhabdocolus striatus striatus* (Gmelin). The census area was a "patch of brush" in the Kariega River Valley, "near Highlands, about 15 miles S. W. of Grahamstown in the Sourveld area of the Albany District." The area was bordered by thick bush, open grass, arable land, and savannah. There were open areas within it. Obviously it was an area of considerable variety of habitat and one in which "edge effect" would be operative.—D.S.F.

33. The Density of Karroo Birds. J. M. Winterbottom. 1946. *The Ostrich*, 17(3):172-176. This paper consists largely of a table compiled from "nine separate censuses made over areas ranging from 13 to 34 acres between 22 December, 1943 and 15 January, 1944, i.e. in midsummer." All were taken in "true Karroo bush." The locality is "some 26 miles west of Victoria West, in the Cape Province of South Africa and at an altitude of about 4000 ft." The minimum observed density (all birds) was 1.3 per acre. The maximum was 3.3 per acre. Most numerous was the Lark-like Bunting, *Fringillaria impetuani* (Smith) (36 per 100 acres). Next in abundance was the Black-eared Sparrow-Lark, *Eremopteryx australis* (Smith) (25 per 100 acres); followed by *Passer melanurus melanurus* (Müller) (16 per 100 acres). Larks of various species constituted 45 per cent of the total number of birds. Thirty-four species are listed.—D. S. F.

34. The Scarcity of the Black-footed Albatross in Parts of its Known Range. W. C. Starrett and K. L. Dixon. 1946. *Condor*, 48(6):268-271. The occurrence of this albatross, *Diomedea nigripes* Audubon, was recorded during 35,000 miles of travel over various parts of the North Pacific. The bird was seen only once in the western part of its range, but was encountered regularly in the central Pacific where breeding colonies are known still to exist. Concern is expressed over the status of this bird in the west Pacific.—J. T. Emlen, Jr.

35. Improved Method for Estimating Numbers of Waterfowl. G. P. Spinner. 1946. *Journal of Wildlife Management*, 10(4):365. The problem of estimating the number of birds in a large flock has baffled nearly every bird observer at one time or another. Waterfowl observers commonly use the "segment method" in estimating the size of large flocks; a segment of the flock is counted and an estimate then made of the size of this segment in relation to the whole flock. In this article the author presents photographs of counted segments of Snow Goose flocks. These photographs, carried into the field, proved to be useful adjuncts in making quick estimates of large flocks.—John T. Emlen, Jr.

ECOLOGY

(See also Numbers 8, 9, 10, 28, 41, 45, 46 and 57.)

36. On the Ecology and Biology of the Birds of Japan. (Zur Oekologie und Biologie der Vögel Japans.) Hermann Jahn. 1942. *Journal für Ornithologie*, 90:7-302. A fine and comprehensive study, dealing with all the birds that occur regularly in Japan. Due to its monsoon climate, most of Japan has a severe winter, a late spring, hot summer, and long, mild fall; migration is late both in spring and fall. Birds seem scarce to the European observer, partly because of their silence and shyness in the woods, partly because of the intense cultivation of farming land. The various biotopes are described: subtropics, deciduous forests, subalpine, and alpine regions, and the sea-coast, with a number of subdivisions under each zone. Most of the monograph is devoted to the annotated list of species, treating of distribution, ecology and habits, including remarks on each bird's notes. There are many excellent photographs of habitats, of birds, and of nests.—M. M. Nice.

37. Competition for Food by Birds of Prey. David Lack. 1946. *The Journal of Animal Ecology*, 15(2):123-129. This is an interesting consideration of

predator-prey relationships. An examination of the data of Uttendörfer (Die Ernährung der deutschen Raubvögel und Eulen. Berlin, 1939) on German Falconiformes and Strigiformes shows that no two congeneric species compete for food in the same habitat and that when different genera are compared no two compete for the same food supply excepting the predators on the vole, *Microtus arvensis*, which is the staple food of several species of hawks and owls. The author suggests that this is not a case of real competition because of the superabundance of the vole at times; when voles are less abundant each predator turns to his own peculiar supply.—D.S.F.

38. Report on the Distribution and Status of the Corn-Crake. C. A. Norris. 1945, 1947. *British Birds*, 38(8):142-148; (9):162-168, 40(8):226-244. Another excellent publication of the British Trust for Ornithology, based on nearly 3,000 questionnaires. The Land Rail, *Crex crex* (Linnaeus), has decreased alarmingly during the last fifty years throughout most of the British Isles. "The mowing-machine must stand convicted for the great and continual decrease that has taken and is still taking place in the British Isles. It is certain that no species can stand up to the annual destruction of its eggs and especially its young and still remain unchanged in numbers." (p. 243.) In most of the northern and western Scottish islands and in north-west Ireland, either the mowing-machine is not in common use or the hay harvest takes place later than the first stage of fledging; in these localities there has been little or no decrease of the Corn-Crake. In northern Europe the introduction of the mowing machine some twenty years ago has marked the beginning of the Corn-Crake's decline.—M. M. Nice.

39. Cover Preferences, Seasonal Movements, and Food Habits of Richardson's Grouse and Ruffed Grouse in Southern Idaho. William H. Marshall. 1946. *Wilson Bulletin*, 58(1):42-52. Richardson's Grouse, *Dendragapus obscurus richardsoni* (Douglas), winters at high altitudes in open stands of Douglas Fir where they feed almost exclusively on the needles and buds of these trees. In spring they descend 1000 feet or more into the Douglas Fir forests to feed on fresh green leaves and flower parts which become available there nearly a month earlier than on the winter range. By midsummer a movement back to the high altitudes follows the ripening of various berries which become the principal food source. Females with broods, however, descend still lower in summer feeding on berries, leaves and insects in brushy thickets along streams. Here they remain until mid August when a migration is made back to the high altitude wintering grounds. This seasonal movement, a reverse of the familiar pattern, is an interesting adaptation to a specialized food habit. Ruffed Grouse, residents of lower altitude forests, do not show these seasonal movements.—John T. Emlen, Jr.

40. Do Birds Seek Man as Protection in Breeding? (Suchen Vögel beim Menschen Schutz für ihre Brut?, J. Peitzmeier. 1944. *Ornithologische Monatsberichte*, 52(1-2):16-18. The author cites four cases in which pairs of Mistle Thrushes, *Turdus viscivorus* Linnaeus, had lost nests by predation and then selected new nesting sites nearer the farm house. The author suggests four steps in which a species may become exclusively or almost exclusively inhabitants of human habitations and settlements. (1) Overpopulation forces birds into the neighborhood of human habitations. (2) Fear of man, which has been a barrier, gradually disappears. (3) Living in the vicinity of human habitation becomes a selective factor because of protection particularly in the face of increase in the numbers of predator species. (4) Eventually after such selection a "species of human habitations" is developed despite subsequent decrease in predation pressure. It would be of interest to apply this reasoning to the several American species which show adaptations in this direction.—D.S.F.

