been continuously present since it was banded. Its behavior is consonant with other observations of mine that trapping intervals for chickadees are clearly longer in December, January, May, and June than during the rest of the year.—Charles H. Blake, Massachusetts Institute of Technology, Cambridge, Mass.

Band Sizes for Evening Grosbeaks.—I understand that some controversy has arisen among banders regarding the proper size of band to use on Evening Grosbeaks (*Hesperiphona vespertina vespertina* Cooper). May I offer our experience in this matter for whatever it may be worth?

Prior to the appearance, in the spring of 1950, of the heavier gauge No. 1A bands we had used 2315 bands of the No. 2 size on this species. Overlapped and partially reopened bands were embarrassingly common on our repeats, returns, and recoveries. Mutilation of the old, lightweight No. 1A bands was even worse.

On March 6, 1950, we received our first string of the heavier size 1A. With the cooperation of E. A. Carrier, a local bander, we proceeded to make a study of the comparative success of the two sizes. A composite summary of our observations follows:

Between March 7 and May 21 the No. 2 bands worn by 255 repeating Evening Grosbeaks were examined. Of these, 17 were overlapped, 15 were partly opened, 9 were flattened, and one bird (identified by the plastic bands which were being used concurrently) repeated with its No. 2 aluminum band missing entirely. During the same period the No. 1A bands on 127 repeats were examined. Of these, 1 was slightly overlapped, 1 was slightly opened, and 9 were slightly flattened.

In brief, almost 1 out of every 6 of the No. 2 bands had been mutilated by the bird to whose tarsus it had been attached. Meanwhile, only about 1 out of every 12 No. 1A bands showed any mutilation whatsoever and any mutilation which had occurred was, in every case, less serious than that of the larger No. 2 bands. What is more, almost every one of the No. 2 bands which showed mutilation required readjustment and, sometimes, replacement, whereas the mutilation of the No. 1A bands was so insignificant that in almost no instance was any readjustment required.

To those who fear that the No. 1A bands are too small for the tarsi of this species let me add that we have now used 816 of the heavy 1A bands on Evening Grosbeaks without even one of the bands fitting too snugly. During the present 1951-52 season we have used, to this writing, 332 of the 1A size and not one of our repeats has worn a band which has needed readjustment. On the other hand, the only two recoveries which we have trapped wearing No. 2 bands were compelled to undergo a major readjustment of their bands before they could be released without at least potential tarsal damage.

It has been intimated that some banders who may be willing to use the 1A size on female Evening Grosbeaks hesitate to use them on the males, believing, apparently, that the tarsi of the latter sex are larger. Allow me to report that we have found that the size of the tarsi of both sexes varies very appreciably. It has been our experience that the tarsus upon which the 1A band fits most snugly belongs more often to a female than to a male. But, let me repeat, please, we have yet to find a member of either sex whose tarsus was too large to accept the 1A band with perfect safety.—G. Hapgood Parks, 99 Warrenton Avenue, Hartford, Conn.

RECENT LITERATURE

BANDING

(See also Numbers 12, 13, 14, 15, 16, 17, 18, 19, 23, 28, 31, 41, and 42.)

1. Bird-Banding in Norway 1950. Holger Holgersen. 1951. *Stavanger Museum Smaskrifter, Zoologisk Serie*, Nr. 3. 35 pp. This paper is a joint report of the banding activities of Statens Viltundersøkelser, Oslo, and the Zoological Department, Stavanger Museum. During 1950, 9434 birds were banded. Species

banded most frequently were the Starling, *Sturnus vulgaris* (Linnaeus) 893; Pied Flycatcher, *Muscicapa hypoleuca* (Pallas) 577; Fieldfare, *Turdus pilaris* Linnaeus 680; Knot, *Calidris canutus* (Linnaeus) 1671; Common Gull, *Larus canus* Linnaeus 536. There is an interesting series of recoveries of Common Herons, *Ardea cinerea cinerea* Linnaeus; among the twenty records, are six from Scotland, two from England, one from Ireland, and one from the Shetland Islands. There are six recoveries of Turnstones, *Arenaria interpres interpres* (Linnaeus); three from France, two from Denmark, and one from Spain. The eight records of Bar-tail Godwit, *Limosa lapponica* (Linnaeus), are from Denmark, France, and England. Among the 18 recoveries of Knots are records from England, Ireland, France, and Spain. Among the 13 recoveries of Dunlins, *Calidris alpina* (Linnaeus), are one from Ireland, one from Portugal, four from Denmark, one from Scotland, four from France, and two from England. The foreign records among the 16 recoveries of Lapwings, *Vanellus vanellus* (Linnaeus), are from Denmark, France, and Spain; none from the British Isles. There is an excellent series of gull recoveries: Black-backed Gull, *Larus ridibundus* Linnaeus 17; Common Gull, 29; Herring Gull, *Larus argentatus* Pontoppidan 16; Lesser Black-backed Gull, *Larus fuscus* Linnaeus 2; Black-backed Gull, *Larus marinus* Linnaeus 30. There is also a very interesting series of 13 recoveries of Razorbills, *Alca torda pica* Linnaeus. These are mostly juvenals banded in northern Norway in summer and recovered in winter in southern Norway. A Ptarmigan, *Lagopus lagopus* (Linnaeus), was banded on 18 July 1949 at Bjoreidalen, Hardangervidda (Aage Wildhagen) and was recovered about 10 February 1950 at Voss (Anders Høgheim), 70 kilometers WNW.—D. S. Farner.

2. The Activities of the Ottenby Ornithological Station during 1950. (Verksamheten vid Ottenby fågelstation 1950.) Gunnar Svärdson. 1951. *Vår Fågelvärld*, 10(3): 97-123. During 1950, 11,566 birds of 106 species were banded. Counts of migrating birds were also recorded. Descriptions are given for 206 new recoveries. The flight of Starlings, *Sturnus vulgaris* Linnaeus, was unusually heavy, more than twice as many being recorded as in 1949. Only a third as many Skylarks, *Alauda arvensis* Linnaeus, were observed, whereas the flights of the Tree Pipit, *Anthus trivialis* (Linnaeus), and the Water Pipit, *Anthus spinoletta* (Linnaeus), were several times larger than during the previous season. Species banded in greatest numbers were the Starling, 956; White Wagtail, *Motacilla alba* Linnaeus 1260; Willow Warbler, *Phylloscopus trochilus* (Linnaeus) 1059; European Robin, *Erithacus rubecula* (Linnaeus) 772; House Martin, *Delichon urbica* (Linnaeus) 583; Dunlin, *Calidris alpina* (Linnaeus) 1580; Common Sandpiper, *Tringa hypoleucos* Linnaeus 535; Ringed Plover, *Charadrius hiaticula* Linnaeus 526; Common Gull, *Larus canus* Linnaeus 522. The largest numbers of recoveries were of Starlings, 14; House Martins, 44; Dunlins, 37; and Redshanks, *Tringa totanus* (Linnaeus) 10. The analyses of the accumulated recoveries of European Robins is of interest in that it indicates that, whereas the bulk of the population migrates southwestward, there is also some southeastward movement. There is a similar division in the migration of the White Wagtail with emphasis on the southeastward movement.—D. S. Farner.

3. The Report of the Swiss Vogelwarte Sempach for 1949 and 1950. (Bericht der Schweiz. Vogelwarte Sempach für die Jahre 1949 und 1950.) A. Schifferli. 1951. *Der Ornithologische Beobachter*, 48(6): 181-209. A substantial portion of this report is concerned with a résumé of the banding activities for the two years. During 1949 the total banded was 12,544, of which 6954 were nestlings. The total for 1950 was 12,361, of which 6811 were nestlings. The number of recoveries for the two years was 1316. Species banded most abundantly were the Great Tit, *Parus major* Linnaeus; Blue Tit, *Parus caeruleus* Linnaeus; Pied Flycatcher, *Muscicapa hypoleuca* (Pallas); Blackbird, *Turdus merula* Linnaeus; the swifts, *Micropus apus* (Linnaeus) and *Micropus melba* (Linnaeus); Redstart, *Phoenicurus phoenicurus* (Linnaeus); and the European Robin, *Erithacus rubecula* (Linnaeus). There is an interesting series of fall and winter recoveries of Hawfinches, *Coccothraustes coccothraustes* (Linnaeus), from France and northern Italy. A Red-backed Shrike, banded as a juvenal 21 June 1946 at Dornach, was recovered dead at the banding locality on 1 June 1949. There are a number of recoveries

of various species of thrushes showing the characteristic southwestward migrations of these species. A series of 32 recoveries of Barn Owls, *Tyto alba* (Scopoli), shows that most of the birds become only slightly displaced from the birthplace although there are five relatively substantial displacements of 150, 150, 235, 300, and 395 kilometers respectively. All of these recoveries occurred during the first year of life of the bird. There is an excellent series of 47 recoveries of Common Herons, *Ardea cinerea* Linnaeus, banded as juvenals. Another valuable series is that of 60 recoveries of Black-headed Gulls, *Larus ridibundus* Linnaeus.—D. S. Farner.

4. The Results of Bird-banding Activities under the Auspices of the Rijksmuseum van Natuurlijke Historie te Leiden, XXXVI. (Resultaten van het ringonderzoek betreffende de vogeltrek, ingesteld door het Rijksmuseum van Natuurlijke Historie te Leiden, XXXVI (1949).) G. C. A. Junge. 1951. *Limosa*, 24(1/2): 27-53. During 1949, 22,096 birds were banded. Species banded in greatest numbers were the Mallard, *Anas platyrhynchos* Linnaeus 1005; European Teal, *Anas crecca* Linnaeus 671; Great Tit, *Parus major* Linnaeus 635; Starling, *Sturnus vulgaris* Linnaeus 4304; Chaffinch, *Fringilla coelebs* Linnaeus 4018; Siskin, *Carduelis spinus* (Linnaeus) 1217; Greenling, *Chloris chloris* (Linnaeus) 1054; and Common Tern, *Sterna hirundo* Linnaeus 624. There are a number of very interesting records. A Purple Heron, *Ardea purpurea* Linnaeus, banded on 16 June 1936 as a juvenal at Ambt-Vollenhove, was caught in Spain 30 September 1949. There is an important series of 98 recoveries of European Teal. More than a hundred recoveries of Starlings are recorded; many are from the British Isles.—D. S. Farner.

5. Bird-banding activities in Belgium in 1949. (Résultats du baguage des oiseaux en Belgique—exercice 1949. Uitslagen van het belgisch ringwerk dienstjaar 1949.) R. Verheyen. 1951. *Le Gerfaut*, 40(3): 152-166. This is a résumé of 280 recoveries reported during 1949.—D. S. Farner.

6. Progress Report: Bird Ringing. E. H. Ashton. 1950. *The Ostrich*, 21(2): 106-112. A report of the initial 26 months of the bird-banding scheme organized by the South African Ornithological Society, listing by locality (Lake Victoria to Capetown) and years (1948-50) the 516 bands placed on 94 species and the eight recoveries. The five most banded species were: Common Sandpiper, *Actitis hypoleucos* (Linnaeus) 75; Kittlitz Sandplover, *Charadrius pecuarius* (Temminck) 68; Pied Wagtail, *Motacilla aguimp* (Dumont) 68; Little Stint, *Erolia minuta* (Leisler) 48; and Cape Vulture, *Gyps coprotheres* (J. R. Forster) 31.—Hustace H. Poor.

7. Ringing Operations. Summary for the Year Ended 31st March, 1951. J. M. Cunningham. 1951. *Notornis*, 4(6): 140-142. This is a summary of banding operations begun in 1950 by the Ornithological Society of New Zealand. Also included are some records from the Department of Internal Affairs. In all, 6787 birds have been banded; there have been 403 recoveries. Perhaps the most interesting is that of a Giant Petrel, *Macronectes giganteus* (Gmelin). This bird was banded on Heard Island on 6 March 1951 by members of the Australian Antarctic Expedition. The probable age at banding was 2½ months. It began flying in mid-April. It was subsequently captured on a fish line 200 miles southwest of Durban, South Africa, 9 September 1951, and was released without injury. The recovery locality is about 2400 miles from the banding locality.—D. S. Farner.

