

RECENT LITERATURE

Reviews by Donald S. Farner and others

BANDING

1. Report of the Bird-Ringing Committee. A. L. Thomson. 1946. *British Birds*, 39: 171-175. During 1945, 7,294 birds were ringed in Great Britain, 5,419 of them nestlings. A Barn Swallow, *Hirundo rustica rustica* Linn., ringed as a nestling in Shropshire in 1943, was taken in Orange Free State in March, 1945. A Wood-Pigeon, *Columba palumbus palumbus* Linn., "ringed in Northumberland in 1944, was recovered in County Tipperary in November, 1945, this being the first record showing movement to Ireland."—M. M. NICE.

MIGRATION

2. The Migration of the Chaffinch. (Over de Trekwegen van Vincken (*Fringilla coelebs* L.)) L. Tinbergen. 1941. *Ardea*, 30(1/2): 42-73. Two groups of Chaffinches migrate through northwestern Europe. The *Scandinavian group*, consisting of *Fringilla coelebs coelebs* L., migrates into Denmark, northwestern Germany, the Netherlands, Belgium, northern France, England, and Ireland. The *Baltic group*, consisting of *Fringilla coelebs hortensis* Brehm from Germany and Denmark and *Fringilla coelebs tristis* Floericke from the eastern Baltic area, migrate to Germany, southeastern Netherlands, Belgium, France, Spain, and northern Italy. The two groups intermingle in western Belgium. In both of these groups there are some non-migratory individuals. In still other populations of this species non-migrants are predominant; these include *gengleri* Kleinschmidt in England, *hortensis* in Holland, and the Belgian subspecies.

This paper presents an unusually thorough and lucid treatment of data obtained from Chaffinches banded in the Netherlands both as resident and migrant birds. There are seventeen helpful maps with titles and explanations in Dutch and German.

There were 24 returns from Chaffinches banded as nestlings. All recoveries (20) during the year in which the birds were banded were within 10 km. of the birthplace with one exception which was recovered 25 km. WSW in late fall. Six birds banded as young were recovered in years subsequent to the year in which they were banded. Five of these were recovered within 10 km. of the birthplace; one was recovered 175 km. SW in Belgium in spring. Five adults banded as breeding birds were subsequently recovered during the year in which they were banded. All were recovered within 10 km. of the breeding place. One banded during the breeding season and recovered subsequent to the year banded was found in France in winter 800 km. WSW, apparently a migrating bird. Since recoveries represent all seasons of the year it is concluded that the Netherlands population is primarily composed of permanent residents.

Returns from fall migrants banded on the dune coast of the Netherlands indicate that these birds are from Scandinavia. These data indicate that birds which migrated southward to or through the Netherlands in one season may in ensuing seasons migrate a much shorter distance south or may not migrate at all. The principal wintering area of the Scandinavian population is in England and Ireland. Birds banded as spring migrants on the dune coast were recovered in winter mostly in Belgium. These plus a summer recovery from Sweden and single winter recoveries from the Netherlands and England indicate that the spring migrants in Holland as the fall migrants and winter visitants are Scandinavian birds. Returns from a rather small number of Chaffinches banded as young in Scandinavia and migrants banded at Helgoland are in agreement with the above-cited data. Also wintering Chaffinches banded in England have been recovered in Scandinavia in summer and in Belgium in subsequent winters.

Of 19 Chaffinches banded in eastern Belgium as migrants, 16 were recovered as migrants or wintering birds in France or Spain whereas only one was recovered in England. These birds are concluded to represent the Baltic populations. This agrees with the conclusions of Bochmann (*Der Vogelzug*, 5: 176, 1934), based on Chaffinches banded in western Belgium, which indicate that both Scandinavian and Baltic populations migrate through this area as described in an above paragraph.

Clarke (*Studies on Bird Migrations*, London, 1912) proposed that the south-westerly flight across the North Sea was composed of birds from Scandinavia, whereas the western flight over the southern part of the North Sea was composed of birds from central Europe. The author shows that this is untenable since only Scandinavian chaffinches winter in England. Chaffinches recovered in the Netherlands are from both eastern and western Scandinavia, whereas those on Helgoland are mostly from western Scandinavia. This indicates that the western Scandinavian population migrates, at least in part, around the North Sea to Holland and Belgium and thence to England. In summarizing the available information on migratory routes and directions of the Chaffinches in fall the author speaks of three groups. A group from the western part of the Scandinavian Peninsula which, beginning its migration due south and thence changing it to southwest to west, passes through northwestern Germany and the Netherlands, eventually reaching Belgium, northern France and England. A second group from eastern Scandinavia flies over its entire migratory route in a southwest to west direction, going to Belgium via northwestern Germany and the Netherlands. Finally there is a group which migrates across the North Sea towards the southwest. "If there are birds from western Scandinavia . . . this population has a great spread in migration direction, from southwest (or somewhat more west) to south or southeast. A portion of these birds, that is those which have approximately a south-southwest course, would have to fly over the North Sea from north to south; the birds which are oriented in a more westerly direction would go directly to Great Britain; those birds which are oriented in a more southerly direction should come into northern Netherlands or northwestern Germany and then go by the 'angular route' over the Netherlands and eventually across Belgium to England. If however the birds which cross the northern part of the North Sea are not from western Scandinavia, the possibility exists that they are from northeastern Scandinavia which, also including those from southeastern Scandinavia, have normally a southwest to west direction in migration, flying across the Scandinavian Peninsula and thence reaching Scotland via the west coast of Norway. The three recoveries in northeastern Scandinavia . . . do not support the latter possibility; two of these were banded in migration in the Netherlands; the third in winter in southern England."

Spring migration is more poorly known. Apparently the crossing of the North Sea begins along the entire British coast. On the coast of the Netherlands east and southeast are the most frequent migratory directions. Inland in northern Holland the principal direction in spring migration is east; in western and central Holland it is east and also northeast. Thereafter the direction is north to western Scandinavia or northeast to eastern Scandinavia.

"The German, Danish, and East Baltic chaffinches have [in autumn], like those of eastern Scandinavia, during their entire migration, a rigid or only slightly varying compass direction (on the average southwest to west-southwest) as their normal direction of flight."

Migration may occur as rapidly as 600 km. per day; over land it is much less. An excellent study.—D. S. F.

3. Concerning the Migration of the European Robin from the East Baltic Area. (Vom Zug der Rotkehlchen (*Erithacus r. rubecula*) aus den

Randgebieten der östlichen Ostsee.) Th. Pauly and E. Schüz. 1942. *Der Vogelzug*, 13(1/2): 44-55. This paper is based on an analysis of 52 recoveries of European Robins banded in autumn in East Prussia. Migration is in general southward, with wintering mostly in France, Spain, Italy, the Mediterranean islands, and northern Africa. The breeding area of the birds banded in East Prussia is not well known although it is presumably in Finland north to 65-67° N. Retakes at the banding stations indicate that migration through East Prussia is very leisurely, with some birds spending several days in a given locality. However, there are records of flights of 58 and 61 km. in single days and a record of 2,700 km. in 44 days. In general the following rate of migration from East Prussia may be recognizable: 19 days, region of Magdeburg; 22 days, Belgium-Ancona; 40 days, northern France-southeastern France; six weeks, Spain-Algeria.—D. S. F.