WILDLIFE MANAGEMENT AND METHODS

41. **The Ecology and Management of the Wild Turkey in Missouri.** Paul D. Dalke, A. Starker Leopold, and David L. Spencer. 1946. Technical Bulletin No. 1, Missouri Conservation Commission. 86pp. This bulletin is the first in a series of technical publications to be reported by the personnel of the Federal Aid-Wildlife program of the Missouri Conservation Commission and the Cooperative Wildlife Research Unit at the University of Missouri. The treatise is divided into three main divisions. (1) *Status of the Wild Turkey in Missouri*: In 1942 a state-wide inventory was made by personal interview with persons acquainted with the Wild Turkey. A sample plot check showed the state survey to be about 86 percent accurate. The state at present (1946) has 4,340 birds in 596 flocks. This represents a 20 percent increase since the 1934-35 tally of Bennet and Nagel. The writers state "the increase . . . has been more nearly 60 to 70 percent." This is interesting in view of the fact that the turkey has disappeared from 14 counties and the range has shrunk from 9,907 to 7,000 square miles in the intervening decade. Rough topography and timber is shown to be less closely associated with turkey abundance than soil type. (2) *Ecological Relationships*: Winter-flock counts on several study areas showed that 36 flocks varied in size from three to 34 birds and that 19 percent of the flocks were all gobblers, six percent all hens, and 75 percent were mixed. The average flock size over a seven-year period (291 flocks) was 9.6 birds. The winter range of the flock is an area from four to five miles long and of lesser varying width. Frequent activity on turkey range (i.e. logging, road building, public picnicking, etc.) tends to make it undesirable for turkeys. Plant food (136 species) comprised 75 percent of the annual diet, insects form the remaining 25 percent. The statement is made that "Some flocks have been known to wander over 12 to 13 square miles during the fall when changing from summer to winter range." How this was determined would be enlightening but is not stated. Also stated, "The importance of acorns in the turkey's diet should not be minimized."—the question is who minimizes it? Winter flocks break up in late March. Gobbling and mating reach a peak during the last two weeks in April. For so difficult a species to work with, the breeding season was very well covered; 77 gobbling males were located. It is concluded that old males are probably necessary for successful reproduction inasmuch as "yearling males . . . make little effort to participate in mating activities." Hens begin laying before winter flocks are completely broken up! The average clutch size is 11 eggs (25 nests). This does not agree with earlier observations, by a refuge manager showing an average (31 nests) of 7.4 eggs per clutch. Reasons for this are not given. The incubation period is given as 28 days and the peak of hatching on about the first of June. Of these 31 nests the hatchability was 53 percent. The writers found a 38 percent nest failure in 29 nests and a 20 percent decline in brood size from June to December. An even greater loss was suspected. These facts, in view of a "60-70% increase" in turkeys in the decade between 1934 and 1944 would imply a very slow turnover period for turkeys, which is *not* true of other studied Gallinae, namely pheasants and quail in the Midwest. The writers make no mention of this however. Predators are of minor importance in decimation of turkey numbers. Restocking (14,000 birds in 18 years) did not yield results to justify the excessive cost of such an undertaking. Hybrid populations only held their own, at best, under management and protection. (3) *Management*: The most productive turkey range lies in the timbered areas. In the discussion of range, areas within the state are compared as are other states in Missouri. In Taney County the best range in the state (outside refuges) had 1.13 birds per square mile compared with 0.62 birds per square mile in the state range at large. The writers believe that the best Missouri range is capable of producing five birds to the square mile and two birds per square mile on the poorer range. The section, *Land Use Practices on the Turkey Range*, is a simple, direct statement of using land wisely

with a long range viewpoint. It should be understood by, and bring a message to any Ozark land-owner who will take time to read it.

Briefly it is stated thus: "... generally speaking conservative land use is usually also good wildlife management." Re-establishing breeding stock is best attained by managing isolated remnants allowing the overflow to repopulate adjacent ranges. Game farm birds have not been successful in establishing thrifty populations. Reintroduction of native stock by live trapping is contemplated. Only five of 15 state refuges were successfully producing a population of wild turkeys, yet those that were, point to the potential value of refuges and are strongly advocated by the writers. Nine management practices are recommended: Control of (1) fire, (2) grazing, (3) predators, (4) hunting; the maintenance of (5) food patches, (6) a water supply in the form of farm ponds, (7) a native turkey stock, (8) the inauguration of proper silvicultural and land use practices, and (9) intensification of neighborly public relations especially around refuges. The concluding section on the *Anticipated Open Turkey Season* contains examples of the common administrative difficulties on opening a season on endangered species. A season if it comes at all will occur in five to seven years; most feasible of the regulations recommended are a fall season of four days and a season bag of one bird of either sex tagged by a system similar to that used in tagging the deer kill.

Most of the technical aspects of the bulletin have been published earlier by A. S. Leopold and are listed in the bibliography. The bulletin is enhanced with sketches by Charlie Schwartz. It contains 13 very good photographs; four maps, five graphs and 15 tables. Some of the tables, especially numbers 2 and 3, are needlessly long. All in all this is an excellent beginning in the publication of a technical research series. —Robert A. McCabe.

42. Trapping Wild Turkey on the Kentucky Woodlands Refuge. W. R. Sylvester and P. W. Lane. 1946. *Journal of Wildlife Management*, 10(4):333-342. Wild turkeys are very difficult to trap. They must first be induced to feed regularly at a bait station. The trap, a large cage of two-inch mesh poultry netting, 10 feet by 15 feet and 6 feet high is then constructed at the site. Large drop doors at both ends of the trap are released by an observer when the turkeys have entered. Automatic traps have not proved successful and are thought to expose the birds to hazards before the operator returns. Turkey trapping is said to be "a full time operation."—John T. Emlen, Jr.

43. Effects of DDT on Wildlife. (a series of seven articles dealing with the toxic effects of DDT on birds, mammals and fish). Various authors. 1946. *Journal of Wildlife Management*, 10(3):181-216. These reports describe the results of a series of experiments and observations conducted by employees of the Fish and Wildlife Service mainly at the Patuxent Research Refuge at Bowie, Maryland. Bird censuses made before and after spraying in treated and control study plots showed little if any destruction of bird life when the material was sprayed as an oil solution from an airplane at a rate of one pound per acre. A moderate reduction in the numbers of Redstarts on the sprayed area may possibly be attributed to the DDT. The Redstart, it is noted, is a species which forages extensively in the upper foliage where toxic accumulations were greatest. Another study conducted in a forest area near Scranton, Pennsylvania showed considerable damage to bird life where DDT was sprayed in an oil solution at a rate of five pounds per acre. In a nearby area, a one pound per acre treatment had no detectable effect on the birds.—John T. Emlen, Jr.