8. The Estimation of Population Parameters from Data Obtained by Means of the Capture-Recapture Method. I. The Maximum Likelihood Equations for Estimating the Death-Rate. P. H. Leslie and Denis Chitty. 1951. *Biometrika*, 38(3/4): 269-292. This is essentially a refinement of Jackson's Tsetse fly methods. The method is readily applied only to a non-migratory species. The actual methods of solution are given in an appendix, pages 288-290. Useful references.—C. H. Blake.

9. On Estimating the Size of Mobile Populations from Recapture Data. Norman T. J. Bailey. 1951. *Biometrika*, 38(3/4): 293-306. This is a discussion of sampling methods which permit maximum likelihood estimates of the precision of the "Lincoln index." See also review of Adams in *Bird-Banding*, 22: 189. Other significant references in present paper. (Banders have given too scant attention to sampling design.)—C. H. Blake.

10. A Mathematical Theory of Animal Trapping. P. A. P. Moran. 1951. *Biometrika*, 38(3/4): 307-311. The theory is based on kill trapping but is useful for the discussion of the assumptions involved.—C. H. Blake.

11. The Expected Frequencies in a Sample of an Animal Population in which the Abundance of Species are Log-Normally Distributed. Part 1. P. M. Grundy. 1951. *Biometrika*, 38(3/4): 427-434. This theoretical consideration may offer bird-banders the possibility of joint estimates of species populations when no one species retraps readily. Useful references.—C. H. Blake.

MIGRATION

(See also Numbers 1, 2, 3, 4, 5, 7, 26, 28, 31, 57, and 58.)

12. The Results of Banding Black-headed Gulls in Several Colonies in Saxony and Neighboring Areas. (Beringungsergebnisse an Lachmöwen einiger sächsischer und benachbarter Brutkolonien.) Gerhard Creutz. 1950. *Ornithologische Abhandlungen*, 8: 3-8. This paper is based largely on young gulls banded during 1931 and 1932 before departure from their colonies. An examination of nineteen recoveries indicates that the movements from the colonies are northwestward, westward, or southwestward. The records are interpreted by the author as indicating that some of the gulls follow rivers and coasts in migration whereas others may travel overland. Three birds were recovered during the breeding season; two of these were birds banded originally at Lindenau and recovered in colonies 30 and 60 kilometers away. Two additional records of similar displacements are given. An appendix contains one case of return to the birthplace as a breeding bird.—D. S. Farner.

13. The Migration of the Redshank in Europe According to Results Obtained from Banding. (La migration de la Gambette d'Europe, *Tringa totanus* (L.) d'après les résultats du baguage.) R. Verheyen and Geo. le Grelle. 1950. *Le Gerfaut*, 40(4): 201-206. A number of interesting aspects of Redshank migration have been ascertained or confirmed as a result of this analysis. Redshanks banded in Great Britain may winter in the southern part of the Island, in Ireland, and in France. The early migration in autumn along the coast of Belgium is composed of Scandinavian birds. Continental Redshanks avoid crossing to the British Isles. Whereas birds banded in western Europe appear to follow the coast in fall migration, those of Central Europe apparently cross overland directly to the Mediterranean. The winter range actually extends from southern Scandinavia to Cape Colony.—D. S. Farner.

14. Bird Migration at the Faroe Islands in 1949 with Comparative Notes from Fair Isle. (Fugletraek på Faerøerne i 1949, med notater fra Fair Isle til sammenligning.) Kenneth Wil iamson and Niels Fr. Petersen á Botni. 1951. *Dansk Ornithologisk Forenings Tidsskrift*, 45(3): 121-138. This interesting set of records involves regular migrants from Iceland and Greenland as well as "drift" migrants which have been displaced by wind from their regular routes along the continent. Most of the passerine records may correctly fall into the latter category. It is noted, incidentally, that the small populaion of the Twite, *Carduelis flavirostris* (Linnaeus), on Nolsóy has apparently died out.—D. S. Farner.

15. The Migration of the Common Gull. (Danske Stormmagers *(Larus canus* L.) traek.) Holger Munk. 1951. *Dansk Ornithologisk Forenings Tidsskrift*,

45(3): 192-196. During 1921-1923 3,600 Common Gulls were banded at four localities in Denmark; 204 of these have been recovered. Of the 124 non-Danish recoveries, only a single one is from Sweden; all others are south or southwest of Denmark. Post-breeding straggling certainly is very restricted in this species. It is of interest to note that nine of the last ten recoveries, all of them 11 to 16 years old, are from Denmark, mostly near the birthplace. The southernmost record is from the mouth of the Garonne; most winter recoveries are from the vicinity of the English Channel.—D. S. Farner.

16. The Migration and Winter Quarters of the Hobby. (Etude relative à la migration et aux quartiers d'hiver du Faucon Hobereau *(Falco subbuteo).*) R. Verheyen. 1951. *Le Gerfaut,* 40(3): 142-152. A thorough examination of banding data and information in the literature has allowed the author to reach a number of interesting conclusions. Generally Hobbies breed within about 100 kilometers of the birthplace. At least the females breed during the second year of life. The Hobbies which are observed "in migration" in western and central Europe in the latter half of August are principally wandering juvenals. The main southward migration occurs in the second half of September and may extend into the second half of October or, exceptionally, early November. The migration is generally oriented towards the south or southwest. Although some Hobbies reach Uganda by the end of September and Nyassa by mid-November, the bulk of them probably reach these regions a month later. Wintering occurs primarily between 10° and 20° S. for the Hobbies from eastern Europe and western Siberia and presumably, or probably, in northwest Africa for the birds from western Europe. The wintering areas strongly resemble the breeding areas in Europe. The return in spring begins in late February or March.—D. S. Farner.

17. Details Concerning the Migration and Wintering Area of the European Cuckoo. (Particularités relatives à la migration et au quartier d'hiver du Coucou d'Europe, *Cuculus canorus* L.) R. Verheyen. 1951. *Le Gerfaut,* 41(1): 44-61. This interesting paper is primarily a critical review of information available in the literature. This is augmented from data on recoveries of banded birds. Banding returns suggest the existence of three populations: (1) a population in southern England, western Belgium, and western France which orients its migration into southwestern France. (2) a population in the remainder of Great Britain, Ireland, the low countries, Denmark, Scandinavia, western Switzerland, and western Germany whose fall migration converges on southeastern France, northern Italy, and Austria. (3) a population in central Europe and western U.S.S.R. which migrates through Italy and the Balkan Peninsula. Banding data suggest further that there is a strong tendency for the young to return as breeding birds to the vicinity of the birthplace. Adults precede juvenals in southward migration. Fall migration is generally oriented southward or southwestward crossing the central or eastern Mediterranean. Migrating Cuckoos appear in northern Africa as early as July. There are two wintering areas, tropical East and South Africa on one hand, and tropical West Africa on the other. There is some evidence to suggest that a few may spend the summer in Africa.—D. S. Farner.

18. The Migration of the Red-backed Shrike. (La migration de la Pie-grièche écorcheur, *Lanius c. collurio* L.) R. Verheyen. 1951. *Le Gerfaut,* 41(2): 111-139. This paper is basically a critical review of the literature on the migration and distribution of the nominate race which breeds throughout much of Europe and in the U.S.S.R. eastward to Tomsk and western Altai. Banding data, with some exceptions, indicate a strong tendency to return to the birthplace to breed. The tendency to return to the breeding locality of the previous year is more pronounced in males than in females. Males arrive in the breeding area in spring a few days in advance of the females. Spring migration is northward through East Africa, around the eastern end of the Mediterranean, and through Asia Minor. This route is used even by those which breed in western Europe. The rate of migration may be as great as 200 kilometers per day. There is some evidence to indicate that the juvenals follow the adults by a week or more in fall migration. The route of fall migration passes through Greece, across the Mediterranean to Egypt, up the Nile Valley, and thence into southern Africa. Two months are required to travel the length of the continent. Arguments are presented for a theory

that the differences in the spring and fall routes are to be explained by differences in prevailing winds and the tendency of the shrikes to use tailwinds in migration. —D. S. Farner.

19. An Analysis of the Recoveries of Banded Meadow Pipits. (Interprétation des résultats du baguage relatifs au Pipit des prés, *Anthus pratensis* (L.).) R. Verheyen and Geo. le Grelle. 1950. *Le Gerfaut*, 40(3): 124-131.. Eleven British and Belgian records of Meadow Pipits banded as young and subsequently recovered during a breeding season were all recovered at the banding localities indicating a strong tendency to return to the birthplace to breed. Birds from Scandinavia, Iceland, the British Isles, and the low countries migrate southwestward into southern France and the Iberian peninsula. However, banding returns show also that there is a considerable segment of the population which appears in Belgium in October and November which may remain there throughout the winter or which drifts into northern France. The precise origin of these birds is yet to be ascertained. A small series of returns from England and Belgium indicate a strong tendency to return to the same locality in successive winters.—D. S. Farner.

20. The Migration of the Starling at the Mouth of the Scheldt and on the Coast of Belgium. (Migration d'Etourneaux à l'embouchure de l'Escaut et au littoral belge.) L. Lippens. 1950. *Le Gerfaut*, 40(3): 73-102. The migratory Starlings observed in Belgium in fall have their origin in northern Germany, the Baltic states, Finland, Sweden, and Denmark. They are *en route* to winter quarters in the British Isles and, to a lesser extent, in the Iberian Peninsula. The first part of the paper is concerned with the behavior of migrating Starlings as they reach the southwest point on the island of Walcheren which lies on the north side of the mouth of Scheldt. From this point it is 140 kilometers west to England, 18-25 kilometers SW to the Belgian coast, or nine kilometers south to the Belgian coast. With winds in the N, NE, and NW sectors the birds reaching the coast on Walcheren refuse to fly out over the water. Rather they turn southeastward in order to cross the mouth of the Scheldt at the narrowest place. With winds in the W, SW, S, SE, and E, the Starlings following the characteristic initial hesitation on reaching the coast, fly out over the water, some, at least, to the southwest eventually contacting the Belgian coast. An idea of the intensity of Starling migration can be obtained from the author's counts within a radius of 350 meters at his observation point 1,500 meters from the shore at Knokke (Belgian Coast): 492,750 in 55 days, 1941; 750,000 in 45 days, 1942; 525,500 in 53 days, 1943. During these three years at Knokke 54.7 percent of the Starlings were seen with S-E winds, 7.7 percent with E-N winds, 13.7 percent with N-W winds, 15.5 with W-S winds, and 8.4 percent with no wind or variable direction. This distribution is quite well explained by the above-described behavior on Walcheren. Speed of flight in migration is about 70 kilometers per hour. Altitude of flight in migration varies from a few meters to 150 meters, exceptionally higher. Nocturnal migration is exceptional. Fall migration through Belgium is completed by the end of November. Spring migration reaches its maximum about 25 March and is favored by winds from ENE.—D. S. Farner.

21. Measurements of the Height and Speed of Migrating Birds. (Messungen von Höhe und Geschwindigkeit ziehender Vögel *(Columba palumbus, Corvus frugilegus, Grus grus).*) Heinz Mildenberger. 1950. *Bonner Zoologische Beiträge*, 1(1): 55-57. Measurements were accomplished with the instruments from flack artillery. On 7 March 1943 at Köln with wind directions E to NE, Wood Pigeons flew at 1200-2400 meters altitude and at 9.5-14.5 meters per second, Cranes at 2100 meters and 12.0 meters per second, and Rooks at 2400 meters and 14.0 meters per second. On 11 March 1943 with winds from WNW to SSW Cranes flew at 750-800 meters and at 8.0-16.0 meters per second; Rooks at 700-1000 meters and 16.0-18.0 meters per second. On 10 March 1943, a flight of Starlings, *Sturnus vulgaris* Linnaeus, was seen at 500 meters altitude flying at 12.5 meters per second. The greatest speed observed was that of a flock of Rooks calculated to be 19.0 meters per second. There are many other interesting data.—D. S. Farner.