4. A Rare Observation of Bird Migration over the North Sea. (Eine seltene Vogelzugbeobachtung ueber der Nordsee.) W. Schwerdtfeger. 1942. *Der Vogelzug*, 13(1/2): 55-57. This is an extremely interesting observation of high-altitude flight by wild geese (species undetermined) made from an aircraft over the North Sea. The altitude was about 2,600 meters and the geese were in three lines of 30 to 40 birds each. The direction of flight was southeast. The observation was made on November 13 while there was a severe storm on the North Sea. There was a dense layer of clouds from 500 to 1,200 meters. Temperatures were as follows: sea level, -5° C.; 1,200 meters, -4° C.; 1,400 meters, 9° C.; 1,800 meters, 8° C.; 2,600 meters, 1° C.; 3,400 meters, -5° C. Wind direction was more favorable at 2,600 meters than at other levels except at the surface, where temperatures were unfavorable.—D. S. F.

5. Investigation of a New Stork Migration Map. (Versuch einer neuen Storchzugarten.) Werner Rüppell. 1942. *Der Vogelzug*, 13(1/2): 35-39. The author presents a new map showing the migration of central European storks based on a thorough survey of the literature and use of the available banding data. The place at which the Sahara Desert is crossed is still conjectural because of the sparsity of records from West Africa. Also the relative use of the two principal routes, (1) via Spain and West Africa and (2) via Turkey, Palestine, and East Africa, is not known. The map attempts to show the relative concentration of migration by varying the concentration of short, fine, straight lines. As the author indicates, it has certain faults, among which is the fact that it does not differentiate between northward and southward migration.—D. S. F.

6. The Homing Ability of Homing Pigeons. (Das Heimfinde-Vermögen der Brieftauben.) Oskar and Kathe Heinroth. 1941. *Journal für Ornithologie*, 89: 213-256. Inexperienced pigeons all return from distances of 15 kilometers, but at greater distances losses increase proportionately. Homing ability in pigeons depends on the sense of sight; in unknown regions they spiral until they find a familiar landmark. Experiments with non-migratory pigeons do not help solve problems of migration.—M. M. NICE.

7. The Terminology of Lapwing Migration. (Zur Terminologie des Kiebitzzuges.) H. Frhr. Geyr von Schweppenburg. 1942. *Der Vogelzug*, 13(1/2): 40-44. The author criticizes the use of "Wegzug" as a designation for the Lapwings' aberrant spring and summer migration away from the breeding area. This migration may begin in May but does not lead to the winter area. The criticism is based on the fact that "Wegzug" has been used synonymously with "Herbstzug" (autumn migration) and should not be employed in the manner used by Kraak, Rinkle, and Hoogerheide (*Ardea*, 29: 151, 1940). According to the author, "Zwischenzug" should be used instead of "Wegzug" of the Dutch authors. The contention is amply supported by citations from the literature.—D. S. F.

PHYSIOLOGY

8. Observations on the Growth of Woodpeckers. (Wachstumbeobachtungen an Spechten.) Ernst Sutter. 1944. *Archives suisses d'Ornithologie*, 2(3): 124-130. This is a comparison of postembryonic growth in the two subfamilies of woodpeckers (Picidae), the wrynecks (Jyninae) and the woodpeckers proper (Picinae). Morphologically the wrynecks are a less specialized group and have a hemispheric index (relative weight of forebrain to weight of brain stem) much lower (6.5) than that of the Picinae (14.6). In the first five days of postembryonic development six species of Picinae attain body weights 6.2 to 9.2 times the body weight at hatching, whereas the Wryneck, *Jynx torquilla* Linn., increases its body weight over the same period by only 5.5 times the weight at hatching. In the case of the Wryneck the extremities attain their full length during the period in the nest. The wings at the time of hatching are relatively smaller when compared to the adult wing than are the legs when compared to adult legs. The breast bone at hatching is still more poorly developed than the wings, grows more slowly, and reaches its definitive length in about eight weeks. The head, excepting the bill, is relatively large at hatching and reaches almost its maximum growth at hatching; the adult size is reached no sooner, however, than the maximum development of the breast bone. The bill is relatively short initially and shows a protracted continuous growth until the tenth week.

In a typical woodpecker, *Dryobates major pinetorum* (Brehm), the extremities attain their maximum lengths in 18 days. The carina of the sternum increases about 20 percent after 22 days, the average departure time from the nest. Its definitive length is attained after about 50 days. Head length and breadth increase only slightly (five percent) after 22 days, attaining maxima at 30-35 days. Bill length increases about 25 percent after 22 days, becoming maximum at 50-60 days. Growth of the bill after leaving the nest is somewhat greater than in the Wryneck. However, increase in body weight after leaving the nest is relatively smaller than in the Wryneck.—D. S. F.

9. Reactions of Young Birds to Atmospheric Humidity. V. E. Shelford and Lenore Martin. 1946. *Journal of Wildlife Management*, 10(1): 66-68. Three pheasant chicks and an unnamed number of domestic fowl chicks (age not recorded) were placed individually in a circular chamber presenting a gradient of humidities from 40 percent to 88 percent R.H. Two of the pheasant chicks, after a preliminary period of adjustment, selected positions where the humidity was estimated to be about 79 percent and remained there with only brief excursions into the wetter and dryer parts of the cage. The behavior of the third pheasant chick is not recorded. Two domestic chicks with "characteristic" behavior avoided the low humidity area but showed less intolerance of high humidities than the pheasants. A correlation is suggested between this humidity selection of pheasant chicks and the climatic conditions of the native home of the species in Asia. Self selection experiments for determining habitat preferences could yield much valuable information on bird ecology, and it is hoped that further observations of the type here described will be forthcoming.—JOHN T. EMLÉN.

10. Weights of Resident and Winter Visitant Song Sparrows in Central Ohio. Margaret M. Nice. 1946. *The Condor*, 48(1): 41-42. A review of 259 weight records of resident and migrant (winter resident) Song Sparrows at Interpont revealed no evidence of weight increase preceding migration such as has been described by Wolfson (*Condor*, 47, 1945:95-127) in California. Records from other localities would be illuminating in explaining these apparently conflicting observations.—JOHN T. EMLÉN.

11. Does the Russet-backed Thrush Have Defective Eyesight? G. Willett. 1945. *The Condor*, 47(5): 216. Attention is called to the fact that a large

proportion of the birds killed by flying against glass windows or doors in southern California migration seasons are Russet-backed Thrushes, *Hylocichla ustulata ustulata* (Nutt.). Bird observers may have noticed the high incidence of such accidents among thrushes of this species in other localities.—JOHN T. EMLÉN.

12. Age Criteria and Condition of Migrating Rough-Legged Hawks. (Altersmerkmale und Zustand durchziehender Raufussbussarde, *Buteo l. lagopus* (Brünnn.)) E. Schüz. 1942. *Der Vogelzug*, 13(1/2): 2-17. These notes are derived from observations on more than one hundred specimens taken during migration in East Prussia. Included are notes on plumage variations, color phases, and molt, illustrated with 18 photographs. The mean weight for 49 adults with wing length less than 432 mm. (mostly males) was 844 grams. For 47 adults with wing lengths more than 432 mm. (mostly females) was 900 grams. The mean weight for 30 birds of the year was 783 grams.—D. S. F.