CONSERVATION

(See also Number 56.)

44. Mist Netting for Birds in Japan. Report No. 88 Natural Resources Section, General Headquarters, Supreme Command for the Allied Powers. 20 August, 1947, 22 pp. Prepared by Oliver L. Austin, Jr. [Lithoprinted] Dr.

Austin, in his capacity as head of the Wildlife Branch, Fisheries Division, Natural Resources Section, has presented a most detailed and interesting account of the little known but nevertheless terribly destructive method employed by the Japanese in catching song birds for food. The mist net is made of strong silk thread; the mesh is loosely mounted on a taut frame of strong twine crossed by two horizontal braces about two feet apart. It is fully as effective as the Italian bird net and simpler to operate, since a net thirty feet long requires only a light bamboo pole at either end to hold the outer frame taut. While the mist net is believed to have originated more than 300 years ago, it is only within the last 75 years that the technique of operation reached its present development.

While the mist net may be used almost anywhere in its simplest form, *i.e.* a single net stretched in any convenient place, it is along the major migration routes of the finches and thrushes as they pass through Japan from eastern Siberia that the most elaborate form of use has developed. The *toyaba* is the Japanese name for a location with a central hut surrounded by a series of nets and equipped with devices for attracting birds to the spot whence they fly into the nets and are caught. One of the devices used is the live decoy, the other is a small flag on a bamboo pole which is flashed as a passing flock of birds hovers over the decoys. The flash of the flag is supposed to simulate the stoop of a falcon, at which the birds dive into the cover where the nets are placed.

Dr. Austin discloses the interesting fact that the Japanese peasant had learned how to bring his decoys into song in the autumn long before scientists knew about the avian sexual cycle and its hormone control of secondary sexual characters.

The Japanese induce fall singing by confining their decoys in a dark place, keeping them on a low protein diet. The birds are brought out at the end of August and exposed to full light with artificial illumination in the evening. At the same time the amount of protein in the diet is materially increased. This method brings the decoy into song in from 40 to 60 days.

The birds caught in the nets are killed and tied in strings of ten each. Most of the catch is sold locally or in nearby towns. A limited number of thrushes are pickled and were formerly sold as a delicacy in the larger cities.

The official figures of the Ministry of Agriculture and Forestry show that during the past ten years the annual catch of thrushes has been about 3,500,000 and of the various sparrows 4,500,000 birds, exclusive of House Sparrows of which about 3,000,000 were taken annually.

The abnormal scarcity of small insectivorous birds in Japan today is the result of mist netting. In consequence the "balance of nature" has become upset and certain insect pests are inflicting serious damage both to farm crops and to woodlands. Dr. Austin recommends that mist netting be abolished and modern management practices and adequate protection for all small birds be instituted at once.—J. L. Peters.

45. The Population of Costa Rica and its Natural Resources. William Vogt. 1946. Pan American Union, Washington, D. C. 24 pp. A very fine report with many pertinent photographs, pointing out the damage done by destruction of forests in this beautiful country. "Hundreds of years are required to produce a single centimeter of soil." (p. 2.) "One of the best clues to the health of a nation's lands is the condition of its rivers;" many are now carrying a heavy load of silt. "Costa Rica suffers greatly through lack of power resources. It has no coal, no proved available petroleum. One of its greatest potential riches lies in hydroelectric power. Unless watersheds are protected, it is going to lose those power resources." (p. 12.) "Much of the land now being cultivated in Costa Rica should be used for pasturage or should have been kept in forests." (p. 13.) "Much of the scientific interest of Costa Rica, such as its fauna and flora, its oak forest, and its high Páramo zone which seems to be the true meeting place of North and South America, are a treasure shared by no other nation in the world." (p. 10.) Practical, dynamic suggestions are made as to a comprehensive

conservation program, consisting of Research, Action Program (among proposed National Parks are the Lago de Coter and the Oak Forest along the Pan-American Highway, "the finest stand of oaks left in the New World, perhaps in the entire world. . ."), and Education.—M. M. Nice.

46. The Population of El Salvador and its Natural Resources. William Vogt. 1946. Pan-American Union, Washington, D. C. 30 pp. The Republic of El Salvador is face to face with a crisis because of "the fact that the national population is *increasing* at the rate of about forty thousand persons per year, and the amount of cultivatable land is *decreasing* at the rate of hundreds of thousands, if not millions of tons." The world population is about 2,200,000,000, while the total area of arable land is probably less than 3,200,000,000 acres, less than $1\frac{1}{2}$ acres per person. "World populations are increasing at the rate of about fifty thousand people per day . . ." while "the area of arable land is being daily reduced." Numerous photographs give a shocking picture of erosion and land destruction. Mr. Vogt classifies land according to Edward H. Graham's "Natural Principles of Land Use" (1944, Oxford Univ. Press, N. Y.). "Until El Salvador intelligently studies its land and recognizes that considerable areas of it would fall in Class VIII and therefore would be inevitably destroyed by agriculture, forestry or grazing; until it recognizes that other lands fall in Classes V, VI, and VII and not only cannot be cultivated but must be lumbered and grazed according to definite limiting principles; that most of its agricultural land falls into Classes II, III, and IV that, for their conservation, require specific methods of cultivation, the country is not going to stop destroying its resources." (p. 24.) Emphasizing the multiple use concept, the author writes, "Watershed lands that *must* be kept heavily vegetated if the nation is not to perish, can also be made to produce important crops of wild plants and animals." "An immediate measure that can be taken without difficulty would be to *stop* clearing roadsides of their vegetation." "The breeding of the small bird-eating hawks should be encouraged in order that the harmful concentrations of Great-tailed Grackles and finches may be kept in check and driven away from farmers' fields."

Splendid suggestions are made for meeting the crisis under Research, Action Program, and Education. For example, "Every electric or kerosene stove in use in El Salvador probably saves from twenty to fifty trees a year." We can all take this to heart: "One of the strangest paradoxes in the history of human culture has been the almost complete neglect of consideration of man's dependence on the land and its resources. There has existed a tacit assumption that human beings live in a vacuum, and even the problems of wealth, *i.e.* economics, have given little attention to the land from which all wealth must come and concerned themselves principally with such *symbols* of wealth as money and trade balances." (p. 29.) Let us hope that these warnings are heeded — in El Salvador and also in the rest of the world.—M. M. Nice.

47. Some Effects of the War on the Wildlife of Micronesia. Rollin H. Baker. 1946. *Transactions of the Eleventh North American Wildlife Conference*, 205-213. A brief discussion of the effects of military operation, pest control, and introduced species on the natural fauna and flora of these minute Pacific islands. Once more the precariousness of the existence of the faunae of these small islands comes to attention. Conservation measures for them cannot be developed and applied too soon!—D.S.F.