22. Wind Direction and the Intensity of Migration by Chaffinches. (Windrichtung und Zugstärke beim Buchfinken *(Fringilla coelebs* L.). D. A.

Vleugel. 1950. *Der Ornithologische Beobachter*, 47(5/6): 158-164. As the result of field studies at several localities in Holland the author concludes that, with weak head or tail winds in fall, migration is equally intense. With moderate winds, head wind is preferred to tail winds; flight, then, occurs at low altitude. In spring no preference as to head or tail wind is shown in either moderate or weak winds. There is very little migration in strong winds.—D. S. Farner.

23. Mortality Records as Indices of Migration in the Mallard. Joseph J. Hickey. 1951. *The Condor*, 53(6): 284-297. With the substantial number of recoveries of banded Mallards, *Anas platyrhynchos* Linnaeus, it is becoming possible to make analyses of banding data which will suggest additional improvements in waterfowl management procedures. The author used more than 6800 autumnal Canadian and United States recoveries of the Mallard to explore a number of problems related to migration. Early hunting season vulnerability of immature Mallards tends to exaggerate their relative distribution, compared to adults, in the North and causes underestimation of their presence in the South. The high percentages of local recoveries of birds banded after being caught in baited traps suggest that they do not provide randomized samples of large regional populations. Problems of dispersion of "populations" banded at particular locations; possible distortions in geographic recovery percentages produced by different banding dates; and bias in geographic recovery percentages produced by regional differences in hunting pressure are discussed. Although few questions are finally answered by this paper, it serves well to air important problems in waterfowl management, and points out the need for a more critical interpretation of waterfowl mortality data.—L. R. Mewaldt.

24. Northern Birds Summering in Panama. Eugene Eisenmann. 1951. *The Wilson Bulletin*, 63(3): 181-185. The author lists 15 species of northern birds observed between June 17 and July 16 of 1948, 1949, and 1950 on the sea-shore near the city of Panama, Republic of Panama. All but two are from the order Charadriiformes. From his own observations upon these and other species, and from a slowly growing literature, the author suspects that most northern birds summering in the tropics are immature birds of species which probably do not breed until they are two or more years old. Summer recoveries of birds in the tropics which were banded as juvenals in the north are cited as being especially instructive. The author suggests that the migratory impulse may be dependent upon gonad development, and that social tendencies may cause some young birds to accompany flocks of migrating adults northward, thus accounting for the summering of some non-breeders north of their winter range. Our present understanding of avian migration and of avian reproduction is not sufficient to permit acceptance or rejection of this theory even for special cases.—L. R. Mewaldt.

FOOD AND FOOD HABITS

(See Numbers 30, 32, and 35.)

PHYSIOLOGY

(See also Numbers 57 and 62.)

25. Structure and Function of the Lung of Birds. E. H. Hazelhoff. 1951. *Poultry Science*, 30(1): 3-10. This paper was originally published in 1943 (*Verslag van de gewone Vergaderingen der Wisen natuurkundige Afdeeling. Koninklijke Akademie van Wetenschappen te Amsterdam*, 52: 391-400.) and then, at the suggestion of Professor Edmund Hoffman of the University of Georgia, translated and published in *Poultry Science*. Considered in conjunction with Erik Zeuthen's "The Ventilation of the Respiratory Tract" (see *Bird-Banding*, 18(4): 134-135. 1947) this study clarifies in many aspects the ventilation of the avian lung. A description of the anatomy of the respiratory tract based on ontogeny is given. In essence it follows the classic descriptions. Hazelhoff's studies were made both by use of specimens of birds (crows, domestic fowl, pigeon, etc.) and by the construction of a glass model. Powdered charcoal was injected into various air sacs of dead birds. Examination showed that expiration always occurred in the dorsobronchus-parabronchus-ventrobronchus direction, since the powdered

charcoal appeared principally in the mesobronchus and dorsobronchus. Furthermore, when powdered charcoal and air were injected into the trachea, more charcoal appeared in the dorsobronchi than in the ventrobronchi. In a second series of experiments the air in the respiratory tract was completely replaced with liquid (alcohol-formalin). The skin was removed from the place where the large dorsobronchi run just beneath the surface above the intercostal muscles. The dorsobronchi were not opened, but were laid bare. A syringe was filled with a starch granule suspension. When the piston was moved the starch granules moved in the same direction regardless of the direction of the movement of the piston. Calculations indicate that the speed of liquid flow is at such velocity, that the differences would result in an identical movement of air. Anatomical considerations also support the thesis. The post-thoracic sac, which in many species of birds is the largest and best ventilated of all, is always caudally recurrent to the mesobronchus and just opposite the row of dorsobronchi. This makes it plausible that air forced out of this air sac is directed in whole or in part against the row of dorsobronchi. A glass model reproduced the effects, as did consideration of aerodynamic principles. It is unfortunate that Hazelhoff apparently did not have Zeuthen's paper at hand, perhaps due to inadequate communications in the war years. At any rate the two are in agreement that ventilation of the parabronchi occurs in both inspiration and expiration. The evidence for Hazelhoff's "continuous current" is more convincing than Zeuthen's "ebb and flow" concept for the movement of air through the parabronchi.—Verner L. Johnson.

26. Investigations on the Depth of Sleep in Passerine Birds. (Experimentella undersökningar övaer sömndjupet hos olika småfågelsarter.) Göran Bergman. 1950. *Ornis Fennica,* 27(4): 109-124. In this series of experiments birds of several species were caged and records made of the intensity and pattern of activity. Also the depth of sleep was studied by ascertaining the amount of Faradaic stimulation necessary to obtain a response. In *Erithacus rubecula* Linnaeus, *Sylvia curruca* (Linnaeus), and *Turdus pilaris* Linnaeus in winter, sleep is deepest from one-half to three hours after going to sleep. During the migratory period sleep is very deep after the evening maximum in activity and relatively light after the nocturnal period of *Zugunruhe.* During molt the single *Sylvia curruca* did not sleep. The author suggests that this may be the result of hyperthyroid activity. Among the Fringillidae the depth of sleep in *Fringilla coelebs* Linnaeus and *Pinicola enucleator* was uniform throughout the night. *Emberiza citrinella* was found to awaken regularly at three to five hours before sunrise. *Carduelis flammea* (Linnaeus) rarely slept. Three *Pyrrhula pyrrhula* (Linnaeus) placed in 18° C. temperatures in mid-December developed *Zugunruhe* and sexual behavior patterns. Later the activity pattern became normal and they developed the characteristic uniform depth of sleep throughout the night. The three species of Tits all showed uniformly deep sleep throughout the night and a uniform activity pattern throughout the day. If awakened within an hour of the normal awakening time, the tit usually did not sleep again. A similar pattern of sleep and activity was shown by the single *Bombycilla garrulus* (Linnaeus). The activity pattern of the Tits is very well adapted for the short winter days since they remain quiet all night and uniformly active throughout the day. "From these investigations it can be established that a relationship exists between the depth of sleep and daytime activity. If daytime activity is great, then the depth of sleep is profound; if daytime activity is less, generally sleep is not as profound. An irregular pattern of daytime activity is frequently followed by an irregular sleep pattern." The author suggests that the evening maximum in daytime activity may be the result of the absence of a "suitable" roosting site for the caged bird. It is often followed by abnormally deep sleep.

This series of experiments is of great interest with respect to the physiology of *Zugunruhe* and to the physiology of migration in general. In the opinion of the reviewer many more quantitative data must be obtained in order to see clearly the basic nature of these behavior patterns. Further, this approach must eventually be combined with a careful analysis of energy intake and energy balance with respect to daylength and temperature. The roles of physiological "priorities" and "rationing" of available energy could well provide the basic explanations of the phenomena described in this paper.—D. S. Farner.

LIFE HISTORY

(See also Numbers 34, 40, 46, 55, and 57.)

27. A Study of the Black-collared Barbet, *Lybius torquatus*, with Notes on Its Parasitism by the Lesser Honeyguide, *Indicator minor*. C. J. Skead. 1950. *The Ostrich*, 21(2): 84-96. A life history study of the habits, nesting, nestling development, and food of the Black-collared Barbet, *Lybius torquatus* (Dumont) based on observations covering three broods. The species is largely frugivorous, and is destructive to orchards. Both sexes participate in nest building, incubation, and caring for the young. One brood was parasitized by the Lesser Honeyguide, *Indicator minor* (Stephens); the three barbet chicks disappeared shortly after hatching, but the honeyguide survived and flew.—Hustace H. Poor.

28. Contributions to the Reproductive Biology of the Swift. (Příspěvek k hnízdní biologii rorýse obecného evropského, *Micropus apus apus* (L.).) Zdeněk Kluz. 1950. *Sylvia*, 11-12(2): 37-51. This paper contains a valuable series of data based on observations of a colony in northeastern Bohemia. Nesting materials were mostly stalks and blades of grass with occasional hairs and feathers. Most of the nesting material was obtained from nearby nests of Jackdaws, *Coloeus monedula spermologus* Vieillot, and House Sparrows, *Passer domesticus domesticus* Linnaeus. The average period of residence at the breeding locality each year is 96.5 days. Among the seventy clutches observed, six contained one egg, 27 contained two eggs, 36 contained three eggs, and one nest contained four eggs. The interval between the laying of successive eggs is usually one day although it may be as high as three. Incubation is mostly by the female. Frequently both adults may be seen in the nest with the eggs or even with the young, particularly at night or in bad weather. The mean incubation period for ten pairs was 19.1 days. As shown by other studies also, it was found that young swifts prior to leaving the nest become considerably heavier than adults. Beginning in 1939 about 430 swifts were banded. In the course of eleven years there has not been a single return of a bird banded in the colony as a nestling. The breeding birds showed a remarkable *Ortstreue;* 80 were found to nest from 2-10 years in the same nests. There is only a single record of recovery of a banded swift away from the colony. This was a bird banded as a young 27 July 1940 and recovered in migration on 9 August at Alcoy, Spain. The following ages were ascertained for banded breeding birds: at least 11 years, one; ten years, two; nine years, one; eight years, two; seven years, two; six years, four; five years, six; four years, four; and three years, 12.—D. S. Farner.

29. Contributions to the Ecology and Reproductive Biology of the Stonechat. (Beiträge zur Oekologie und Brutbiologie des Schwarzkehlchens, *Saxicola torquata rubicola* (L.).) Heinz Mildenberger. 1950. *Bonner Zoologische Beiträge*, 1(1): 11-20. This paper is based on observations in Rheinland. In this area the Stonechats normally return during the middle third of March. Departure in fall usually occurs in the latter part of October. It appears that the young may leave before the adults. The dry and moist heaths in all parts of the Rheinland have a sparse but uniform density of breeding birds of this species. The species also inhabits grasslands of a considerable variety. The greatest densities are found in the cultivated areas, and probably also in the waste grasslands, of Odland. The nest is constructed exclusively by the female; it is always on the ground. There are two clutches per year. Incubation begins after the laying of the next to the last or the last egg. The normal size for the first clutch is five or six; for the second, four or five. The incubation period is 12.5-14 days. The young are fed by both adults. The nestling period is 11-13 days. However, the young are not able to fly well until 16-19 days. By 25-26 days the young are independent and the female will begin the construction of the nest for the second clutch.—D. S. Farner.