FOOD HABITS

13. Alternative Methods in Upland Gamebird Food Analysis. A. C. Martin, R. H. Gensch, and C. P. Brown. 1946. *Journal of Wildlife Management*, 10(1): 8-12. The classical method of recording stomach-content data is to give a percentage figure for each item represented in the stomach on the basis of visual estimates of relative bulk. Records for a series are then assembled and an average "aggregate percentage" figure determined. In spite of its obvious shortcomings, this method still remains the best for many types of material where food items are finely divided and pretty well disintegrated. The contents of crops of gamebirds, on the other hand, are recovered in such good condition that the various items may be accurately segregated and measured. Crop contents from a series of birds may accordingly be pooled and an "aggregate volume" measure recorded for the lot. The "aggregate volume" method is well adapted to gamebird studies. Results were found to differ only slightly from those obtained by the aggregate percentage method.—JOHN T. EMLÉN.

BEHAVIOR

14. Willow-Warbler Using Threat-Display to Artificially Produced Cuckoo-Note. Stuart Smith. 1946. *British Birds*, 39: 118. When the author concealed himself under a hawthorne bush and started blowing a Cuckoo call through his hands, a male *Phylloscopus t. trochilus* (Linn.) that had been singing nearby came to the hawthorne with a queer chittering note; when the call continued the bird came within six inches of the author's face, fluffed out the feathers of head and neck, waved his wings and uttered a loud hissing note.—M. M. NICE.

15. Note of Willow-Warbler. Sybil Butlin. 1946. *British Birds*, 39: 215. The note described by Smith has often been heard by the author from Willow-Warblers, "but only when a Cuckoo begins singing in the immediate vicinity." It is "a harsh, squeaky chittering quite unlike any other of the Willow-Warbler's calls with which I am familiar and it is uttered while the bird hops round the Cuckoo at close quarters."—M. M. NICE.

16. "Injury-feigning" of Nuthatch. G. E. Took. 1946. *British Birds*, 39: 117. A female *Sitta europaea affinis* Blyth when flushed from her nest "dropped like a stone" to the ground and ran with "wings spread open and drooping"—apparently the first recorded instance of this behavior among Sittidae.—M. M. NICE.

17. "Injury-feigning" of Nuthatch. H. Bentham. 1946. *British Birds*, 39: 214. When a cat approached a brood of young nuthatches which had recently left the nest, one of the adults "immediately descended to the ground, over which it moved rapidly with drooping, outspread wings."—M. M. NICE.

18. Earlier Singing of Blackbird in Towns. Sylvia Lloyd. 1945. *British Birds*, 38: 216. *Turdus m. merula* Linn. singing in January in London. Earlier singing of birds in cities has been noted by several observers in England and Germany, presumably due to warmth from heated houses. Is this true in this country?—M. M. NICE.

19. [The Function of Territory.] Charles Dupond. 1945. *Le Gerfaut*, 35: 193-194. In commenting on my "Role of Territory in Bird Life," 1941, the editor of *Le Gerfaut* prefers the restriction of the term to the "typical" cases where the territory includes feeding as well as nesting ground. "In my opinion I do not see any other reason for the existence of an instinct to reserve a territory but the question of food, since family affairs proceed sufficiently smoothly among those species that live in colonies and without food territories. The question of food is the great preoccupation among living beings and selfishness is a necessity for the conservation of individuals and species. This fundamental question incurs the greatest danger through over-population; this is at the bottom of the most terrible catastrophes, famines and pestilences in vast regions. It is over-population that is the principal cause of great conflicts, not only with animals, but also with men."—M. M. NICE.

20. Observations on the Behavior of the Carrion Crow to Friend and Foe. (Beobachtungen über das Verhalten der Aaskrähe (*Corvus corone*) zu Freund und Feind.) Gustav Kramer. 1941. *Journal für Ornithologie. Ergänzungsband III, Festschrift Oskar Heinroth*: 105-131. Pairs were still found together on their territories in winter and once with a young bird that begged in December, but was not fed. Tame crows of either sex will greet their master with the female invitation to pairing. The author considers that hawks and owls are known and reacted to innately (p. 116). He describes various experiments, among them the taking of a tame young crow into the territory of breeding pairs and the violent reaction of these adults towards himself who apparently was endangering one of their species.—M. M. NICE.

21. The Parental Devotion of Birds. A. F. Skutch. 1946. *Scientific Monthly*, 62: 364-374. Very interesting accounts of nest defense in Central and North America, with the conclusion that wild creatures appear to be "instinctively aware of the strength and prowess of their hereditary natural enemies and avoid risking their lives in the defense of home or offspring against such enemies as are likely to overcome them." Too great self sacrifice would mean the end of a species. Examples are given of substitute behavior: when nests are threatened by men, Great-tailed Grackles, Brown Jays, Blue Jays and Ravens, will attack boughs or leaves or grass, while Prairie Falcons will strike and even kill other birds in the vicinity. Wasps that do not attempt to defend their brood from a Caracara, nevertheless persist in trying to nest on houses where the whole colony is destroyed by man. This makes one think of Hudson's account of mosquitoes on the pampas; the appearance of a dragonfly would cause them all to disappear, but the crushing of hundreds by Hudson made no impression on them. Similarly a "hereditary natural enemy" such as a man-eating tiger in India will cause desertion of many villages, while the far more dangerous automobile in our country is treated almost with indifference.—M. M. NICE.

22. Courtship Feeding of Linnet. D. D. Harber. 1945. *British Birds*, 38: 211. On Apr. 24, 1944, a number of *Carduelis c. cannabina* (Linn.) were feeding on weed seeds, when suddenly a male flew to a female, alighted a little above her and thrust his bill several times into hers.—M. M. NICE.

23. Herring Gull Feeding Independent Young. R. H. Brown. 1945. *British Birds*, 38: 217-218. Jan. 7, 1940, two *Larus argentatus argentatus* Pont. in

juvenile plumage begged food from an adult, which at first walked away, but when they followed it begging, it disgorged food for them.—M. M. NICE.

24. "Anting" by Starlings. Wm. Baggaley. 1946. *British Birds*, 39: 212. *Sturnus vulgaris vulgaris* L. was often noted in the London Zoo taking a "dust-bath" in a large ants' nest, sinking into it up to the thighs, kicking the ants in all directions, then with its head scooping the ants under its wings.—M. M. NICE.

25. Observations on the Behavior of the Satyr, *Satyrus semele* L. (Ethologische Beobachtungen am Samtfalter, *Satyrus semele* L.) N. Tinbergen. 1941. *Journal für Ornithologie*, 89, *Ergänzungsband III, Oskar Heinroth Festschrift*: 132-144. Courtship of the Satyr, *Eumenis* (= *Satyrus*) *semele* (L.). N. Tinbergen, B. J. D. Meeuse, L. K. Boerema, and W. W. Varossieau. 1942. *Zeitschrift fuer Tierpsychologie*, 5: 182-226. Fine examples of Tinbergen's technique in casual analysis of behavior; the releasing functions of color, form, size, distance, and movement in the courtship of this butterfly, as well as the significance of the scent areas on the male's wings, were investigated by means of controlled experiments with models, painting the subjects, etc. Comparisons are made with observations on other insects, with Lorenz's (1927) Jackdaws and Koehler's and Zagarus's (1937) Ringed Plover.—M. M. NICE.