ZOOGEOGRAPHY

(See also Numbers 57, 58, and 59.)

48. History of the North American Fauna. Ernst Mayr. 1946. *Wilson Bulletin*, 58(1):3-41. Historical zoogeography is a subject which has received very little attention from ornithologists in recent years. Perhaps this is because

there is so little direct evidence upon which to base speculations. It is, nevertheless, an extremely fascinating and significant branch of our science, and Dr. Mayr has here made a valiant attempt to construct a logical and meaningful presentation.

Zoogeographical concepts have developed in the past 50 or 60 years from a descriptive stage to a dynamic interpretation of the origin and history of our present faunas. Bird geography is relatively difficult to interpret, but recent advances in avian palaeontology and taxonomy have resulted in progress. Bird bones are unfortunately too frail to make good fossils under many conditions, and the record is even now very incomplete. (Arboreal animals are nearly always poorly represented in fossil beds.) New concepts of the taxonomic relations of land bird families have, however, shed new light on the problems of origin and evolution of major groups. These concepts are unfortunately, though perhaps necessarily, presented in the paper in sweeping statements without adequate reference to authority, leaving the neophyte taxonomist in a fog of questions and doubts in which to embark on a speculative journey.

North America, according to geologists, became separated from South America at the beginning of the Tertiary period 50 to 70 million years ago and did not re-establish this connection until some two million years ago. This separation resulted in a segregation of the animals of the two areas during long periods of evolutionary development. North America and Eurasia, on the other hand, are believed by Mayr to have been connected repeatedly during these critical epochs of avian evolution. Theories of permanency and fixity of continents are briefly discussed, and the theory of permanence adopted. Wegener's theory of continental drift is unceremoniously disposed of as out of line with the zoogeographical evidence. Full discussions of these concepts would, of course, be impossible in a paper of this type but the thoughtful reader may justifiably hesitate blindly to accept the author's interpretations of these controversial concepts.

The American avifauna is analyzed and classified under seven headings: (a) a general (unanalyzed) element; (b) a pan-tropical element; (c) a pan-boreal element; (d) an old world element; (e) a North American element; (f) a pan-American element, and (g) a South American element. The three Tertiary land masses, South America, North America and Eurasia are recognized as the basic contributors to the present fauna, but the further analysis is necessitated because of early intercontinental connections which render the ultimate origin obscure. Families and, in some cases, subfamilies are discussed in relation to their probable center of origin. The discussion, based almost entirely on taxonomic considerations and extent of representation in the various modern faunas, is suggestive and stimulating, but not always convincing. As the author says, a vast amount of further information is needed before this complex problem can be solved.

Having at least tentatively assigned the various families to their respective faunal elements an interesting analysis of North American bird populations is assayed. A number of principles are brought out in this discussion: (1) Local lists from Alaska to Mexico show a progressively increasing representation of the South American element and a decreasing representation of Old World forms. (2) Breeding bird censuses from northern localities to southern localities show a similar progressive change, but, significantly, the Old World element is more weakly represented here than in the species tabulation. (3) The Old World element is essentially non-migratory, the South American element, migratory.

A brief discussion of regions or subregions within the American continents indicates that, at least with birds, the value and validity of such divisions is questionable.

An analysis of the elements represented in the modern fauna of temperate North America shows that the South American element is much better represented in the birds than in other forms of plant and animal life. This, it is conjectured, is due to an earlier occupation of the North American continent by birds

as a result of their ability to cross the Tertiary water barriers which separated the northern and southern continents. Migratory behavior, better developed in the South American than the Old World element, is thought to have further contributed to this success.

A final discussion of the history of the pan-tropical element leaves the reader fully aware of the tremendous difficulties which the zoogeographer faces in trying to explain the spread of faunas over the earth. It leaves this reader wondering just how far we really have advanced beyond the stage of pure speculation.

The problem of presenting this complex and evasive subject in a short review article is an extremely difficult one which few have the background or audacity to attempt. The author is to be congratulated on his success.—John T. Emlen, Jr.

49. The Distribution and Migration of Four Species of Terns of the Genus *Sterna*. (Über Verbreitung und Wanderungen von vier *Sterna*-Arten.) Bertil Kullenberg. 1946. *Arkiv for Zoologi*, 38A. No. 17. 80 pp. This treatise examines in detail the distribution, ecology, systematics, and possible origin of the Common Tern, *Sterna hirundo* Linnaeus; Arctic Tern, *Sterna macrura* Naumann; South American Tern, *Sterna hirundinacea* Lesson; and Antarctic Tern, *Sterna vittata* Gmelin. The Arctic Tern and the Antarctic Tern are more eurythermal and adapted to the more severe temperatures than the Common Tern and the South American Tern. All four are associated with a high relative humidity. Fog may be important in the distribution of the Arctic Tern perhaps accounting for its absence from the Sea of Okotsk. Cold water of the subarctic and subantarctic areas, and the currents which emanate from them, with its higher solubility for gases and greater content of phosphorus and nitrogen, has a higher biologic productivity than the warmer waters; this is an important factor in the distribution and migration of these four species of terns. It is believed that the four species have a common origin. It is suggested that the South American Tern (now distributed along the southern coasts of South America) was first separated from the Common Tern, or its ancestor, in either case a species of mild climates. With the development of arctic and subarctic climates in the northern hemisphere the Arctic Tern was separated from the ancestral form (the Common Tern) of milder climates. The annual fluctuations of light, plankton, and pelagic Crustacea and Mollusca in the high latitudes resulted in the development of migration by the Arctic Tern. In the development of this migration to Antarctica the Arctic Tern followed routes over cold waters of high biologic productivity; the present routes of migration likewise follow routes over cold productive waters. Presumably a population of the Arctic Tern became established in Antarctica and evolved into the Antarctic Tern. This species, which has become circumpolar, has only limited migratory movements and shows extensive subspeciation.—D.S.F.

50. Antarctic and Sub-antarctic Birds. Holger Holgerson. 1945. *Scientific Results of the Norwegian Antarctic Expeditions 1927-1928 et seq., Instituted and financed by Consul Lars Christensen*. No. 23, 100 pp. *Det Norske Videnskaps-Akademi i Oslo*. This is mostly a valuable annotated systematic list of 45 species of birds of Antarctica and the sub-antarctic islands based principally on materials from the *Norvegica* expeditions of 1927-1928 and 1928-1929 with information also from material collected by the Roald Amundsen South Pole Expedition of 1910-1911, the British *Southern Cross* expedition of 1898-1899, Captain Ring on the Crozet Islands and Kerguelen Islands, and other sources. The twenty-page section on faunistic features of Antarctica and the sub-antarctic islands lists the following numbers of species, total observed and known to breed respectively: Antarctic Mainland, 10, 7; Peter I. Island, 13, 3; the Graham Land Region ("... between Hearst Land and the South Shetlands, including islands to the west and south.") 22, 15; the South Shetland Islands, 23, 14; the South Orkney Islands, 20, 16; the South Sandwich Islands, 17, 7; South Georgia, 29, 24; Bouvet

Island, 16, 6; Marion and Prince Edward islands, 12, 5; Kerguelen Islands, 35, 28; Heard Island, 21, 13; Macquarie Island, 29, 21; Gough Island, 23, 16.—D.S.F.