30. The Biology of the Fiscal Shrike. (Sulla biologia del *Lanius collaris humeralis* Stanley.) Augusto Toschi. 1950. *Laboratorio di Zoologia Applicata alla Caccia Università di Bologna, Supplemento alle Richerche di Zoologia Applicata alla Caccia*, 2(4): 65-136. This paper is based on studies in Ethiopia and Kenya during 1940-1946. The typical habitat of the species is a parkland type;

there are many suitable habitats in colonized areas. It occurs most abundantly in East Africa in the highlands at 1500-2000 meters. Both sexes are involved in the nest building although most of it, including the lining, is done by the female. The male brings some of the materials used by the female. The nest is placed 1.5 to 5.0 meters from the ground. Copulation was observed about a week before egg laying. At least a partial incubation begins with the first egg. Eggs are laid at 24-hour intervals. Clutch size was almost invariably three. Incubation is by the female only; she is usually fed on the nest by the male. The incubation period is 15-16 days. During the first ten days the young are fed only by the female who delivers food to them by regurgitation. During this period the male continues to feed the female. The nestling period is about 21 days. After leaving the nest the young are frequently found on the ground and are, at first, dependent on the adults for food. Up to 45-46 days after hatching they are still fed at least occasionally. The male accomplished about one-third of the total work incident to rearing the young. It appears that one clutch per year is the rule although two have been recorded. Nesting may occur in any month of the year.—D. S. Farner.

31. Investigations on the Reproductive Biology of the European Tree Sparrow. (Untersuchungen zur Brutbiologie des Feldsperlings (*Passer m. montanus* L.). Gerhard Creutz. 1949. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere,* 78(2): 133-172. This important paper is based on investigations made near Dresden in a 50-hectare orchard in which rigid protection of the birds was practised from 1936 to 1947. In the course of the studies 261 adults and 780 young were banded. Of these 106 were recovered or retrapped. *Ortstreue* is the rule for adult Tree Sparrows; second nests were located very near the first nest of the season. Usually the same nest box was used. *Ortstreue* is almost as well developed for subsequent nesting seasons. It is obviously not as well developed in young of which only 4.3 percent were recovered with displacement from the birthplace as much as 35 kilometers. The mean survival after leaving the nest is estimated to be about two years. Survival to four years is exceptional. The breeding population was found to have the following composition: adults returning from the previous year, 45 percent; first-year birds hatched in the area, five percent; birds from elsewhere, 50 percent. Normal clutch-size is three to six. Incubation often begins before the laying of the last egg and is shared by the two parents. The incubation period is 13-14 days. There is almost always two broods per season, sometimes three. The nestling period is 13-14 days; the number of nestlings is most frequently four or five. Experiments were conducted to ascertain homing ability. Seventy-eight adults and 38 juvenals were displaced distances of 2-300 kilometers. Only four returned, the maximum distance being eight kilometers. Two others were recovered elsewhere. Obviously homing ability in this species is very poor—D. S. Farner.

BEHAVIOR

(See also Numbers 20, 27, 28, 30, 31, 57, and 62.)

32. The Behavior of Young Ducks. (Zur Ethologie junger Anatiden.) Eric Fabricius. 1951. *Acta Zoologica Fennica,* 68: 1-175. Experiments on imprinting with newly-hatched Tufted Ducks, *Aythya fuligula* (Linnaeus); Shovellers, *Anas clypeata* Linnaeus; and Eiders, *Somateria molissima molissima* (Linnaeus). Hatching eggs in the incubator were covered with paper hoods, and the chicks brought out at different ages and confronted with the object on which they were to be imprinted. These ducklings were imprinted as successfully as are Grey Geese, *Anser anser* (Linnaeus), either to the human caretaker or to older ducklings of another species. The imprinting proved irreversible. A mounted adult duck either standing or "swimming" when pulled with a string, was ignored or induced fright. In order to induce following-reactions the object had to move away ". . . in the characteristic way in which, in living vertebrates, the various parts of the body and limbs move in relation to each other." (p. 162.) Size of the object could vary within wide limits from a duckling twice the weight of the newly-hatched one to a man, but ducklings did not become imprinted on brothers and sisters. Acoustic signals were very effective, but did not have to resemble

the quacking of a duck; the author used to call "*kom, kom, kom*" in series of about four "*koms*" to a second with a second's pause between series. (p. 32.) The sensitive period for imprinting was strongest in the first six hours after hatching and had practically disappeared at the age of 24 hours. Fear reactions, first shown in one of four birds at six to nine hours, rapidly predominated and were invariable after the birds reached 24 hours when first taken from the incubator. Some of the older ducklings (taken from the incubator at 18-38 hours) became incompletely imprinted on the author; they followed him, but were frightened when he leaned down to pick them up. Those that were not imprinted at all gradually became tame but never followed the author. The Tufted Ducks followed him until 20 days old, the Shovellers until 23, the Eiders until 26 days old. They followed him on land, but even better on water when he waded, swam, or rowed a boat. They would not follow him when they were busy eating, preening or sleeping.

Up to the age of 60 hours a duckling immediately joined other ducklings of the same size and species, but they did not join dummies. Two ducklings kept in isolation for four days paid no attention to their brothers and sisters when finally introduced to them. "The newly-hatched birds showed some apparently innate reactions to the feature of the country. *The young birds went into the water spontaneously* and swam out even if they were not conducted into the water. *Young tufted ducks and shovellers . . . were . . . strongly attracted to reeds, whereas young eiders avoided reeds* and instead were especially fond of swimming along open rocky shores." (p. 167.) "*Conditioning on objects in connection with the feeding developed extremely rapidly.* Young birds that had been fed twice from a plankton net or a plate came rushing when that object was shown for a third time." (p. 168.)

There is much discussion of the psychological implications of the experiments with references to the pertinent literature. Very fine work, based on carefully planned, illuminating experiments.—M. M. Nice.

33. Territorial Behavior of the Eastern Robin. Howard Young. 1951. *Proceedings of the Linnaean Society of New York*, Nos. 58-62: 1-37. Two hundred and four *Turdus migratorius migratorius* Linnaeus were color-banded and imped with correspondingly colored feathers during three years on an area of blue grass and arbor vitae at Madison, Wisconsin. Three threat postures—tail lift, crouch, and attack run—are described and sketched. The red breast is depressed, not displayed as in the European Robin, *Erithacus rubecula* (Linnaeus). A diagram is given of the territorial defense technique—here called "pushing"—where each bird runs a few feet, pauses, runs again. The Robins ". . . seemed able to maintain their terrtiories with very little recourse to advertising song." Whisper song appears to function "primarily as threat." Size of territories varied between 0.11 and 0.60 acres, averaging 0.30 acres. Territories frequently overlapped. After the first brood, 23 pairs left, one pair nesting one-quarter of a mile away, while 16 pairs remained for the second brood.

"Territory defense is by both sexes, against both sexes." (p. 16.) "In Robin fights, victory almost always goes to the aggressor." (p. 30.) Statistical treatment of the results of encounters showed that both males and females won a majority of the encounters within their territories, males 68 percent, females 73 percent. Males defeated females in 64 percent of fights.

There is much discussion of definitions of territory and of the respects in which Robin territory differs from "typical territory." "Fighting is associated with an area rather than with a bird of the opposite sex. The majority of intruders upon a territory which are attacked, are repulsed, but many intruders are tolerated." The author defines Robin territory thus: "The territory is an area about the nest, in which the pair spend the greater part of their time, which they defend, and to which they persistently return." (p. 25.) This is an important contribution, an excellent study, combining precise technique with thoughtful evaluation of results.—M. M. Nice.

34. Courtship and Pair Formation in the Collared Flycatcher. (Balz und Paarbildung beim Halsbandfliegenschnäpper.) Hans Löhrl. 1951. *Journal für Ornithologie*, 93(1): 46-60. A population of *Muscicapa albicollis albicollis*

Temminck was studied from 1934-1939 and again from 1949-1950. The breeding birds were color-banded and some of the males also marked with paint. Males arrive before the females, and examine every hole; when they find one that suits them they sing and show the hole to all passing birds. The male demonstrates his hole with a slow flight in which all the striking plumage characters are conspicuous. In a crowded colony a repetition of the call note is heard much more often than real singing; the birds seem too busy demonstrating and fighting to have time for song. Later, considerable song is heard from unmated males. The appearance of a female stimulates the male to start showing his hole; he may show it to his mate who is busy carrying nesting material to it, or he may show it to a stranger after his mate has finished her nest in it, or he may show his incubating mate another box he has adopted. Females respond strongly to this behavior. One bird whose eggs were near hatching was caught in a box 40 meters distant where a male was courting intensively. Year-old males are apt to attach themselves to one box and one mate; most of the males take on another box as soon as the first is adopted by a mate, while a few are so belligerent that they fight continually with no permanent attachment to one box. They fly from one territory to another disturbing the neighbors, but finally one may help a female to feed a brood whose father he has driven off. Courtship and fighting are inhibited by a drop in temperature to 10° C. (50°F.). The flycatchers drive off woodpeckers and other birds from the vicinity of their homes. Several sketches illustrate the behavior of males and females. A fine study.—M. M. Nice.

35. Some Aspects of the Behaviour of the Jay *Garrulus glandarius*. Derek Goodwin. 1951. *The Ibis*, 93(4): 602-625. Further valuable observations on captive and wild Jays. Experiments were made with stuffed hawks and owls and a live Tawny Owl, *Strix aluco* Linnaeus. "It would seem that instinctive recognition of owls as enemies is of a rather weak and individually varying character—if it subsists at all—and that tradition and sympathetic imitation are largely responsible for the intense mobbing of Tawny Owls in the wild." (p. 605.) "Black corvids appear to be instinctively recognized as potential nest-enemies and are liable to be attacked on coming into the nest area." (p. 623.) "Dominant or submissive status (in non-breeding specimens) is normally assumed without any physical combat and seems to depend primarily on psychological factors. Reversal of status may occur for no apparent reason and again without apparent, and certainly without serious, fighting." (p. 611.) In captivity males normally dominate females, but with a breeding pair the female always dominated while incubating and brooding. Acorns form the largest item in the food of wild British Jays and ". . . there can be no doubt that the Jay is one of the primary agents in securing the natural regeneration of oak-woods." (p. 615.) Warningly-colored insects were accepted by the captive Jays but refused after one trial. When these insects were offered to Golden Pheasants, *Chrysolophus pictus* (Linnaeus), the birds ran towards them, then recoiled as if in horror.

All of the captive Jays anted with *Formica rufa*. When the two young birds were 29 days old they first saw anting. "When some of the ants started to clamber up on them both showed signs of wishing to ant, but in a very uncertain, hesitant and 'amateurish' manner and not for more than a few seconds at a time." (p. 622.) The "play" of Jays consists in dashing madly about from bough to bough, ducking and dodging, with crest raised. This is "emotion-dissociated fleeing reactions" suggesting "an accipitrine hawk, probably the Goshawk, as a major predator in natural conditions." (p. 624.)—M. M. Nice.

36. Tameness in Birds. (Zahmheit bei Vögeln). Frh. Geyr von Schweppenberg. 1951. *Journal fur Ornithologie*, 93(1): 32-34. A pair of Moorhens, *Gallinula chloropus* (Linnaeus), settled on the common of Eicks and soon became exceedingly tame; the young, however, were very shy and scattered into the water plants upon the approach of people, while the parents remained completely undisturbed on the open water. Apparently they had not warned the young; indeed they seemed "surprised" that the young disappeared. After three weeks the young became tame. The young of tame Mallards, *Anas platyrhynchos* Linnaeus, that had hatched from "wild" eggs behaved differently; when the author met the brood on their first leaving the nest, they crowded anxiously around their mother, but

if she feigned injury, they scattered and hid. The European Robin, *Erithacus rubecula* (Linnaeus), seems to have an innate tendency to come to a large animal—horse, wild boar, badger, deer, wisent, bear, or a man working in the woods, the advantage being that it gets some insects upturned as a by-product of the mammal's activity. Due to the short lives of these birds and to their solitary habits, it does not seem that such behavior could be learned.—M. M. Nice.