26. Use of Social Roost by Birds, especially by the Chaffinch and the Brambling. (Sociale roestgewoonten bij vogels, inzonderheid bij Vink (*Fringilla coelebs* L.) en Keep (*Fringilla montifringilla* L.)) D. A. Vleugel. 1941. *Ardea*, 30(1/2): 89-106. This paper is based on the observations of the sleeping place of a group of Chaffinches and a small number of Bramblings during two winters (1933-4 and 1934-5) from December to March. This sleeping place was southeast of Nijmegen on the edge of the Ooyolder. It consisted of scattered groups of rhododendron and conifers. Arrival at the sleeping place and departure therefrom is in close relation with the time of sunset and sunrise and changes accordingly with the change in length of day. In the evening in February the birds arrived before sunset, the majority coming between 35 and 60 minutes before sunset. In the morning most left after sunrise, the majority leaving between sunrise and twenty minutes thereafter. The spread of arrival times in the evening and of departure times in the morning increased in spring as compared with winter. In December arrival occurred both before and after sunset but from January to March it occurred only before sunset. This is the opposite of the situation in the case of the Blackbird, *Turdus merula* L. Because of changes in arrival and departure times which can be correlated with variations in light the author believes that a certain light intensity is the stimulus for flight to the sleeping place in the evening and flight away from the sleeping place in the morning. Arrival and departure times can also be influenced by meteorologic factors.—D. S. F.

LIFE HISTORY

27. A Contribution to the Breeding Biology of the Gray Woodpecker. (Beitrag zur Kenntnis der Brutbiologie des Grauspechts (*Picus c. canus* Gm.)) Joseph Bussmann. 1944. *Archives suisses d'Ornithologie*, 2(3): 105-123. This paper is based on observations of a nest in an apple tree in the Lake Lucerne Valley. The entrance to the nesting cavity was two meters from the ground; the entrance hole was 5.3 by 5.5 cm. In the preparation of the nest cavity the majority of the work was done by the male. Contrary to other reports in the literature this pair was not shy. They were not disturbed by the cutting of the grass around the tree nor did they abandon the nest when the author removed the terminal portion of the branch containing the nest cavity in order to allow direct observation of the nest and young. On 30 May the nest contained seven eggs "which must have been laid in the period from May 20 to 26." Incubation was performed by

the male from evening to morning and for a period at midday. The female incubated a maximum of seven hours per day divided into morning and afternoon periods. The incubation period was calculated to be 18 days. The young were fed at first by both parents. The food consisted exclusively of ant pupae. On the first day there were nine feedings; the maximum feeding per day was 26 on the seventeenth day. At the time of departure from the nest, feeding had dropped to 15 per day. Until the ninth day the young were brooded by the parent after each feeding. After the ninth day they were warmed only at night and after the fifteenth day not at all. The young reached adult weight 17 days after hatching. Adult head measurements were not attained until the twenty-fifth day. Adult bill length was not attained until after 30 days. Adult wing and leg measurements were reached before 25 days. After leaving the nest the family remained in the neighborhood for ten days. After 16 days they were no longer to be found.—D. S. F.

28. A Study of Captive Galapagos Finches of the Genus *Geospiza*. Robert T. Orr. 1945. *The Condor*, 47(5): 177-201. A collection of thirty live birds representing four species of Galapagos finches of the Genus *Geospiza* were donated to the California Academy of Sciences by David Lack on his return from the islands in 1939. The four species are practically identical in plumage and in behavior but differ markedly in the form of the bill and in body size. Except during the first year, survival in the cages was good and reproduction successful.

Observations on behavior agree quite closely with those made in the field by Lack (*Occas. Papers*, 21, Calif. Acad. Sci.). The breeding season, however, was shifted from winter and early spring, the rainy season on the Islands, to spring and summer, with some nesting activity during every month of the year. Males, regardless of species, were generally incompatible during the period of breeding activity, but inter-specific conflicts were less frequent than intra-specific conflicts. Males generally became sexually active before females and assumed the aggressive role in pair formation chasing the females around the cages. In instances where the female showed sexual behavior before the male, the aggressor role was reversed. Some males were so aggressive towards their mates that it was necessary to separate them to avert injury to the female.

Courtship display by the male involved song, posturing, feeding and the carrying of nesting material. It was most pronounced during the nest-building period. A distinction between aggressive and sexual behavior and a reciprocal swaying display not noticed by Lack are described. Experiments with stuffed specimens of various birds indicated little discrimination of species in display and copulation behavior, probably less than that detected by Lack in the field.

No specific distinctness of song could be detected among the four species under study. This close similarity of song, it is conjectured, might have value in discouraging the overlapping of nesting territories among these specifically distinct but none-the-less highly competitive birds.

False nests were frequently built by males before the female became sexually active. The final nest, however, was built almost entirely by the female. Three eggs were usually laid and incubated from 11 to 14 days (average 12.3). Frequency of laying varied considerably; one female produced ten clutches totalling 31 eggs in eight consecutive months. Only 48 of 117 eggs were fertile, a condition which apparently applies also in the field, and which, it is suggested, may be correlated with the scarcity of native predators on the Islands.

The male assumed the major role in feeding the young, but, unlike conditions in the wild, was assisted to a limited extent by the female in feeding fledglings. Young left the nest on the thirteenth or fourteenth day.

Plumage patterns and sequences were very similar in all the species studied. Males became progressively darker with successive molts but generally did not attain the full black plumage until the fourth year. The author believes that this delayed acquisition of the black plumage may also apply under field conditions and may explain the large numbers of brown-plumaged males reported. Geographic

variation in the proportion of brown and black males, he thinks, may be simply a matter of segregation of age groups.

A few experiments with injected sex hormones indicated a feminizing response of male plumage to estrogens and an absence of plumage response to androgen. These results are not surprising in the light of other work on endocrine control of plumage in birds. It hardly seems likely that the proposed experiment of hastening the acquisition of the black plumage by androgen injections would have been successful.

The color of the bill changes with the seasons under natural conditions from black in the breeding season to pinkish-yellow during the remainder of the year. The captive birds for the most part retained the black bill coloration throughout the year, a feature which was probably correlated with the more continuous breeding activity. Black bills were associated with sexual activity and pale bills with non-activity. No mention is made of the effect of androgen on bill coloration.

Despite the practical absence of predators on the Galapagos, captive geospizids gave a definite fear reaction to mounted specimens of various North American hawks, a vulture, and a raven.

This paper amply demonstrates the value of intensive studies of captive birds in interpreting the behavior of species in the wild. It merits close study by all students of bird behavior.—JOHN T. EMLÉN.

29. Breeding Habits of Megapodes on Simbo, Central Solomon Islands. Charles G. Sibley. 1946. *The Condor*, 48(2): 92-93. Megapodes, widely known for their peculiar habit of entrusting the incubation of their eggs to the heat produced in mounds of decaying vegetation or in warm sand, were observed in a particularly interesting role on a small island in the central Solomons. A group of active nesting burrows of the native species, *Megapodius freycinet eremita* Hartl. was discovered in the heated earth of a small volcanic hill. At least 200 burrows were present in an area of 5000 square yards, 40 of them in a measured plot 100 by 50 feet. According to report, no comparable nesting activity occurred on the other hills of the island which differed from the nesting hill only in lacking volcanically heated slopes.—JOHN T. EMLÉN.