51. The Goosander on the Banks of the Areuse in 1946. (Le Harle bièvre sur les rives de l'Areuse en 1946.) M. Weber. 1946. *Nos Oiseaux*, 189:225-230. A record of observations of this species, *Mergus merganser* (Linnaeus), during 1946. These birds nest in suitable cavities in large trees, principally the Swiss or Italian poplars, at heights up to ten meters. Four cavities in one tree were occupied in 1946, one having 21 eggs, of which 19 hatched on the same day. The period of incubation was 34-35 days. Nest building began about the middle of March, incubation started about the third of April, and the first broods hatched appeared on the seventh or eighth of May. Newly hatched young remain in the nest for at least one day, leaving at the call of the female on the ground. They depart unassisted. The author is of the opinion that the females desert the young at an early age, leaving them to fend for themselves. Short reports on the 1946 status of this species in other Swiss localities are given in subsequent notes by P. Delay (p. 231) and P. Géroudet (p. 232). The latter, editor of *Nos Oiseaux*, in a separate note (p. 232) lists a number of questions to serve as a guide for further observations on the species, and suggests a coordinated program to augment knowledge of its behavior. Coordination of observer's efforts, particularly when directed toward the solution of unsolved problems, could be more widely applied with advantage in this country.—R. O. Bender.

52. The Presence of the Purple Sandpiper in the High Mountains of Sweden and its Breeding Biology. (Om skärnsnäppan, *Calidris m. maritima* (Brünnich), i de svenska fjällen och dess häckningsbiologi.) P. O. Swanberg. *Fauna och Flora*, 1945, Häfte 4:155-169. English Summary, 165-167. Prior to 1933 the Purple Sandpiper had been recorded only once as a breeding species in Sweden. Since then it has become a regular breeder in the high mountains of southwestern Jemtland; there is a record of a nest from northwestern Jemtland and in Lapland more than 40 pairs of the species have been found as well as nests and young. There is a record from Lapland for 1903. It seems probable, according to the author, that the species has been overlooked because of its secluded mountain biotope on the plateaus at 1,000 to 1,400 meters and that the species has not necessarily increased markedly. Clutch size is most frequently four; incubation begins in the second or third week of June although this may be delayed until the end of June by persistent snow. Cock nests were observed. Both sexes apparently incubate for long periods (about fifteen hours). There are many interesting notes on the biology of this species.—D.S.F.

SYSTEMATICS

(See also Numbers 49, 58, and 59.)

53. The Role of Temperature and Natural Selection in Relation to the Variations in the Size of the English Sparrow in the United States. John B. Calhoun. 1947. *American Naturalist*, 81:203-228. No one has hitherto succeeded in demonstrating geographical variation in the introduced English Sparrows, *Passer domesticus* Linnaeus, of North America. Dr. Calhoun, after comparison of many specimens from all parts of the United States, concludes (a) that the wing length has increased about one millimeter since the species' introduction, i.e. from 1881 and before to the present, and (b) that at present there is a south to north cline of increasing size, northern birds averaging about one millimeter longer in length of wing, humerus, and femur. This trend is considered an example of Bergmann's rule that warm-blooded vertebrates usually increase in size in the colder parts of their range. Kendeigh's experiments on the survival of English Sparrows under laboratory extremes of cold, heat, and hunger

are believed to favor this interpretation. Apparently, it was assumed that measurements of appendages are correlated with body size. This is by no means always true, in fact, appendages often are shorter in colder regions (Allen's rule).

Samples which do not agree with the above size trends have been excluded, sometimes on what seems rather dubious grounds. Thus, all specimens from the South Atlantic, Gulf and west coast states were eliminated as possibly subject to non-selective gene drift or other irrelevant variation resulting from their more or less peripheral position. This removes from consideration the birds of the warmest states, including one series from Louisiana, the males of which averaged second largest in the entire country. Yet, material from the New England and North Atlantic states that could be excluded on the same basis was included "on the assumption that these areas were so heavily populated by people as to allow a continuous distribution of English Sparrows with areas to the west." (p. 217.) A series from Presque Isle, Maine, averaged very small in wing length and was excluded as possibly a result of genetic isolation. If climatic selection is effective, however, it should operate in peripheral and isolated populations, as well as others unless they are very small. This is certainly not true of some of those concerned here. Even after the above selection of material and some rather fine corrections for seasonal plumage wear, the variation comes to only a millimeter. Regarding the increase in size since introduction, it would be interesting to determine with other species whether any series of skins collected sixty or more years ago might not often average slightly less in wing length than recent material as a result of long drying and handling. The latitudinal size trend seems better substantiated, particularly by the skeletal measurements, yet the differences are so slight and the exceptions frequent enough to raise some doubts as to the regularity and cause (genetic, environmental, or other) of the variation. These criticisms should not conceal the fact that the problem is very difficult and that the author has placed his findings on as sound a statistical basis as possible. If northern English Sparrows are larger, this should be most evident in their weights. Here is a problem for banders.—D. Amadon.

EVOLUTION

(See also Numbers 53 and 56.)

54. Avian Evolution in New Zealand and Australia. W. R. B. Oliver. 1945. *The Emu*, 45(1):55-77, 45(2):119-152. This is the presidential address delivered to the 1944 meeting of the Royal Australian Ornithologists' Union. Following a discussion of the evolution and variation in morphology of the vomer, maxillo-palatines, palatines, antorbital, quadrate, mandible, sternum, and pelvis the author makes these generalizations concerning the evolution from simple to more complex birds. (1) There has been a general increase in size. (2) There has been increasing ossification. (3) Projecting portions of the skeleton have become more prominent. In the evolution of birds, the author believes that the first transition from reptilian ancestry was the development of feathers from scales, a process which came long before the development of flight. Next came bipedal locomotion and consequent development of the hind limbs and reduction of the fore limbs. Reduction of the wing continued in one group (the moas) until the forelimb (wing) disappeared completely. It is proposed then that the first bird was *feathered, bipedal, with teeth, and with reduced fore limbs*; the sternum had no keel. "The last important change in the making of a bird was the ability to fly which involved the development of the stiff wing feathers, a keeled sternum and other changes. . . . *Archaeopteryx*, or a bird like it, could possibly have been in the direct line between reptiles and modern birds. To me, however, it seems unlikely that the ancestor of modern birds was a tree-climber. It is much more likely that this ancestral group consisted of bipedal cursorial birds which appeared after the era of birds like *Archaeopteryx*." (p. 71.) The author's phylogenetic chart