37. Bird Song as a Preliminary Stage of Music and Speech. (Der Vogelsang als Vorstufe von Musik und Sprache.) Otto Koehler. 1951. *Journal für Ornithologie*, 93(1): 3-20. In experiments on the inheritance of song, one should not try to find out how much a bird can learn to imitate, but rather what he can say of himself. An acoustic 'Kaspar Hauser' of the first order is a bird raised alone from the egg in a sound-proof room and never allowed to hear any song or note but its own. (Kaspar Hauser was a mysterious youth in the early 19th century supposed to have been raised in isolation and close confinement.) Kaspar Hausers of the second order are birds taken from the nest and raised alone in sound-proof rooms; of the third order several nestlings from one brood raised together in a sound-proof room, and of the fourth order nestlings brought up in a room or a zoo with birds of other species. All the sounds of these experimental birds should be recorded. Experienced birds respond to sounds belonging to their own species; it may be that the young bird is more sensitive to its own song than to other songs. Learning its song may be a sort of "imprinting"—a sudden fitting of outside stimuli to a gap in the inborn mechanism during a sensitive period, p. 7. Birds have remarkable memories for sounds. A six-weeks-old hand-raised Nightingale, *Luscinia megarhyncha* Brehm, heard a Blackcap, *Sylvia atricapilla* (Linnaeus), sing for ten days in July; in November the Nightingale started with a juvenile song and in mid-January gave the Blackcap song. A parrot first used phrases two years after he had heard them. Like the "speech" of birds and mammals a baby's babblings and even his first words are self-expression; when he puts words together into sentences he has reached the human level.—M. M. Nice.

38. All-Day Song Totals. I. Noble Rollin. 1951. *Dawn Song and All Day*, 1(4): 42. All day singing at Glanton, Northumberland, all birds mated but the last; nest building not started with first three. Chaffinch, *Fringilla coelebs* Linnaeus, Apr. 13, 435 songs. Redstart, *Phoenicurus phoenicurus* (Linnaeus), May 18, 1,050 songs. Whitethroat, *Sylvia communis* Latham, May 21, 3,251 songs. Wren, *Troglodytes troglodytes troglodytes* (Linnaeus), June 22, nest building, 407 songs. Willow Warbler, *Phylloscopus trochilus* (Linnaeus), male feeding two fledged young, July 2, 533 songs. Robin, *Erithacus rubecula* (Linnaeus), mateless, in full territorial song, Sept. 19, 1,347 songs.—M. M. Nice.

39. Amount a Bird Sings. Noble Rollin. 1950. *Dawn Song and All Day*, 1(3): 23-27. The greatest number of songs in one day yet recorded from a bird is that of an unmated male Blackbird, *Turdus merula* Linnaeus: 6,140 songs on 5 April 1948. All day records of five other Blackbirds were: 18 February 1945, 108 songs; 9 April 1944 (laying in progress), 474; 21 May 1947 (incubation in progress), 1,621; 2 July 1947 (mateless), 1,487; 2 August 1947 (incubation in progress), 571.—M. M. Nice.

40. Change of Nesting Habits in the Spine-tailed Swift. (Umstellung der Nistweise beim Stachelschwanz-Segler *Chaetura andrei.*) Helmut Sick. 1951. *Journal für Ornithologie*, 93(1): 38-41. Spine-tailed Swifts in Brazil live in the hollow trunks of the large Buruti palm, *Mauritia vinifera.* Since 1948 nests have been found in the small chimneys of private houses, six nests 1949-50 in the small town of Teresopolis. Apparently all 30 species of *Chaetura* in the Old and New World nest in hollow trees.—M. M. Nice.

41. A Field Study of Some Grouping and Dominance Relations in Ring-Necked Pheasants. Nicholas E. Collias and Richard D. Taber. 1951. *The Condor*, 53(6): 265-275. A study of some grouping and dominance relations in a wild population of Ring-necked Pheasants, *Phasianus colchicus* (Linnaeus), was made during the first four months of 1948 near Madison, Wisconsin. Thirty-eight of 81 cocks and 170 of 231 hens in the study area were banded with numbered

aluminum bands, and with distinctive combinations of colored bands. Each bird was also marked with a large numbered tag pinned through the skin on the back of its neck. Most observations were made during the early morning hours from blinds near three feeding stations. Unisexual and mixed groups of hens and cocks during the winter gave way to harems of hens, each harem under a single cock, as the breeding season progressed. Composition of winter flocks showed little if any consistent association of individual birds. Food competition provided a basis for determination of dominance among hens and among cocks. All cocks dominated all hens but ceased pecking or driving hens after the onset of the breeding season. Territorial cocks usually dominated non-territorial cocks. Whereas differences in weight, within each sex group, seemed to be relatively unimportant, older and trap-shy birds tended to be high in dominance rank.—L. R. Mewaldt.

42. Territorial Behavior and Age Composition in a Population of Mockingbirds at a Feeding Station. Josephine R. Michener. 1951. *The Condor,* 53(6): 276-283. At Pasadena, California, a total of 806 juvenal and 594 adult Mockingbirds, *Minus polyglottos* (Linnaeus), were banded with numbered aluminum bands from 1925 to 1940. From 1933 to 1940 they were also banded with individual combinations of colored bands. The observation of birds wearing color bands continued until 1946 when no birds were found that still carried complete sets. After the establishment in 1936 of feeding trays, the ratio of adults to juvenals visiting the author's yard increased, and breeding territories were no longer established in the yard area where prior to 1936 a number of pairs held territories. Older birds tended to use the food shelves in preference to traps, resulting in more extensive survival data based upon sight records than upon retrapping. Thirty-three percent of the Mockingbirds banded as juvenals were known to survive at least one year, the oldest for 12 years; however, 57 percent of birds banded as adults were known to survive at least one year after banding. The usefulness of this interesting paper might have been increased by citations from related literature.—L. R. Mewaldt.

43. Crepuscular or Nocturnal Flights by Swifts. (De nachvluchten van Gierzwaluw, *Apus a. apus* (L.).) C. de Graaf. 1950. *Ardea,* 38(3/4): 165-178. In this paper the author presents a resume of the currently available information on this very interesting phenomenon. Apparently no crepuscular flights occur before the latter part of May. Thereafter they are first performed primarily by non-breeding birds which ". . . . ascend for crepuscular flights, spending the night in the sky and descending at sunrise." (p. 177.) As soon as the young are fledged, either juvenals or adults, or both, join the crepuscular and nocturnal flights. No ascents are observed during unfavorable weather probably because of the temporary emigration of the adults to areas with more favorable weather.—D. S. Farner.

ECOLOGY

(See also Numbers 20, 27, 28, 30, 31, 33, and 56.)

44. Population Cycles and Random Oscillations. LaMont C. Cole. 1951. *Journal of Wildlife Management,* 15(3): 233-252. The present paper offers excellent support to the hypothesis of Palmgren *(Oikos* 1: 114-121. 1949.) which states that population oscillations may be a function of random fluctuations. Palmgren showed that graphs simulating population cycles could be constructed using random numbers obtained by rolling a die or drawing numbered cards. Cole's contributions are: (1) The application of Trippett's table of random numbers to obtain cyclic distributions and (2) the application of the theory of probability to determine the expected distribution of cyclic lengths in randomly fluctuating numbers. One conclusion is that, "Most of the 'population cycle' data, in fact, show greater variability in the 'cycle' lengths than would be expected if the populations fluctuated entirely at random!" In comparing the frequency distribution for Douglas Fir *(Pseudotsuga taxifolia);* Trippett's numbers; Arctic Fox, *Alopex lagopus* (Linnaeus); Red Fox, *Vulpes fulva* (Desmarest); and European Partridge, *Perdix perdix perdix* (Linnaeus), (Table 3) with the theoretical distribution, it was found that good agreement existed between the observed and expected cycle lengths for the tree-ring data, Trippett's numbers, and European Partridge data.

The data for both species of foxes appeared to differ significantly from the expected. Possibly this discrepancy reflects economic and fur-style influences, indicating that trapping statistics do not realistically reflect actual population fluctuations. Cole shows that the theory of randomness agrees well with both the shorter cycle of 3-4 years and the longer 10-year cycle. By using a two-point moving average of random numbers, Palmgren obtained a series with a mean interval of four, suggestive of the four-year, small rodent cycle. This procedure accounted for the influence of an environmental condition or population size the previous year on the current population level. Cole suggests that years of above-average favorability followed immediately by below-average years may randomly produce the four-year cycle. He presents probability data to support this hypothesis. The explanation here lies in fluctuations of environmental factors, and turns attention back to the problem of cause-and-effect relationships between the environment and population fluctuations. Both Palmgren and Cole establish the possibility that population cycles could occur as a result of simple random fluctuations with no relation to the environment, yet both men go on to show that populations may fluctuate because of random oscillations among environmental factors that determine population levels. It is assumed by both workers that many environmental factors operate separately to favor population change. This postulation is basic to the mathematical theory that lies behind the hypothesis of random variation; but it should be recognized that the interactions between environmental factors, such as temperature and moisture conditions, often produce the most marked population changes. Without doubt Palmgren and Cole have made major contributions to clarify thinking concerning population cycles and establish a more realistic basis for future research.—Helmut K. Buechner.

45. Canada's Premier Problem of Animal Conservation. A Question of Cycles. W. Rowan. 1950. pp. 38-57 in *New Biology*, 9, edited by M. L. Johnson and M. Ambercrombie, Penguin Books Ltd., Middlesex, England. 1/6. Following a discussion of several classical cases of fluctuations in animal populations in the northern part of the Northern Hemisphere, the author accepts the ten-year cycle as phenomenon of rather wide occurrence among birds and mammals. Among the possible causes of this phenomenon he considers as attractive the proposition that cycles in winter ultra-violet radiation affecting the quality of nutrition may be basic. It is unfortunate that a number of recent papers published in Finland, Scandinavia, and Germany were apparently unavailable to the author. Some may well have made him less confident of the validity of the ten-year cycle whereas others would have supported his idea of a nutritional basis in the fluctuations of animal populations. Whether or not the ten-year cycle is real, there are nevertheless fluctuations in the populations of birds and mammals. Among the possible etiologic factors are certainly variations in the quality of nutrition. It is to be hoped that the author's suggestions will stimulate further investigations into this aspect of the problem.—D. S. Farner.

46. The Refuge in Pheasant Management. Fred H. Dale. 1951. *Journal of Wildlife Management*, 15(4): 337-346. The usual refuge for Ringneck Pheasant, *Phasianus colchicus* (Linnaeus), supports no greater population than the surrounding farm area; to function a refuge must contain superior habitat and concentrate Pheasants during hunting and critical winter seasons. If a refuge actually functioned properly, the reduction in State-wide illegal hen kill would not amount to more than *two* percent of the hen population, based on the sound assumptions (for which data are presented) that not over 10 percent of the population would be on refuges and that the illegal hen kill off refuges would not exceed 20 percent. Under extremely heavy hunting pressure up to 300 gun-hours per 100 acres, sex ratios sufficiently divergent to reduce egg fertility have not been reported. The heaviest hunting pressures produced ratios of one cock to 7-8 hens; one cock can easily serve 10-13 hens with little or no effect on egg fertility in the field. Even when 90 percent of the cocks were harvested on Pelee Island, six cocks per 100 acres remained, a level at which hunting begins on poorly stocked areas. The harvest varies with the supply of cocks, but the number of cocks remaining after the hunting season tends to be a characteristic of the habitat. It is the remnant of the cock population that tends to remain constant, not the harvest. Therefore it is wise to harvest heavily to reduce populations to the stable remnant character-

istic of a given range. The Pheasant refuge system, then, is contrary to good management, since it results in unnecessary reductions in cock harvests.—Helmut K. Buechner.

46a. The Chukar Partridge in Nevada. J. R. Alcorn and Frank Richardson. 1951. *Journal of Wildlife Management*, 15(3): 265-275. The Chukar Partridge, *Alectoris graeca chukar* (Gray), has been introduced from southern Eurasia into many parts of the United States during the past two decades. Only in Nevada and Washington has it been sufficiently successful to permit hunting seasons. From 5,000 to 10,000 were liberated in Nevada beginning in 1934. Few additional liberations of pen-raised birds should be necessary, but shifting wild-trapped birds is considered an important management technique. The Chukar Partridge has become well established in mountain ranges in approximately one-half of the State, with the greatest centers of population in the central portion. The data on natural history are of particular interest. An analysis of 41 crops showed that the seeds of cheatgrass *(Bromus tectorum)*, filaree *(Erodium cicutarium)*, the basal shoots of Sandberg bluegrass *(Poa secunda)*, and piñon pine nuts *(Pinus monophylla)*, and green grass blades were the most important foods. At no time were Chukars found far from water; they were observed habitually drinking during early morning hours. Although brushy cover was usually available, Chukars made little use of it for escape, preferring instead to run up steep, rocky hills or the sides of canyons. Nesting apparently begins in May and possibly continues through July. An average of nine eggs was found in 14 nests. In seven observations, the average number of young was 7.5 in Nevada, whereas 13 pairs produced an average of 14.6 young in Missouri. Although avian predators were seen apparently hunting Chukars, no kills were observed. The Chukar Partridge is capable of remaining absolutely quiet for 20 minutes and nearly quiet for an additional hour. During the summer Chukars sought the higher parts of the range, except where they located near water in the valleys. Some interesting information is provided in this paper on the little-known relationships of the Chukar Partridge to its American habitat.—Helmut K. Buechner.