30. Courtship and Breeding in the Lapwing. (Beobachtungen über Balz und Brut beim Kiebitz (*Vanellus vanellus* L.)). Brunhilde Laven. 1941. *Journal für Ornithologie*, 89, *Ergänzungsband III, Oskar Heinroth Festschrift*: 1-64. An excellent study. Male Lapwings arrived first on the Kurische Nehrung and defended territories by fights in the air and spectacular courtship flights. Many males inclined to polygamy and territories were not sharply defined. The female took complete charge of incubation at first, but later the male helped more and more in the first attempts, but seemed to take no interest in later attempts. Incubation was watched for 123 hours; almost half the time the eggs were uncovered (partly due to disturbance by the watcher entering the blind); the male incubated one third as much as his mate during daylight hours. Incubation lasted 25-31 days. The female cared for the young, while her mate stands guard; she brooded them at night for 16 days and during the day for 5 or 6 days or longer in bad weather. Members of one brood were able to fly at 33 days. In 1938 the 11 pairs (some of which laid four sets) hatched no young, due largely to crows and foxes; in 1939 15.5 percent of the eggs hatched and 10.2 percent fledged. A female banded when a few days old was found nesting the following spring 200 meters from her birth place. The bond between the Lapwing pair is much more loose than in the Ringed Plover, *Charadrius hiaticula* Linn.—M. M. NICE.

31. The Nest Life of the Fieldfare in the Rominter Heide. (Ueber das Brutleben der Wacholderdrossel, *Turdus pilaris*, im Gebiet der Rominter Heide.) Otto Steinfatt. 1941. *Journal für Ornithologie*, 89:204-212. This large and aggressive thrush with its harsh *tschack-tschack* note was seldom heard to give anything like a song. They nest singly or in small groups in orchards, building

sturdy nests and driving off jays and woodpeckers, as well as a tame Raven, but neighboring males seldom quarrel. Two broods are raised, five to six eggs being laid in a set. Four all day observations were made. On the fifth day of incubation, April 24, stormy weather, the female left sixteen times, her periods on the nest ranging from seven to 145 minutes and averaging 49; her periods off ranging from three to eleven minutes, averaging seven minutes; she incubated 87.5 percent of the 13 hour and 52 minute day. Two days later on a cold and quiet day she left 18 times, her periods on ranging from one to 156 minutes, averaging 50; her periods off ranged from one to nine minutes, averaging five; she incubated 90.6 percent of the 13 hour and 47 minute day. The male is a zealous defender of the nest and at times calls the female off. Another nest was watched on June 21 and 26, the young (number not given) having hatched the 13th and 14th. Both parents fed about equally. During 16 hours and 35 minutes of feeding on the 21st 76 meals were brought, or 4.5 an hour, while excreta was carried off eleven times; during the 16 hours and 45 minutes of the 26th, 144 meals were brought (8.5 times an hour) and excreta removed 74 times. The young leave at 12 to 14 days, before they are able to fly.—M. M. NICE.

32. The Nesting Biology of the Osprey. (Zur Brutbiologie des Fischadlers (*Pandion h. haliaëtus* (L.)). Horst Siewert. 1941. *Journal für Ornithologie, Ergänzungsband III, Oskar Heinroth Festschrift*: 145-193. A fine study with superb photographs. Throughout the nesting the female stays by the nest, while the male provides for her and later for the young. Both parents build and defend the nest; both incubate, the female doing the greater part. Incubation lasts 38 days, 10 days longer than reported by Bent (1937). The male brought an average of three fish per day during building, two per day during incubation, and five during care of the young. The female brought nesting material until the young were six weeks old. They left at 51, 52 and 53 days, but returned to the nest for several days for meals and sleeping. Two all day watches were kept and detailed descriptions given of behavior. The parents showed greatest enmity towards a visitor of their own species. There is a bibliography of eighteen titles.—M. M. NICE.

33. Further Notes on the Breeding of Blue Tits. N. D. Pullen. 1946. *British Birds*, 39: 162-167. Very interesting results obtained at a nest fitted with "an electric recorder," which is not described in detail. Incubation lasted 13½ days, fledging 20. The female did all the "effective building," but the male made frequent visits to the hole, pecking vigorously around inside. "The hen entered the box for the first time on April 16th when the nest was complete (1st egg, 17th)." All eleven eggs were laid before 6 a.m.; about two hours later the hen returned "to cover them with feather or fluffy material brought for this purpose." Incubation was by the hen. "Taken over the whole period, the average 'on' was 15 minutes and the average 'off' 5 minutes; the maximum 'on' recorded being 37 minutes and the maximum 'off' 14 minutes." We are not told how many times a day she left the nest. The cock was not seen near the nest during the period of egg laying, but as soon as incubation started he brought food to the hen, usually coming within a minute or two of her return. "By about the fifth day feeds on the nest had almost ceased, being replaced by a call to feed on a neighboring tree." Towards the end of the period the cock was seldom seen.

"On May 12th, when the hatch was complete and the first youngster 48 hours old, the feeds throughout the day averaged 25 per hour. Within two days this rate had risen to 35 per hour, at which figure it remained for the next week—that is, until the end of the blind period. It then rose to about 45, which was the highest average obtained." The highest rates usually came in the middle of the morning. The rates this year with eleven young were no higher than those of the previous year with eight young, but fairly large grubs and caterpillars seemed to be brought more frequently the second year. Hourly figures are given for four days, the time of the first and last feedings, etc.; it is a pity that records of the whole feeding period are not included. Total feeds for the 3rd day were 396, for

the 8th day 454, the 15th day 649, the 17th day 601, the hourly averages being 25, 30, 42 and 41 respectively.—M. M. NICE.

34. Clutch and Brood Size in the Robin. David Lack. 1946. *British Birds*, 39: 98-109; 130-135. A cooperative study on *Erithacus rubecula* (Linn.), carried through with the help of a large number of collaborators and a thorough coverage of the literature. Breeding starts earlier in the south than in the north and in the west than in center of Europe, 3-4 weeks earlier in England than in central Europe (although the day length is the same); it continues later on the continent than in England, July nests being very uncommon in the latter region but regular for second broods in Germany. "The Robin feeds its young primarily on caterpillars, and, in England at least, the breeding-season coincides with the caterpillar harvest," (p. 101). A few winter attempts have occurred in exceptionally mild seasons, but only 3 of 20 were successful. In England and Wales clutch size increases from early March until early June, then declines. There is some evidence of larger clutches in fine weather and smaller ones in cold weather. Average clutch size ranges from 6.3 in Scandinavia, 5.9 in central Europe, 5 in England and Wales (1,091 field records), 4.9 in Spain and Portugal, and 4.2 in North Africa to 3.5 in the Canary Islands; thus "clutch-size tends to increase with increasing daylength, since with a longer day the parents can usually bring more food to the nest per day, and so can raise more young at one time" (p. 108).