shows two lines of evolution from a "pro-avian feathered reptile," one ending with the Archaeornithis (including *Archaeopteryx*), the other giving rise to the primitive Neornithes with a keel-less sternum and primitive pelvic girdle. From this arose, on one hand, the *protoratite stock*, (sternum without keel), the ancestry of the modern ratite birds (ostriches, emus, kiwis, moas, cassowaries, rheas) and, on the other hand, the *protocarinate stock* (toothed, sternum with keel). This *protocarinate stock* gave rise to the toothless ancestral Carinatae from which the author derives the Palaeognathae (tinamous) and the Neognathae (including all other modern birds). The author proposes five superorders of Neognathae: Larimorpha (including penguins; albatrosses, shearwaters, petrels, etc.; pelicans and their allies; ducks, geese, and swans; herons and their allies; cranes and rails; shore birds, gulls, terns, etc.; owls; hawks), Gallimorpha (including the bustard quails; pigeons, doves, and sand grouse), Passerimorpha (including the passerine birds among which are placed the swifts), Coraciiforma (including cuckoos, goatsuckers, kingfishers, etc., and parrots), and Turnicimorpha. Only birds of Australia and New Zealand are listed in the above system. The author rejects sub-class status for the penguins because "On the whole the osteological evidence indicates that penguins and petrels have sprung from stocks very near one another." The author believes that the order Pelicaniformes as recognized today (including pelicans, cormorants, tropic birds, etc.) is of multiple origin. The hawks are regarded as closer to the owls than is generally accepted at the present time. [This relationship has also been suggested on the basis of the relationships of the Mallophaga parasitizing these two orders.—*Reviewer*].—D. S. F.

55. Fossil Penguins. George Gaylord Simpson. 1946. *Bulletin of the American Museum of Natural History*, 87, article 1. 99 pp. This paper is devoted initially to a description of a specimen of *Paraptymodytes antarcticus* (Moreno and Mercerat) found by the Second Scarrit Expedition in Chubut Territory, Argentina. Although incomplete, it is far more complete than the previously known specimens. The age although "disputed" is considered to be early Miocene. This is followed by a critical list and discussion of the 23 genera and 35 species of fossil penguins which have been described. Because of the unavailability of the types and inadequacy of descriptions, such evaluation, in some instances, is difficult. Twenty-four pages are devoted to a careful comparative osteologic examination of the Miocene penguins. The author's classification recognizes five sub-families of which four are Miocene; all recent penguins occur in the fifth sub-family, the Spheniscinae. The mid-tertiary penguins were far more varied (producing four sub-families) than the recent penguins which are apparently derived from a *single* mid-tertiary stock and in which divergence has developed only to the generic stage. Miocene penguins have been found in central Patagonia, Seymour Island near Antarctica, on the south island of New Zealand and in South Australia. The largest fossil penguins, *Antropornis norden-skjöldi* Wiman and *Pachydyptes ponderous* Oliver, may have been five feet in standing height; individuals of these species may have weighed between 200 and 300 pounds. The living Emperor Penguin weighs about 70 pounds. There is an interesting discussion of the possible origin of the penguins. Because they constitute such a distinct group, their separation from other birds must be placed at an early time. In considering the evolution of penguins the author points out that "Almost all of the more striking features that differentiate penguins from the flying birds most nearly similar ecologically or structurally are clearly correlated with three functional factors: 1. The penguin type of swimming, which might be called submarine flying . . . 2. Terrestrial locomotion in an upright posture . . . 3. Insulation. The obvious structural correlatives are the feathers and blubber. . . In brief, the penguins are a group of birds fully adapted for swimming in cold water by means of their wings. Most of their peculiarities are consequences or, at least, concomitants of this basic adaptation." (p. 84.) The evolution of the penguin wing has been one of *change of function* not a true

regression. Menzbier and more recently Lowe have proposed that penguins were evolved from terrestrial non-volant ancestors. The author presents much evidence and logical argument against this concept. The author in turn proposes that the penguins were derived from aerial volant birds via an *aerial-and-aquatic volant stage*.

In an appendix to this paper the author disagrees completely with the thesis of Lowe that *Archeopteryx* and *Archaeornis* are not primitive birds and that the primitive birds were all terrestrial and that from these arose three groups, a cursorial group (ostriches, etc.), an aquatic group (the penguins), and a volant group (all other birds). In pointing out the intermediate position of the skull of *Archaeornis* between *Euparkeria* (a Triassic reptile) and a modern pigeon he contends logically that *Archaeornis* is a primitive bird that flight is therefore primitive in birds. [In taking this position the author is also in disagreement with the theory of Oliver (Review no. 55, this number of *Bird-Banding*) who suggests a terrestrial ancestral bird group from which all modern birds are derived.]—D.S.F.

BOOKS AND MONOGRAPHS

56. Silent Wings. A Memorial to the Passenger Pigeon. Published by the Wisconsin Society for Ornithology. (Edited by Walter E. Scott, Mendota Beach Heights, Madison 5, Wisconsin.) 1947. 43 pp. \$1.00. This profoundly impressive booklet was issued on the occasion of the unveiling of a monument at Wyalusing State Park, Wisconsin, "Dedicated to the last Wisconsin Passenger Pigeon shot at Babcock, Sept. 1899. This species became extinct through the avarice and thoughtlessness of man." Included in the booklet are an excellent full-page reproduction in color of William Pope's painting of the Passenger Pigeon, a photographic reproduction of Audubon's painting of the Passenger Pigeon, a photographic reproduction of Walter Thorp's pencil and water color of Wisconsin Passenger Pigeons, and eight photographs of Passenger Pigeons and nests. The text includes "On a Monument to the Pigeon" by Aldo Leopold (pp. 3-5), "The Passenger Pigeon in Wisconsin and the Problems in its History" by A. W. Schorger (pp. 8-17), "Attitude in Conservation" by Hartley H. T. Jackson (pp. 19-24), and "The Great Wisconsin Passenger Pigeon Nesting of 1871" by A. W. Schorger (pp. 26-38) reprinted from the *Proceedings of the Linnaean Society of New York*, No. 48, pp. 1-26, 1936 (published October, 1937). The Passenger Pigeon as a species has perhaps never been so vividly and aptly characterized as in the words of Professor Leopold: "The pigeon was no mere bird, he was a biological storm. He was the lightning that played between two biotic poles of intolerable intensity: the fat of the land and his own zest for living. Yearly the feathered tempest roared up, down, and across the continent, sucking up the laden fruits of forest and prairie, burning them in a travelling blast of life. Like any other chain-reaction, the pigeon could survive no diminution of his own furious intensity. Once the pigeoners had subtracted from his number, and once the settlers had chopped gaps in the continuity of his fuel, his flame guttered out with hardly a sputter or even a wisp of smoke." This booklet is important and good conservation propaganda; it is good propaganda because it presents vividly the true picture of the destruction of a species whose existence could have been compatible with civilization. It is to be hoped that its limited edition of 4,000 copies will have a wide and effective distribution.—D.S.F.