47. History and Status of the Ring-necked Pheasant in Missouri. Donald M. Christisen. 1951. *Pittman-Robertson Report, State of Missouri*, pp. 1-66. Missouri Conservation Commission, Jefferson City, Missouri. Covering the period 1945-1949, this report is concerned with the history, geographical distribution, and abundance of the Ring-necked Pheasant, *Phasianus colchicus* (Linnaeus), in Missouri. Alluvial farm land along the major rivers in the northern part of the state supports greater population densities than the uplands. As shown by cock-crowing indices, the productivity of Pheasant populations is directly correlated with soil fertility. The highest density on soils of very good fertility was 17 acres per bird, which is actually a *low* density compared with that found on the better Pheasant ranges to the north. To help determine why Pheasants have not succeeded well, the presumably optimum climograph of Zi-Ka-Wei, China, was compared with two localities in Missouri and one in North Dakota. Despite the fact that the North Dakota ranges were highly productive, the climograph correlated more closely with the Missouri ranges, with the exception of the month of May, which was wetter in Missouri but drier in North Dakota compared with Zi-Ka-Wei. Flooding of bottomland during the spring and early summer may cause severe nest and juvenile mortalities. No mention is made of the effect of temperature during the laying period, an important point brought out by Ralph E. Yeatter in his paper, "Effects of Different Preincubation Temperatures on the Hatchability of Pheasant Eggs" (*Science*, 112(2914): 529-530, 1950), which indicates that vulnerability of embryos to high temperature may limit the southern distribution of Pheasants. It appears doubtful that the Pheasant will ever become an important game bird in Missouri.—Helmut K. Buechner.

48. The Reservoirs in Upper Austria and their Effect on the Avifauna. (Die Stauseen in Oberösterreich und ihre Auswirkungen auf die Vogelwelt.) Karl Steinparz. 1950. *Bonner Zoologische Beiträge*, 1(2/4): 215-220. The author has made observations of the effects of four reservoirs on the Enns River. The list of breeding birds includes 13 species; 82 additional species are listed as migrants, winter residents, winter visitants, and accidentals.—D. S. Farner.

CENSUSES AND POPULATIONS

(See Numbers 8, 9, 10, and 11.)

AVIFAUNAL DYNAMICS

(See Numbers 14, 16, 17, and 56.)

CONSERVATION

(See Numbers 45 and 46.)

EVOLUTION

(See Numbers 58 and 59.)

SYSTEMATICS

(See also Number 59.)

49. Preliminary Note on the Taxonomy of Canada Geese, *Branta candensis.* Jean Delacour. 1951. *American Museum Novitates,* 1537. 10 pp. Drawing heavily on the unpublished materials of the late James Moffitt, the author proposes a taxonomic system for the white-cheeked geese recognizing a single species with 12 subspecies, two of which are previously undescribed.—D. S. Farner.

50. A Revised Classification for the Birds of the World. Alexander Wetmore. 1951. *Smithsonian Miscellaneous Collections,* 117(4): 1-22. This represents a revision of the author's 1940 classification. Among the notable changes are the erection of a separate family for *Archaeornis,* the combination of the Palaeognathae and the Neognathae, and the introduction of the family Eleutherornithidae for *Eleutherornis helveticus* Schaub. There are, of course, several purely nomenclatorial changes. In general the revision is conservative, many suggested changes being rejected or deferred until further studies are accomplished.—D. S. Farner.

BOOKS AND MONOGRAPHS

51. The History of Ornithology from Aristotle to the Present Time. (Die Entwicklung der Ornithologie von Aristoteles bis zur Gegenwart). Erwin Stresemann. 1951. F. W. Peters, Kurfürstendamm 54, Berlin W 54. xv + 431 pp. While many diverse aspects of ornithology have been assiduously studied, the history of the field as a whole has not been given the attention its interest merits. Aside from the now classical historical resume in the introductory portion of Elliott Coues's "Key to North American Birds" and the recent "History of American Ornithology Before Audubon" by Elsa G. Allen (see next review), both of which are oriented towards a regional ornithology, there has been almost nothing except for rather sketchy historical surveys of previous work in many faunal reports and biographies of deceased ornithologists. Stresemann's volume gives us for the first time a comprehensive history of the development of ornithology on a world-wide basis and over the whole of its existence as a scientific discipline. His wide knowledge, great experience, and fine scholarship have all been brought to bear on this undertaking and the resulting volume before us is a distinct contribution to the field whose growth it traces and analyzes. Stresemann has not merely collated a vast amount of information but has synthesized it around major approaches and problems, thereby putting the work of our predecessors in a proper perspective.

The book is divided into three parts, each of which is broken down into convenient chapters. The first part deals with the fundaments of ornithology and comprises two chapters. The first of these describes the growth of ornithological knowledge from the ancient times to the Renaissance. During all this time ornithology was wholly European, which was natural as the rest of the world was either as yet undiscovered or known from only a few slight contacts. (Mediter-

ranean Africa and Asia Minor are included here as "European.") With the advent of the intellectual awakening that constituted the Renaissance came many adventurous excursions into the hitherto unknown areas of the world, and the history of these efforts and their resulting accretions to knowledge form the text of the second chapter—the beginnings of exotic ornithology.

The second part of the book, the longest of the three, deals with the development of systematics and evolutionary studies, treated in some thirteen chapters. First we have a discussion of the methods by which birds were classified and named, the early studies of anatomy, the development of ways of preserving avian material for "museum study," the beginnings of bird illustration, the various systems of nomenclature, and a warm, surprisingly vivid account of the personalities involved. Then comes a chapter on the important explorations in the latter half of the eighteenth century, dealing specifically with such important figures as Capt. Cook, J. R. Forster, Latham, and Sonnerat. Individual chapters then are devoted to Levaillant, Illiger, Temminck, Bonaparte, Schlegel, Finsch, and Hartert, and on the all-pervading changes brought about as a result of the general acceptance of the theory of evolution. American ornithologists may take a reasonable pride in the important role our predecessors—Baird, Ridgway, J. A. Allen, and Coues, among others, played in applying evolutionary concepts to bird taxonomy and in reforming the older purely binomial nomenclature into the trinomial system we know today. Until Hartert's work and influence overcame reactionary opposition in Europe, there was a marked divergence between the methods of systematic ornithology in Europe and America, a divergence now fortunately disposed of. In all these chapters the author has been able to bring together enough of the personality of each of his major characters and of the times and prevailing thoughts surrounding each, to make them lively, human portraits. This part of the book ends with a chapter on the ascendence of the mutation theory and its consequences in genetics and in the newer systematic appraisal of characters and trends too long regarded in a static and overly and arbitrarily simplified manner.

The third section of the volume deals with the development of avian biology, with the knowledge of the living birds, their habits and their processes, their migration, distribution, territorialism, and behavior. Of the six chapters in this part of the book, the first two deal primarily with topics now fairly well relegated to the limbo of things past and of no current concern except in an historical sense. Among these items may be mentioned the analysis of teleological *versus* mechanistic approaches in early work on bird biology. Today no ornithologist consults the writings of William Harvey or of Caspar Schwenckfeld as sources of critical data (would that the systematists could free themselves of the crushing burden of the past literature with its time-consuming attention to synonymies, emendations of nomenclature, first records, etc.). Even the purely anecdotal descriptions of habits of birds by such writers as Brehm and Naumann in Europe or Audubon and Brewer in America are relatively infrequently used compared to the fuller or more critical accounts by their less monumental descendants. However, while their words may no longer be our familiar reading matter, their accomplishments still form an important part of the background of current knowledge, and these men are worth an occasional backward glance. In the chapter on the effect of evolutionary thinking on the fields of zoogeography and of animal psychology we see the developments that have caused these earlier descriptions to lose much of their usefulness. One result of the then new Darwinism was to let loose a flood of largely speculative accounts of behavior in the new terminology but without sufficient critical data. This eventually brought about what Stresemann calls a return to empiricism (Rückkehr zur Empirie) which, in turn, resulted not only in a great increase of observational factual data, but also in the development of new methods of study, chief among which is bird-banding. The final two chapters discuss the necessary reforms through which the field of avian ethology had to pass to come to its present status where it is now not only a valid subject in itself but has begun to bring its influence to bear on the older, classical field of systematics as well. The rather recent special fields of hormones and their effects, of flight, of orientation, of population dynamics, of ecological relationships are all described with their several contributions to the total picture of our knowledge of birds. The work in avian behavior of Konrad Lorenz, Otto Koehler, and their followers brings the account up-to-date and the text ends with them.

To free the pages of the book from a multitude of footnotes all such comments have been put together (p. 375-409) as a supplementary chapter. Then follows a brief bibliography arranged by chapters of the book, an index to persons referred to in the text, and finally a general index to all birds, places, topics, etc.

It is obviously impossible, in a book of 430 pages, to go into great detail in many aspects of so diversified a field as ornithology. One therefore expects to find many well-known names unmentioned, but there are a few, whose contributions, while definitely limited in scope, were yet of such importance that their absence from the text seems unfortunate. Thus, although molt is mentioned, Dwight's name does not appear; the discussion of systematic ornithology seems poorer for the lack of reference to Lyne's work on *Cisticola,* and Lambrecht's work on fossil birds (paleornithology as such is not included in the book), although it is true that neither of these two were concerned with blazing new paths. It is always true in historical writings that the originators of new ideas, new methods, new values are given due treatment while the great number of faithful workers in the pre-existing paths receive little or no attention. This does not mean that their work was not important, but that it lacked what might be called "historical valence." Often the paths laid out by an historically valent or important pioneer are important largely because they were followed and completed by a host of his colleagues and successors and so yielded a large harvest of information.

Dr. Stresemann's book is one that should be translated into English to make it more available to English speaking people. It is a fine achievement, and fills what has hitherto been a real vacuum in ornithological literature. With reference to this "vacuum" it is only fair to state that Maurice Boubier's book "L'evolution de l'ornithologie," 1925, has not been available to the reviewer, but it is not likely that it covers the subject with anything like the sweep and competence of the present work.—Herbert Friedmann.

52. The History of American Ornithology before Audubon. Elsa Guerdrum Allen. 1951. *Transactions of the American Philosophical Society* 41(3): 387-591. $2.00. — This admirable publication begins with the works of Aristotle and traces the development of ornithology to the year 1814. The history of ornithology in America is inseparably bound to that of Europe and cannot be set in a clear light without following the course of the science abroad. Each writer is discussed at greater or lesser length according to the importance of his contribution. The humble beginnings in America are due to laymen who could do little more than give to our native birds the names of the European species which they resembled. Some were far-fetched as the use of bustard *(outarde)* for the Canada goose, a name that persists among French-Canadians even today. Some of the drawings, such as those of John White (1585) of the Roanoke Colony, were so well done that there is little difficulty in identifying the subjects. Speculation on the identity of some of the birds mentioned seems far afield. Instead of assuming that Denys (p. 435) may have recognized *Bonasa umbellus thayeri* Bangs, it is more credible that he referred to the two color phases, gray and red, of *Bonasa,* extreme examples of which could be mistaken for two distinct species. Imlay's (p. 527) "ivory-bill woodcock" is interpreted too literally. The vernacular names woodcock and logcock were in common use for both the ivory-billed and the pileated woodpecker. The latter is still known as 'woodcock' by some of the old residents of northern Wisconsin.