Of 1936 eggs found in England and Wales 1,216 hatched (73%), and 57% of the eggs were fledged. The robin is intermediate between a typical open nester (about 43 percent success) and typical hole-nester (about 66 percent), "as might be expected since it nests in a covered niche" (p. 130). Usually two broods are raised; 19 pairs averaged 4.6 fledged young. A valuable paper which should stimulate similar studies with common species in other countries.—M. M. NICE.

35. Notes on the Territory and Breeding Behaviour of the Blackcap and Garden Warbler. R. J. Raines. 1945. *British Birds*, 38: 202-204. The size of three territories of *Sylvia a. atricapilla* (Linn.) were 900, 960 and 1,140 sq. yds.; of *Sylvia borin* (Bodd.) 720, 1,024 and 1,180. Neither tolerated the other species in its territory. Males that set up territories, but failed to get mates after a week or more moved on. Cock's nests—platforms of dry grasses—were constructed by each species before the arrival of mates. When a female first came to a singing male, he would display, then fly down to the nest site, where he sang the normal song, while the female followed him and was left at the nest site while he returned to his song post and sang a long version of the normal song. One female Garden Warbler examined the nest, fidgeted with the material, then brought a straw and laid it on the nest, this act apparently signifying acceptance; the next day she made a considerable addition. A female Blackcap was seen to deposit a straw in a bed of nettles and here both birds constructed a nest; apparently there had been no cock nests. Another female Blackcap was shown two cock nests by the male, but she left the territory, and the male, unable to get a mate, left two weeks later. The female does most of the work of completing the nest, the male, in the meantime, decreasing the size of his territory.—M. M. NICE.

36. Feeding of Blue Tit Nestlings. N. D. Pullen. 1945. *British Birds*, 38: 205-210. A brood of 8 *Parus caeruleus obscurus* Prazak were watched in a box with a glass back covered with a wedge-shaped hood with an observation slit at the end. During the "blind period" 5 or 6 mouths opened at the slight tapping noise made by the arrival of the parent, or at the author's imitation of this sound; after the opening of the eyes on the 11th day the chicks hid in the bottom of the nest at a tapping sound and did not gape until the parent entered. Only one ration was brought per visit; "the hunger cycle was completed in about ten minutes." Three sample periods from 30 to 105 minutes showed visits from the parents ranging from once every minute to once every 1.6 minutes. Of 137 feedings 102 were accepted by the first chick to which they were offered, 26 by the second, 7 by the third, and 2 by the fourth. By marking one chick and by means of sta-

tistical analysis the author concludes that feeding is not random, but selective, "the selection depending on a sign exhibited by the nestlings." The young flew at the age of 18 and 19 days.—M. M. NICE.

37. California Jays, Their Storage and Recovery of Food, and Observations at one Nest. Harold Michener and Josephine R. Michener. 1945. *The Condor*, 47(5): 206-210. Two California Jays, *Aphelocoma californica* (Vig.), were watched as they thrust or hammered walnuts and other objects of food into loose ground, then covered them with dirt, stones or leaves. Many of the cached nuts were recovered; a number of observations strongly suggest that the birds knew where at least some were hidden. Nuts were opened at suitable "anvils" where they could be held securely and hammered on the line of cleavage. Fragments of kernels, scattered on the ground around these "anvils," were utilized by other species of birds. After an unsuccessful start at nest-building in early March the birds built a nest in mid-April. The male of the pair became destructive to other local nesting birds in early May and was trapped and removed. The female continued feeding the young for several days until a new bird, thought to be a male, appeared in the territory. Nesting was then discontinued and the young destroyed, supposedly by the intruder. No further nesting activity was noted in the area.—JOHN T. EMLÉN.

38. The Breeding and Feeding Biology of the Red-backed Shrike. (Zur Brut- und Ernährungsbiologie des Neuntöters (*Lanius collurio*.) Theo Shreuers. 1941. *Journal für Ornithologie*, 89:182-203. A spectacular pre-coital flight around the female is described in which the red of the male's back, the black of his cheeks and black and white of his undertail coverts are strikingly displayed and during which he gives a cry like that of young birds. Both birds carry material for the bulky nest, but the female is the chief architect. While working on the foundation or middle part of the nest, the birds are extraordinarily susceptible to colored rags and strings, particularly white and after that red, gray, brown and blue, but never green; they came from 80 to 150 meters to collect such material. During three years pairs from some 50 territories used these materials that made the nests less secure and much more conspicuous than nests of native stuff. First sets consisted of 5 to 6 eggs, second sets averaged 4.5. The female incubates and is fed by her mate. Both feed the young, although in some cases the female spends most of her time standing guard. Many details are given as to the larders that consist of mice, shrews, lizards, frogs, insects and birds. Small prey is caught and carried in the beak, large prey also in the claws.—M. M. NICE.

39. Observations on the Neusiedlersee and in the Salzlachen Region. (Beobachtungen am Neusiedlersee und in dem Gebiet der Salzlachen.) Friedrich Goethe. 1941. *Journal für Ornithologie*, 89: 268-281. Interesting observations while making sound film on this lake near Vienna. Sounds are deadened in the reeds, the men not being able to hear each other's movements at 20 to 30 meters; it is natural that the voices of birds inhabiting the marsh should be loud and penetrating. Hand-raised Bearded Tits, *Panurus biarmicus biarmicus* (Linn.), in a cage in the boat were excited by the calls of their free companions that came right up to the boat; these birds are very fond of bathing and practice social preening. In connection with the courtship flights of the Turtle Dove, *Streptopelia turtur turtur* (Linn.), the author emphasizes the striking appearance of the tail with its dark and white feathers against the sky and points out analogies with our use of flags. The Marsh Harrier, *Circus aeruginosus* (Linn.), and Hooded Crows, *Corvus cornix* Linn., carried off many of the strikingly-colored young of the White Egrets, *Egretta a. alba* (Linn.), from their isolated nests. A hand-raised Bittern, *Botaurus stellaris stellaris* (Linn.), taken everywhere in the boat, was devoted to its masters, but went into the threat display at the approach of a small

boy who quickly fled! One day instead of frogs the bird was given a snake, of which it was much afraid. Dr. Goethe believes that "Fear and disgust in face of snake-like movement is certainly somewhat instinctive in man;" with this, from experiences in my childhood and with my own children, I cannot agree.—M. M. NICE.

40. All the Year Breeding of the Rock Dove. John Lees. 1946. *British Birds*, 39: 136-141. Wild Rock-Doves, *Columbia livia livia* Linn., were found nesting throughout the year in inaccessible caves by the sea. "Nesting usually takes place simultaneously by small groups of pairs (2-10) occupying adjacent sites in one cave." Most hatchings take place in April, August, November and January. Incubation lasted 18 days, fledging 35-37 days. Only one feral domestic dove was found and it fell a victim to a Sparrow-Hawk, *Accipiter nisus* (Linn.). The birds were very sensitive to disturbance; when a Rook's egg was placed in a nest in one cave and a nest torn down in another, all Doves left these two caves for some months.—M. M. NICE.