57. Birds in their Domain. (Vogels in hun Domein.) J. Tinbergen. 1946. Scheltema & Holkema's Boekhandel en Uitgeversmij. N. V., Amsterdam. (No. 1 of a series, *Van Eigen Erf Monografieën ter Verdieping van de Kennis van eigen Land en Volk.*) 119 pp. This is excellently presented fundamental and elementary avian ecology for the layman and amateur student of ornithology. It is directed primarily to the level of the student who has learned to identify birds and has become familiar with them in the field. A logical introduction to ecology comes

in pointing out the adherence of species to particular habitat-types, using as examples species of tits and other Dutch birds. The third chapter is an interesting discussion of food and feeding habits of water and shore birds including a very interesting description of the diving and feeding of the Greater Scaup, *Aythya marila* (Linnaeus). Attention is given to the role of feeding habits and requirements in ecologic distribution of aquatic and shore species. Two additional chapters are devoted to choice of terrain and habitat in relation to mode of life and nesting requirements. Chapter VI (pp. 42-49) is a sound introduction to territory, the function of the song of the male, methods of defense, and other aspects of territory. There is a fundamentally sensible discussion of the tendency to return to the breeding place of the previous year (*plaatstrouw*). "It is true that one must not represent their *plaatstrouw* so strongly that each bird seeks the identical square meter where it bred the previous year. One can describe it best as follows: a strikingly high percentage establish themselves within a short distance of the old breeding place." (p. 50.) The actual distance varies in different species. "The opposite of *plaatstrouw* is the situation in which the birds disperse at random throughout the range of the species . . . This can occur only among migratory species. . . So far as I know this situation has been established as fact in only a few species. An example is the Crossbill [*Loxia curvirostra* Linnaeus]. . . We can say that most species of birds have an inclination towards fidelity to the area of the first breeding place." (p. 51.) Tendency to breed in the vicinity of the birthplace is well developed in many species. The opposite is true in certain species, an example being the Goshawk, *Accipiter gentilis* (Linnaeus), in which the young may disperse 40-80 kilometers within a month after leaving the nest. The basic concepts of population dynamics, death rates, birth rates, and censuses are well presented. An excellent illustrated graph (p. 56) compares the annual population cycles of the European Blackbird, *Turdus merula* Linnaeus, and the Herring Gull, *Larus argentatus* Brünnich. First-year birds comprise three fourths of the population in the former, one half in the latter. There are population estimates for several species for the entire Netherlands. Perhaps the most important part of the book is its pictorial presentation of the population densities for 44 species of land birds in six typical habitats in the Netherlands. The densities (total for all species) in numbers of territory-defending males per ten hectares (24.7 acres), are as follows: mixed forest on edge of dune, 112; mixed forest on dry ground in Noord-Veluwe, 55; 50-year-old dense fir forest, 35; 35-year-old fir forest on poor ground, 11; 12-year-old fir forest on poor ground, 23; and village with many trees in Noord-Veluwe, 117. Chapter X (pp. 84-114) is largely a habitat classification of Dutch birds often including specific localities. This little book comes as a refreshing change in the ever increasing volume of popular books in ornithology. It could well serve as a model for a similar treatise in English on American birds.—D.S.F.

58. Bird Life in Switzerland. II. The Nesting Birds in Their Habitats. (Schweizer Vogelleben. II. Die Brutvögel in ihren Lebensgebieten.) Hans Noll. 1942. Basel. Gaiser and Haldimann. 207 pp. An admirable book for the general reader describing the nesting birds according to habitats: house and garden; fruit orchards; meadows and fields, hedges and copses; deciduous woods; coniferous woods; the Alps; streams; marsh and lake. In simple, genial style, Dr. Noll tells of the life history of 161 species, largely drawing on his own experience of many years, but quoting other observers at times and including much information gained from ringing. The changes in bird populations are of much interest. For instance, the Crested Lark, *Galerida cristata* Linnaeus, has followed the railroads—in 1815 it was a very rare winter visitor, in 1859 it was first known to breed in Switzerland, since 1912 it has been widely distributed throughout the country. The White Stork, on the other hand, has almost disappeared. In the 18th century there were as many as 20 to 30 nests in one village; in 1910 there were still 100 occupied nests in the country, but now there are only ten. The

draining of the swamps and ever increasing number of telephone wires and power lines are two factors responsible for the decrease. A table lists the birds in systematic order with their occurrence in the eight habitats indicated by a scale of abundance descending from 5 to 1. There are 16 plates of excellent photographs.—M. M. Nice.

59. Birds of Malaysia. Jean Delacour. 1947. The Macmillan Co., New York. xvi. + 382 pp. 84 line cuts, map. \$5.00. This is a companion volume to "Birds of the Southwest Pacific" by Mayr and "Birds of the Philippines" by Delacour and Mayr. Malaysia comprises the Malay Peninsula, Sumatra, Java, Bali, Borneo, Palawan and smaller nearby islands. It is a subregion of the Oriental region with 21 genera and numerous species of birds peculiar to it. Of these endemic genera, one—*Pityriasis* of Borneo—probably deserves family status; another—*Psaltria* of Java—is remarkably similar to the Bush-tit (*Psaltriparus*) of western North America, which Delacour considers its nearest relative though we need to know more of the habits of *Psaltria*. East Indian jungles have been a mecca for naturalists since the days of Wallace. Many remarkable pheasants, hornbills, broadbills and other birds occur there only. 780 species of birds are known from Malaysia, of these 660 are resident, 420 on Borneo alone. The introduction and glossary to this volume give hints for field identification and observations and a summary of Malaysian birdlife. In the systematic section each family is briefly characterized, the genera and species described and the subspecies listed and, when worthwhile for field identification, described. Text figures by Poole and Seidel and numerous keys will aid identification. This handbook incorporates a revision of most of the birds included. Captain Delacour favors large genera and inclusive species or superspecies. The increased clarity of such treatment from a purely practical or amateur's point of view was never more apparent than in this volume. "Birds of Malaysia" will be of value not only to those fortunate enough to visit that region but to anyone interested in the birds of tropical Asia.—D. Amadon.