The numerous contributions to American ornithology were minor in effect until the appearance of Mark Catesby's "The Natural History of Carolina" (1731-43). The next important event was the Linnaean system of binomial nomenclature given to the world in 1758. It was the pioneer work of men like Catesby, Bartram, Forster, Edwards, and Pennant that provided the information on American birds for systematic treatment by Linnaeus and Gmelin. At the beginning of the nineteenth century there came from the press the very valuable "Histoire naturelle des oiseaux de l'Amérique septentrionale" (1807-08) of Vieillot. Approximately 26 of his genera and 32 of his species still stand in the Check-List of the American Ornithologists' Union. The period covered by the author closes with Wilson's "American Ornithology" (1808-14). The 320 drawings in this work represent 262 species of which 39 were new to science. As the accepted "Father of American Ornithology," Wilson receives the fullest treatment in sixteen pages of text.

The number of typographical errors is unfortunate. Some of them are: *Seg(c)undus* (pp. 395, 396); *Seg(c)undum* (p. 401); 13(2)01 for the birth of Thomas de Cantimpré (p. 401); *S(L)imilus* (p. 431); *phasianel[l]us* (p. 523); S(L)imkin (p. 542); Ma[u]duyt (p. 552); Re(i)ndisbacher (p. 580); and the second reference to Déry (p. 574) is incorrectly documented.

There is a good index. Aside from some of the works mentioned in the text there is a bibliography of nearly 800 titles. William Byrd's "Natural History of Virginia," Richmond (1940), first published in German in Bern in 1737, is not mentioned, nor is the important publication of Baron Marc de Villiers, "Les rarétes des Indes," Paris (1930), containing many drawings of Canadian birds made about 1701 by Charles Bécard de Granville. However, very little pertinent information has escaped citation.

The reader will be impressed by the erudite research that has gone into the volume. Many unrecorded prints and documents were brought to light. The pleasing style and vast amount of information contained in the 'History' should command the attention of every person interested in ornithology—A. W. Schorger.

53. The Birds of Michigan. Norman A. Wood. 1951. *Miscellaneous Publications of the Museum of Zoology*, University of Michigan, Ann Arbor. No. 75. 549 pp. $4.00. For 51 years Norman Wood labored to gather information on the birds of Michigan. At the time of his death in 1943, he had, with the aid of many collaborators, amassed so many data that ". . . they could be published in a single volume only by severely restricting that volume to an account of the distribution, relative abundance, and migration of Michigan birds." A total of 334 forms (309 species) are included, 202 of which have bred in the state. All forms are based on Michigan specimens examined by qualified ornithologists. The introduction gives a brief history of Michigan ornithology. The bulk of the book is devoted to the status and distribution of the birds with data on migration and breeding. A map is included showing the counties, as well as 23 excellent photographs of characteristic Michigan birds, and a 28-page bibliography. It fell to Josselyn Van Tyne to edit the book and see it through the press. We are much indebted to him for his painstaking labors in the final preparation of this impressive, comprehensive reference work which will serve as a firm foundation for future studies. —M. M. Nice.

54. The Birds of Greenland. Part III. Finn Salomonsen, with plates (water color) by Gitz-Johansen. 1951. Einar Munksgaard, Copenhagen, Denmark. pp. 349-609. $42 for the complete set of three parts. Part III completes this important treatise. It contains full treatments of six species of Alcidae, three species of Falconiformes, two species of Strigiformes, and nine species of Passeriformes. There is also a complete systematic list (pp. 561-575) which includes all forms for which there are acceptable records. Many of these are rare visitants or accidentals. Doubtful records are treated in footnotes. There is also a general index (pp. 595-604), a table of contents (pp. 605-606), and a list of the 52 plates (pp. 607-608). There are 17 pages of bibliography. Again a few differences in subspecific taxonomy are to be noted, particularly in respect to *Cepphus grylle* (Linnaeus), *Alca torda* Linnaeus, *Falco rusticolus* Linnaeus, and *Calcarius lapponicus* (Linnaeus). As in the two previous parts, a wealth of interesting information has been summarized. It is estimated that there are 74 breeding pairs of the Greenland White-tailed Eagle, *Haliaeetus albicilla groenlandicus* Brehm, and it is thought that species is in no danger of severe reduction of numbers. Similarly the Gyrfalcons, although subjected to some persecution, appear to be in no danger. Evidence is presented to indicate that it is possible that the Great Auk, *Penguinus impennis* (Linnaeus), was once a breeding species in Greenland. Contrary to the A. O. U. Check-List, the author finds no positive evidence to regard the Short-eared Owl, *Asio flammeus* (Pontoppidan), as a breeding species; also the records for the Storm Petrel, *Hydrobates pelagicus* Linnaeus, and the Flicker, *Colaptes auratus* (Linnaeus), are rejected. One of the most interesting accounts in Part III is that of the movement of Fieldfares, *Turdus pilaris* Linnaeus, to Greenland in 1937 and the subsequent establishment of this species as a member of the breeding avifauna. Apparently it is a permanent resident. The systematic list contains a considerable number of accidental and casual visitants not noted in the fourth edition of the A. O. U. Check-list.

The *Birds of Greenland* is a beautiful book and an excellent regional ornithology containing much material of great interest to American ornithology. It must be emphasized that, in addition to that of an annotated regional list, it has many important additional functions. For example, it is an excellent source of information concerning the expansion of ranges of several species during the recent amelioration of North Atlantic climate. Its contributions to arctic and sub-arctic ecology are many.—D. S. Farner.

55. Life Histories of North American Wild Fowl (Order Anseres). Ducks, Geese, and Swans. In two volumes. Arthur Cleveland Bent. Reprinted in 1951 by Dover Publications, Inc., 1780 Broadway, New York 19, New York. Vol. 1, ix + 244 pp., 46 plates. Vol. 2, x + 316 pp., 60 plates. $8. per set of two volumes. These volumes are photo-offset reproductions of the original U. S. National Museum bulletins 126, published in 1923, and 130, published in 1925. These two bulletins have long enjoyed the status of virtual collectors items. Although the table of contents and the entire text have been reproduced without alteration, a few changes elsewhere should be noted. The title pages have been replaced, thereby removing reference to the U. S. National Museum Bulletin and, unfortunately, the original publication dates. The initial and final paragraphs of the introductions of both volumes have been deleted. In both volumes the first plate has been transferred from the original position opposite the title page to the final section of the volume containing the remainder of the plates. Also the individual explanations of plates have been placed at the bottom of each plate rather than retaining them on separate pages (241-245) as in original Bulletin 126, or on pages opposite the plates as in the original Bulletin 130. This of course makes the plates readily usable. Also the indices have been placed before the plates with an adjusted pagination. In general the reproduction of the text, table of contents, and indices is good, particularly in view of the quality of the original printing; the plates, also reproduced by photo-offset, have not fared as well although a substantial number are usable. It is very unfortunate that the only reference of any kind to the fact that these volumes are reproductions is a brief allusion on the jacket to the "unbound, worn copies of the Wild Fowl set. . . ." Nowhere in the actual volumes is there reference to the U. S. National Musuem Bulletin or to the *date* of the original publication. Moreover, p. iv actually states "published, 1951." A person unfamiliar with the Bent series might well procure these volumes without realizing initially that the manuscripts were closed more than a quarter of a century ago. Although this is most regrettable, one must, on the other hand, not hesitate to acknowledge that an important contribution to ornithology and the study of wildlife in general has been rendered by making these important volumes generally available.—D. S. Farner.

56. Distribution and Populations of Summer Birds in Southwestern Georgia. Robert A. Norris. 1951. The University of Georgia Press, Athens, Georgia. 67 pp. $1.25. Since Mark Catesby first recorded the birds he observed in Georgia in or about 1723, the bird life of the state has been the subject of continual, if at times intermittent, interest and study on the part of numerous ornithologists. For some reason, however, the southwestern corner has been largely ignored, and little has been known of the distribution of bird life in this part of Georgia. Consequently, this publication fills a gap that has existed since the days of Catesby, and is a valuable contribution to our present knowledge of the avifauna of the state. With the Emory University Field Station near Newton, Baker County, as a base, the summers of 1947 and 1948 from mid-June to late August were spent on ornithological field studies within an eight-county unit lying between the Flint and the Chattahoochee rivers. The purpose of these studies was that of "determining the geographic and ecological distribution of regional birds, the status of species and subspecies having range discontinuities within the region, and of estimating actual abundance of breeding species on selected small areas of ecologically important habitats." The present paper discusses in detail the results obtained from this field work, and is treated under three main headings. Part 1 is an annotated list of species observed; Part 2 is a summary and discussion of distributional data; and Part 3 a detailed account of summer bird populations of three major habitats. There is also an introductory chapter on climate,

geology and physiography, and vegetation, a concise summary, and a bibliography of 67 titles. Maps, always an important addition to such a report as this, show the region studied in relation to the principal physiographic regions of Georgia, and also the physiographic sub-divisions of the region itself. There are likewise additional maps outlining the breeding ranges of four species having a breeding range boundary (in 1947 and 1948) in southwestern Georgia, and of four species which here approach the southern limits of their breeding range. Finally, there are eleven photographs illustrating the varied topography and flora of this corner of the state.

Obviously, a study such as this, limited to two summers of field work, must be considered merely a start in determining the distribution and relative abundance of the breeding birds of southwestern Georgia. However, the paucity of information heretofore available emphasizes the importance of the data presented. Summarized briefly, 96 species, representing 16 orders and 39 families, were recorded in the area studied. Of these, only the ibis and herons were definitely considered as not breeding. The Rough-winged Swallow, *Stelgidopteryx ruficollis* (Vieillot); Catbird, *Dumetella carolinensis* (Linnaeus); Prairie Warbler, *Dendroica discolor* (Vieillot); Louisiana Water-thrush, *Seiurus motacilla* (Vieillot); Redstart, *Setophaga ruticilla* (Linnaeus); Goldfinch, *Spinus tristis* (Linnaeus); Chipping Sparrow, *Spizella passerina* (Bechstein); and Field Sparrow, *Spizella pusilla* (Wilson) were found to reach the southern limit of their breeding ranges here. Seventy-one of the species were polytypic, of which seven, the Carolina Chickadee, *Parus carolinensis* Audubon; Brown-headed Nuthatch, *Sitta pusilla* Latham; Red-winged Blackbird, *Agelaius phoeniceus* (Linnaeus); Grackle, *Quiscalus quiscula* (Linnaeus); Yellowthroat, *Geothlypis trichas* (Linnaeus); Cardinal, *Richmondena cardinalis* (Linnaeus); and Towhee, *Pipilo erythrophthalmus* (Linnaeus) showed intergradation between two races. The quantitative study of summer populations was made on three plots described as: (1) an old field with fence rows; (2) a mature longleaf pineland; and (3) a beech-magnolia sandy hammock. The first yielded 66 pairs per 100 acres, the second 197 pairs, and the third 740 pairs.

The annotated list shows one tendency that the present reviewer has always deplored. That is, the too frequent use of trinomials when no specimens were actually taken to determine the subspecies concerned. The author gives as his reason "overwhelming geographical probability," but one wonders what is really gained by assigning a species to a definite race on such evidence. Listing the Screech Owl as *Otus asio* rather than as *Otus asio asio* changes in no way the status of this species as "apparently uncommon," and eliminates the possibility of error on the part of the author. There is little question but that the use of trinomials in published lists, based entirely on geographic probability, has resulted in much confusion in the past, and has given undue emphasis to subspecies where the average person is concerned. It seems advisable, therefore, that trinomials be consistently avoided in all annotated lists until at least one specimen has been taken and identified. In the final analysis, no science is worthy of the name if accuracy is sacrificed for convenience.—Thomas D. Burleigh.