41. The Biology of the European Squid. (Zur Biologie von *Loligo vulgaris* Lam.) L. Tinbergen and J. Verwey. 1945. *Archives Néerlandaises de Zoologie*, 7: 213-286. Although concerned primarily with the growth, reproduction and migration of the common squid, based on a nine-year study of 12,000 specimens taken near Den Helder, comparisons are made with birds, mammals and fishes and valuable summaries given. First-year females start to lay later (p. 225) and lay fewer eggs than older females (p. 239); the North Sea population is migratory, that of the Mediterranean sedentary (p. 274); males arrive earlier than females (and here is an excellent discussion and table correlating earlier and simultaneous arrival of the sexes in various bird species with their territorious and sociogamous [Makkink, 1942] type of mating, p. 229); older squids arrive earlier than younger ones (p. 225); the timing of migration depends on both temperature and day length (pp. 247-248).—M. M. NICE.

CONSERVATION

42. War and the Birds of Midway Atoll. Harvey I. Fisher and Paul H. Baldwin. 1946. *The Condor*, 48(1): 3-15. A survey of the birds of Midway Atoll was made in the spring of 1945 in an attempt to evaluate the effects of war disturbances. Estimates of bird numbers are given together with brief descriptions of census methods. Lack of quantitative data in published reports prevented anything but general comparisons with earlier conditions. Three species, the Brown Booby, *Sula leucogaster plotus* (Forst.); the Laysan Rail, *Porzana palmeri* (Frohawk); and the Laysan Finch, *Telespiza cantans* Scott Wilson, had disappeared entirely, several species had decreased to small remnants, and most of the nesting sea birds had been materially reduced. The principal factors in this reduction were destruction of nesting grounds by military installations and improvements, killing of birds by airplanes, motor traffic and miscellaneous operations, disturbances caused by workmen, equipment and curious observers, and destruction of nests by introduced rats and dogs. Suggestions are made for curtailment further destruction of bird faunas on militarily occupied islands.

The story of bird destruction on Pacific islands during the war emphasizes the importance of quantitative measures of bird populations in faunal surveys. The present paper constitutes a valuable record of conditions on Midway in the spring of 1945. It would have been desirable, in the reviewer's opinion, to have included more detailed accounts of distribution and density, using maps and tables, as a basis for comparison in future surveys.—JOHN T. EMLEN.

43. The Status of the Whooping Crane on the Aransas Refuge, Texas. Earl Craven. 1946. *The Condor*, 48(1): 37-39. From 14 to 26 Whooping Cranes

have visited the Aransas Wildlife Refuge in Texas each year since its acquisition by the Fish and Wildlife Service in 1937. The birds usually arrive in October and remain into April or early May; three birds remained over summer in 1941. Contrary to some early reports of congregations, the birds remain in isolated pairs or family groups (two adults and one young), widely spaced over many square miles of coastal flats.—JOHN T. EMLEN.

GEOGRAPHIC DISTRIBUTION

44. The Starling Arrives in Oregon. Charles W. Quaintance. 1946. *The Condor*, 48(2): 95. A specimen of the European starling, *Sturnus vulgaris* L., collected at Cove, Union County, Oregon, together with recent records from southeastern Washington and northeastern California, suggest that it will not be long before this adaptable species completes its march across the continent to the Pacific coast.—JOHN T. EMLEN.

45. The Avifauna of Noesa Penida near Bali Based on a Collection by Baron Viktor von Plessen. (Ueber die Vogelwelt von Noesa Penida bei Bali nach einer Sammlung von Baron Viktor von Plessen.) Wilhelm Meise. 1941. *Journal für Ornithologie*, 89(4): 345-367. The small island, Noesa Penida, is of considerable zoogeographic interest because of its position in the Lombok Strait. Lombok Strait, separating Bali on the west from Lombok on the east, marks the westward limit of certain Australo-Papuan species and the eastward limit of many Indo-Malayan forms. The "sharp faunistic boundary" between Bali and Lombok forms a part of Wallace's line. Noesa Penida is nine kilometers from Bali and twenty-one kilometers from Lombok. It lies on a narrow elevation which extends from Bali to Lombok; in the Badoeng Strait (between Noesa Penida and Bali) this elevation is no more than 210 meters from the surface; in the Lombok Strait (between Noesa Penida and Lombok) it is 220 meters. The dimensions of the island are 20.7 kilometers by 16.5 kilometers. The greatest elevation is 529 meters. It is heavily populated and there is considerable rice culture and other agriculture. The collection on which this paper is based was made between February 21 and March 12, 1938. It was the first since that of Stresemann's expedition to Bali in 1911. The collection consists of 177 specimens belonging to 51 species and subspecies. An analysis of the breeding avifauna of Noesa Penida indicates that for 100 western (Indo-Malayan) genera, species and races on this island there are respectively 60, 56, and 70 of eastern (Australo-Papuan) origin. A comparison with the situation on Bali and Lombok shows that "Penida is absolutely richer and relatively much richer in eastern (Australo-Papuan specifically Celebo-Floresian) elements than Bali and relatively richer thereby than Lombok." From this it is concluded that at the time of colonization from the east, which occurred in early Pleistocene or earlier, Noesa Penida must have been connected with Lombok and not with Bali, and that the closer relation to Bali occurred about the time of the lower sea levels of the Pleistocene. "The great line of division in the Soenda Archipelago passed originally *not through the Lombok Strait from north to south, but rather in the southern part, westward*, so that Penida lay east of this cleavage and the Badoeng Strait became the continuation of the Lombok Strait and thereby the boundary between the Asian-Malayan insular region and the Indo-Australian intermediate region."—D. S. F.

PARASITOLOGY AND DISEASE

46. Problems of Mallophaga Investigation. (Problem der Mallophagenforschung.) Wolfdietrich Eichler. 1946. *Die Voegel der Heimat*, 16(9): 205-217. This is an excellent and most interesting review paper. The emphasis is placed

on those species of Mallophaga which parasitize birds. It contains many interesting bits of information not generally known to ornithologists. Many of the Mallophaga are bloodsuckers and as such are potential transmitters of disease. This phase of Mallophaga research has been poorly exploited. For example, the filariasis of one of the African swifts is transmitted by a species of Mallophaga. Many Mallophaga have interesting peculiarities in their life histories and habits. Species of the genus *Piagetiella* occur not only in the customary habitat among the feathers of pelicans and cormorants but also are found in the anterior part of the digestive tract where they suck blood from the mucosa. They have special adaptations of the tracheae for this aquatic existence. In general, Mallophaga are highly host specific and it is safe to assume that there is at least one species per species of birds, perhaps considerably more. Therefore it can be said that only about 2,100 species of at least 10,000 species have been described. Among some of the rarer species parthenogenesis occurs. Species of the genus *Meinertzhageniella* are ovoviviparous. Predators sometimes acquire temporary infestations by the parasites of their prey. Sometimes these give clues to unusual food habits. According to the Fahrenheit Rule there is a parallelism of evolution between host and parasites so that closely related parasites are regarded as an indication of close relation of the respective hosts. The author cites some interesting suggestions concerning the systematics of birds based on the relations of Mallophaga. For example, he believes that the present separation of the ratite and carinate birds is not justifiable nor is the division of Recent Birds into Palaeognathae and Neognathae. He suggests also that the tropic birds are more properly placed near or in the Order Charadriiformes. The Family Anatidae is not a homogeneous group but consists of two markedly distinct groups, the ducks and the geese and swans. It is suggested also that the hawks and owls are more closely related than commonly assumed and that humming birds are more closely related to passerine birds than they are to the swifts. A very stimulating paper.—D. S. F.