60. A Working List of Australian Birds Including the Australian Quadrant and New Zealand. Gregory M. Mathews. 1946. Printed and published for the author by Shepherd & Newman Pty. Ltd., Yurond Street, Sydney, N. S. W. vi. + 184 pp. The first part of this volume (149 pp.) consists of a list of the native species of Australia, the Australian Quadrant of Antarctica, Lord Howe Island, and Norfolk Island. Included are citations to original descriptions of genera, citations to original description of species or the subspecies which occurs in the area, brief notes on distribution of each species or subspecies, and the type locality for each species or for the subspecies which occurs in the area. The second part of the volume (25 pp., separate pagination) is a list of New Zealand birds, following a similar plan although distributional notes are restricted to distribution in New Zealand and the system of listing is somewhat different, complete citations being given for New Zealand species, names and dates (of original descriptions) for New Zealand subspecies and only scientific names for "the visiting birds." There are indices to the Australian genera, Australian vernacular names, New Zealand genera, and New Zealand common names.—D.S.F.

61. Glacial Geology and the Pleistocene Epoch. Richard Foster Flint. 1947. John Wiley and Sons, New York. 586 pp. \$6.00. As the development and the history of the distribution of the species of birds becomes more clearly understood, the importance of the Pleistocene Epoch and its dominant feature, glaciation, rightfully assume increasing attention as important factors in the dynamics of the avifaunal distribution. It is appropriately fortunate that a scholarly treatise, which can be used without technical knowledge of geology, should present a readable and interesting summary of the facts and theories of the Pleistocene Epoch. The clarity of the text is enhanced by well selected illustrations, mostly

diagrams, and tables. Following a presentation of the development of the Glacial Theory, the remainder of the first four chapters is devoted to the dynamics of glaciation based primarily on existing glaciers. The fourth chapter lists and discusses the existing glaciers. Five chapters are directed to the evidences of glacial action and their interpretation. Of particular interest to ornithologists are the ensuing chapters on the Pleistocene Epoch with its glacial and interglacial periods, their climates and physiography, fluctuations in sea level, and land bridges. Of interest also is the brief but intelligent discussion of the facts and theories of fluctuations of climate and the causes thereof. These have an additional importance in the consideration of recent climatic changes and their effect on the geographic ranges of birds. One cannot read this book without being impressed with its clarity of presentation and without gaining the impression of a wholesome unbiased attempt not only to present the facts but also the various theories based on them. — D. S. F.

62. Kleew. Nikolaas Tinbergen. 1947. Oxford Books for Boys and Girls. Oxford University Press, New York. \$1.50. 42 pp. Based on weekly letters to the Tinbergen children written from hostage camp in 1942, this is a delightful story of a Herring Gull on the sand dunes of Holland from his start as an egg, to his banding, independence and finally adventures as parent, all illustrated by innumerable charming and animated sketches. — M. M. Nice.

63. Sketches of American Wildlife. Stanley Paul Young. 1946. Monumental Press, 3110 Elm Avenue, Baltimore. 12+143 pp. This is a most interesting collection of natural history Americana recorded by one who for more than a quarter of a century has been in intimate contact with American wildlife and who apparently has enjoyed every moment of it. Included are the history of the range and habitat expansion of the coyote, the story of the famous controversy over the black-footed ferret, an account of the reintroduction of the musk ox into Alaska, a discussion of the relationships between the wolf and man and the attempts of the latter to control the former, an interesting condensed history of the collection and use of furs, and finally the interesting, although perhaps mislabeled, "Random Shots from Research" containing a fascinating miscellany of historical facts concerning American wildlife. The post-Columbian history of American wildlife is characterized by its numerous and varied relationships with man and his expanding and developing civilization. The author has been a keen student of these relationships and their ultimate ramifications in American wildlife as amply testified by this interesting collection. The style is simple and direct, as though being related before the fireplace. My only disappointment was its brevity. — D. S. F.

64. Birds in the Garden and How to Attract Them. Margaret McKenny. 1946. University of Minnesota Press, Minneapolis. xvi + 349 pp. \$5.00. Since its publication by Reynal and Hitchcock in 1939 this volume has occupied a unique niche in ornithological literature. It supplies, in an interesting and readable manner, important information for those who wish to attract birds to their gardens and lawns. Attention is directed to problems of city and country for many sections of the country. Included are chapters on feeding devices, protection, bird homes, water in the garden, songs and their recognition, bird-banding, bird photography, and sanctuaries. Chapter Eighteen contains annotated lists of plants useful in attracting birds in various parts of the country including lists of plants to attract waterfowl. The illustrations consist of 32 photographic plates. The 16 color plates by Allan Brooks, W. J. Breckenridge, and Walter A. Weber are from "Bird Portraits in Color" by T. S. Roberts and hence contain a few species which are rather uncommon in gardens. The University of Minnesota Press has performed an important service for popular ornithology in making this book available once again. — D. S. F.

65. Wing to Wing. E. H. Ware. 1947. Harper and Brothers Publishers, 49 East 33rd Street, New York 16. 159 pp. \$2.75. This is another interesting contribution to the growing record of the ornithological experiences of ornithologists in the Armed Services during World War II. The author in-volunteering his services to the R. A. F. as a wireless mechanic in 1940, resigned himself to a vacuum of ornithological activity. His subsequent experiences demonstrated clearly that whoever has the desire to observe and study rarely finds himself in circumstances where such is impossible. Included are the interestingly presented observations in Essex, the Scottish Highlands, Algiers, Bordj Menaiel, Atlas Mountains, "Across North Africa," and Corsica. These well-chosen observations are delightfully spiced with just the correct number of war-time anecdotes and terse bits of philosophy which come to all whose lot included participation in military operations. There are 27 truly excellent photographs and 26 distinctive, line drawings by Roland Green. This is an attractive, interesting, and informative book. — D. S. F.

66. April in the Branches. Guliema F. Alsop. 1947. E. P. Dutton and Company, 300 Fourth Avenue, New York 10, New York. 257 pp. \$3.50. This is a charming, often poetic, expression of the joy in observing nature in a New England garden. It is not a technical treatise but rather an example of the healthful relaxation that may come to busy professional people in the simple observation of natural history in garden and dooryard. The plan of the book is that of a log of the events in the garden from April to the first snow in November. Interspersed is much simple and refreshing philosophy about nature and man and nature. — D. S. F.

Mr. Edwin Mason wishes to notify all bird banders that the Connecticut Valley Evening Grosbeak Survey is to be operated again this year, if there is another invasion of Grosbeaks. Due to the shortage of celluloids, no expansion is possible. The same colors will be used to designate the banding stations, with the color BROWN being added to indicate the year.

BLUE—J. Hapgood Parks, 99 Warrenton Avenue, Hartford 5, Conn.

GREEN—Prof. Frederick A. Saunders, South Hadley, Mass.

WHITE—Alfred Tobey, Eaglebrook School, Deerfield, Mass.

ORANGE—Lester P. Marland, Ware, Mass., Sub Stn., James F. Nields, Jr., Hardwick, Mass.

RED—Arcadia Wildlife Sanctuary, Northampton, Sub. Stn., M & B Shaub, Northampton.