57. Vertebrate Sexual Cycles. W. S. Bullough. 1951. Methuen and Co. Ltd., London, and John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. vi + 117 pp. $1.50. In this little book the author has accomplished an admirable synthesis of a large and confusing mass of information. The second chapter is a general discussion of cycles of reproduction which emphasizes that in most vertebrate species throughout the world sexual activity is commonly a seasonal phenomenon. The third chapter, which in many respects is the best, is concerned with the relation of the environment to reproduction. Like the preceding chapter much of the material is drawn from observations and experiments on birds. Since some reproductive cycles are initiated by increasing light whereas some are initiated by decreasing light, it is suggested that most, or all, vertebrates have an inherent reproductive rhythm which is maintained at a greater precision by the stimulatory effect of decreasing or increasing photoperiod. This suggestion would assign a rather superficial role to photoperiod with respect to reproductive cycles. Inherent reproductive cycles may be "timed" by other periodic environmental factors. The author (p. 43) accepts Baker's suggestion that the breeding seasons of most vertebrate species are determined by two sets of causes, ultimate and proximate. The ultimate causes are those which ascertain the time of the

breeding season to be the most beneficial for that purpose. It is suggested that the food supply is probably the most important single factor. This, and other similar factors have presumably operated through natural selection. The proximal causes are threefold: (1) Internal reproductive rhythm which usually has an approximate periodicity of one year. Obviously there are great specific differences in strength and precision of such rhythms. (2) An environmental variant to which the cycle is attuned. Normally the stimulus of the external factor reinforces that of the internal rhythm. (3) A group of factors, such as breeding area, mate, etc., in the immediate environment which must constitute an appropriate pattern before the shedding of eggs and sperm becomes possible. The fourth chapter is a very useful condensation of information on the gonadotropic and sex hormones and their relation to reproduction. In view of the the great mass of literature in this field, this chapter is quite a remarkable achievement. The fifth chapter deals with sexual behavior. In the opinion of the reviewer this does not equal the quality of the preceding chapters although it is difficult to conceive how this would be possible in the pages allocated. Nevertheless it does contain much interesting information and several useful generalizations. The author includes in this chapter "the special problem of migration." Although there is usually a correlation between gonadal development and spring migration and between gonadal regression and fall migration, the reviewer feels that the author should exercise more caution in implying that there is a "cause-and-effect" relation on the basis of currently available information. There is a list of 203 references. The number of typographical errors is not unusual. It should be emphasized that this little book can be used readily with a very minimum knowledge of endocrinology and physiology. The reviewer does not hesitate in recommending it to any ornithologist interested in any aspect of avian reproduction, life history, or behavior.—D. S. Farner.

58. The Avifauna of Micronesia, Its Origin, Evolution, and Distribution. Rollin H. Baker. 1951. *University of Kansas Publications, Museum of Natural History*, Vol. 3, No. 1, 359 pp. This monographic work presents in detail the information available to date on the birds of the Mariana, Palau, Caroline and Marshall Island groups and the seas of that region. The Gilbert Islands are included only in the discussion of distribution. The first 28 pages include brief descriptions of the islands and island groups, their soils, climate, surface water, vegetation, a gazetteer of the islands, a brief summary of ornithological exploration, and a check-list of the birds. The next 32 pages are devoted principally to a discussion of the avifauna by groups, such as oceanic birds, migratory shore birds, and land and fresh water species. In this section are also discussed dispersal, colonization, speciation and the regions from which these oceanic islands received their bird life, the routes and time involved and the degree of differentiation which the species and groups have undergone. The migratory routes and flyways of shore birds visiting that area are discussed and numbers occurring on specific dates in 1945 on Guam, Ulithi Atoll and Peleliu are presented in tabular form. Nearly all of the remainder of the book is devoted to an account of the species and to the excellent bibliography. The 206 kinds of birds treated belong to 150 full species, 91 genera, 37 families and 13 orders following the classification of Wetmore and Peters. Six species have been introduced by man. Under each species discussion are included apparently complete synonomies for the region, geographic range, notes of systematic bearing, measurements of specimens, weights and remarks on the biology and ecology, based on observations by the author as well as other field workers and on the literature.—D. W. Warner.

59. Phyologeny of the Waxwings and Allied Birds. M. Dale Arvey. 1951. *University of Kansas Publications, Museum of Natural History*, 3(3): 475-530. As the result of detailed anatomic studies, and additional biologic considerations, it is concluded that the waxwings, phainoptilas, phainopeplas, *Ptilogonys*, and palm-chats are to be placed in the single family Bombycillidae. Three subfamilies are recognized: Bombycillinae, Ptilogonatinae, and Dulinae. The rather marked differences in coloration in the three subfamilies are thought to be the result of different responses to ecologic stimuli; the existing coloration appears to have been developed relatively late. It is thought that the center of origin for the family must have been in the Western Hemisphere and somewhat south of

the present range of the Waxwings. Waxwings are thought to be descendants of a migratory population that diverged early from the primitive stock. The Palm-chats are thought to be the descendents of an isolated population that developed communal habits. The Silky Flycatchers became adapted for insect feeding and have specializations which are roughly similar to those of the Tyrannidae. It is suggested that the Bohemian Waxwing, *Bombycilla garrula* (Linnaeus), may have become isolated in Eurasia and later came into contact with the Cedar Waxwing, *Bombycilla cedrorum* Vieillot, after the two had become genetically well differentiated. The Japanese Waxwing, *Bombycilla japonica* (Siebold), is regarded as an earlier derivative of the Waxwing stock since it has characteristics that seem relatively unspecialized.—D. S. Farner.

60. Birds from the State of Veracruz, Mexico. George H. Lowery, Jr., and Walter W. Dalquest. 1951. *University of Kansas Publications, Museum of Natural History*, 3(4): 531-649. This very important contribution to the ornithology of Vera Cruz is based on the 1,007 specimens and field notes obtained by the junior author in 1945-1949, a collection of about 200 specimens obtained in 1937 and 1938 by Mr. Dyfrig McHattie Forbes of Petrero Viejo in Vera Cruz, and 87 specimens obtained by the senior author and Robert J. Newman in 1937 and 1949. This material gives the basis for distributional data on 297 species. Following a discussion of the life-zones of Vera Cruz based on the observations of the junior author, the bulk of the treatise is an annotated list.—D. S. Farner.

61. A Country Parish. Great Budworth in the County of Chester. A. W. Boyd. 1951. William Collins Sons and Company, 14 St. James Place, London, S.W. 1, England. 278 pp. 21s. A comprehensive history of an English parish, starting with man's influence on the fauna and flora, continuing with "man"—history; social conditions; farming, past and present; speech; folk-lore, etc., then passing to the mammals, birds, butterflies and flora. Mr. Boyd has done a great deal of banding of his home birds and he tells of returns and recoveries of Rooks, Starlings, Greenfinches, Yellowhammers, Tree Sparrows, Robins and Barn Swallows, also recording brood-size in a number of species. The final chapter on the plants is especially interesting. There are 48 black and white photographs and 24 color photographs of much charm. Mr. Boyd shows himself a fine all-round naturalist, keenly aware of all the life around him, and recording it vividly and sympathetically for his readers.—M. M. Nice.

62. Flight among Animals. (De Fliegkunst in het Dierenrijk.) E. J. Slijper with the coöperation of J. M. Burgers. 1950. E. J. Brill, Ouden Rijn 33a, Leiden, Holland. viii + 178 pp. 14.50 guilders. This interesting book represents a condensation of a tremendous amount of information concerning the physics and biology of animal flight with emphasis on the flight of birds. Following a resume of the history of the knowledge of animal flight, there is a chapter on the groups of flying animals, living and fossil. Chapter Three is a well-illustrated discussion of aerodynamics particularly in relation to flight by animals. In many respects the most interesting part of the book is Chapter Four which is concerned with the body structure in flying animals, including considerations of body form, wing area, wing form, skeleton, and musculature. Interesting comparisons are made among various groups of flying animals. Chapters Six and Seven consider gliding and flapping flight respectively. These are profusely illustrated with diagrams from many sources. There is a bibliography of eight pages. This treatise of flight is clear and effective. The numerous illustrations and tables will make it very useful even to those who are unable to read Dutch.—D. S. Farner.

63. Stalking Birds with Color Camera. Arthur A. Allen. 1951. National Geographic Society, Washington 6, D. C. viii + 328 pp. $7.50 in U. S. A. and Possessions; $7.75 elsewhere. This volume is primarily a collection of 331 illustrations in natural color from Kodachrome and Ektachrome photographs, mostly by the author. Two hundred sixty-four species are included. To state that these illustrations are exquisite is indeed understatement. Their importance in stimulating a wider interest and appreciation of birds can scarcely be over-estimated. To prepare a text, if such is indeed necessary, for a book of this type is indeed diffi-

cult. Much of it, like many of the illustrations, has appeared previously in the *National Geographic Magazine*. It is highly anecdotal, frequently anthropomorphic, but at times interesting, particularly when the details of the procurement of photographs are given. It is, however, as a collection of illustrations of unsurpassed quality and choice of subjects, that this book is recommended without reservation to anyone interested in birds.—D. S. Farner.

64. Wildlife in Color. Roger Tory Peterson. 1951. Houghton Mifflin Company, 2 Park Street, Boston, Mass. vi + 191 pp. $3. This colorful little book, sponsored by the National Wildlife Federation, is designed basically to stimulate a sympathetic appreciation of wildlife and the necessity of effective wildlife conservation. Wildlife conservation is a national problem and, in a democracy, its basic elements must be understood by a substantial portion of the citizenry. Consequently this book is directed to the average layman. Bearing this in mind, the selection and presentation material are both well conceived. To a great extent the text is constructed about the colored reproductions of 453 National Wildlife Federation stamps. The aspect is essentially ecologic, an aspect which has been lacking too frequently in presenting the problems of wildlife conservation to the layman. Western species are not accorded an emphasis equivalent to that given to eastern species. It is disappointing to find that so characteristic a species as the Water Ouzel has been omitted. Unfortunately the reproduction of the illustrations is by no means uniformly good. Nevertheless this little book is certain to make an important contribution to the development of a greater sympathy for American wildlife. Because of its potential effectiveness in this respect it is to be hoped that it will have a wide distribution.—D. S. Farner.

65. Birds of Montezuma and Tuzigoot. Henry H. Collins, Jr., with illustrations by Roger Tory Peterson. 1951. Southwestern Monuments Association, Montezuma Castle National Monument, Camp Verde, Arizona. 14 pp. $0.25. This attractive little bulletin has been prepared obviously for the visitor who knows nothing about birds. Forty-four species are described in varying detail for purposes of field identification. As an aid to identification of these species by the ornithologically inexperienced the bulletin should prove quite useful despite the feeling of the reviewer that the approach could have been at a somewhat higher intellectual level.—D. S. Farner.

NOTES AND NEWS

Dr. Donald S. Farner has served as an editor of *Bird-Banding* for the span of 37 issues, and has carried the heavy load of responsibility for the reviews in virtually all of these issues. It has now become impossible for him to find time for this work, because of his increasing responsibilities in teaching and research at The State College of Washington. With the July issue, therefore, Dr. Farner will limit his work on *Bird-Banding* to reviews of material in some of the European languages which few other American ornithologists are able to read easily. Seldom has familiarity with ornithological works in other languages been more important than at present, to aid our own research and to avoid duplication of effort; but seldom has it been harder for journals to maintain a comprehensive review section, because of the many other tasks confronting those competent to write such reviews. To Dr. Farner, more than to any other single individual, goes the credit for the breadth of coverage of our review section, achieved by his sacrifice of countless evenings and week-ends.

We hope to maintain this breadth of coverage, and we welcome as the new head of the review section Dr. Oliver L. Austin, Jr., widely known for his many years of banding on Cape Cod, Mass., and the author of many books and papers on other aspects of ornithology. Dr. Austin has recently returned from seven years overseas, the last four in charge of wildlife work in Japan under the Occupation.

In our January, 1951, issue, we urged readers to make use of Section *Aves* of the *Zoological Record*, if they were not already familiar with it. Since then, the Treasurer of the American Ornithologists' Union has agreed to accept orders, even