47. The Relationships between Parasitology and Ornithology. (Ueber die Beziehungen zwischen Parasitologie und Ornithologie.) Lothar Szidat. 1942. *Der Vogelzug*, 13(1): 17-39. This paper begins with a review of the literature of avian parasitology with emphasis on the German helminthological literature. Despite the large amount of research in this field in Germany, Niethammer's *Handbuch der deutschen Vogelkunde*, which contains lists of the known parasites of each species, shows that for many species, passerine in particular, no parasites whatsoever have been recorded. In other parts of the world, the parasites of birds are in general more incompletely known. Application of more modern techniques is revealing subspecific and specific differentiation according to hosts that were heretofore undetected.

The author forcibly brands the present systematics of parasitic groups as worthless in showing the true fundamental relationships. Parasitism of a species of bird by a species of parasites does not just happen; it is the result of the development of a great number of fine relations between host and parasite. Host specificity very probably can be correlated with the development of the specific nature of the proteins of the individual bird; hence, young birds in which the proteins have not reached their specific differentiation, often have parasites not characteristic of the species. Many species of parasites have probably followed the development of modern vertebrates through classes, orders, families, etc. The degree of specialization of the parasites is usually an indicator of the age of the host species. The degree of relation of the parasites of host species is actually an indication of the degree of relationship of the hosts. Hence the study of avian parasites can contribute to avian systematics. The author cites the evidence from the Mallophaga supporting the relationship of the flamingoes to the ducks and geese, a relation that has since been substantiated by morphologic evidence. The author's own data on the parasites of storks and herons indicate that they should not be placed in the same order and that the herons have a closer relationship to the Falconiformes.

The parasites of the storks, on the other hand, show no relationships to those of the falconiform birds.

Investigations on parasites of birds may also give information on the primitive home or dispersal center of species of birds. The author's data cause him to conclude that the center of origin and dispersal of storks was in the swamp regions of Africa, whereas the herons, whose parasites have no relationship to those of the storks, have an origin and distribution center which "may be sought in the swamp regions of South America." Study of the cestodes and trematodes of birds can give information on food habits when the intermediate hosts of these parasites are known.

Avian parasitology has made useful contributions to medicine. Avian malaria has been used in testing and developing antimalarial drugs. Schistosome trematodes of birds have contributed to the understanding and treatment of the human schistosomiasis. Also certain diseases of birds, such as psittacosis, may also be human diseases. The relation of avian hosts to human schistosome dermatitis is also cited.

The probable role of parasites in maintaining a control of numbers of species is described as well as the more catastrophic destruction of large numbers of individuals by parasites. Parasitic infections may have contributed to the decline and extinction of species. Several examples of the effect of parasitism on the numbers of an avian species are given. It is suggested that the rapid spread of the Starling and English Sparrow in North America, as well as the similar success of certain European species in New Zealand, may be due to the absence of the normal control by parasites.

This is an interesting and stimulating paper. It suggests many interesting channels of research that American ornithologists might well consider, for of all of the fields of ornithology, parasitology of birds has certainly received the least attention.—D. S. F.

48. Duck Disease at Tulare Lake. Donald D. McLean. 1946. *California Fish and Game*, 32(2): 71-80. Spring floods inundated large areas of the hot, arid Tulare Lake basin of California in 1938, creating ideal culture conditions for *Clostridium botulinum* type C, the organism responsible for "duck disease." Severe outbreaks of the disease occurred during the late summer and early fall duck flights from 1938 through 1941, reaching a peak in 1941 when the loss was estimated at 250,000 ducks. Improved methods for handling the water are considered responsible for the marked improvement in conditions after 1941. Rescue crews captured and treated 14,000 sick birds and succeeded in curing and releasing 12,271 of them. The great majority of these were banded.—JOHN T. EMLÉN.

BOOKS

49. A Laboratory and Field Manual of Ornithology. Olin Sewell Pettingill, Jr. 1946. v + 248 pp. Burgess Publishing Company, 426 Sixth Street, Minneapolis 15, Minnesota. \$3.50. This manual is the result of an extensive revision of the earlier edition which was published in 1939 and partially revised in 1941. It is based on the author's experience in teaching ornithology and directing ornithological research at Carleton and the University of Michigan Biological Station. The manual contains 18 sections and seven appendices. According to the author the first ten sections are used for an elementary one-semester course. These sections deal with topography, feathers and feather tracts, internal anatomy, classification and nomenclature, external structural characters, laboratory identifications, plumages and plumage coloration, distribution and migration, field identification, and bird ecology. The last eight sections are designed for an advanced course and deal with bird communities, bird territory, mating, nests and nest building, eggs, egg laying and incubation, young and their development, parental care, and populations. The sections vary in organization from

brief outlines to more extensive treatises. The illustrations by Walter J. Breckenridge are an invaluable asset.

In the preface the author states that "During the weeks prior to spring migration, class work is devoted to laboratory studies and lectures. . . . From the beginning of spring migration to the close of the semester, class work centers on the recognition and study of birds in the field and the identification of skins representing the species observed." In the reviewer's experience it seems much more advisable to begin field work before the spring migration. This provides a better opportunity to develop field methods and above all to develop the habit of making extensive observations on a single species or even on a single bird. Too many students are instilled with the philosophy that the important objective is a lengthy list rather than complete and accurate observations on individual species.

The sections on topography (including osteology of the appendages) and feathers and feather tracts are well done and should prove useful as laboratory exercises. The section on internal anatomy should also be useful in teaching, although it contains detail perhaps a bit beyond that which can ordinarily be given in an elementary course and omits any reference whatsoever to physiology. Constant comparisons with human anatomy can perhaps be defended as a mnemonic device. The table of classification in the section on classification and nomenclature lists all of the orders but gives only North American families. The student is asked to know the families and orders and their sequence, which seems to be a bit of overemphasis in an elementary course. The section on external structural characters is perhaps the best in the manual. It demonstrates well by descriptions and illustrations the variations in feet, bills, plumage, wings, etc., and introduces the student to the accepted terminology. The section on laboratory identification contains keys to the orders and families of North American birds. The section dealing with plumages and coloration is excellent, the discussions of molts and color being well adapted for student use. The chart showing plumage sequences for six American species should be most useful as a teaching device.

The treatise on bird distribution follows that of Pitelka (1941). It is confined to regional and seasonal distribution. No attempt is made to show how it fits into the world-wide distribution of birds. Nothing is said concerning the dynamics of bird distribution in response to climatic and cultural changes. The life-zone concepts of Merriam are not discussed despite their extensive usage especially in the western United States. However, Merriam's papers are listed in the bibliography. The classification of the migration of North American birds into five "migration routes" may be useful for teaching purposes, although much care must be exercised to prevent the concept from becoming completely misleading.

The suggestions for field identification and note taking are excellent, although it would seem to be good pedagogy to begin field work before spring migration in order to allow the student to learn the suggested methods rather than to attempt to acquire them during the abundance of spring migration as suggested by the author.

In the section on avian ecology the author has followed Kendeigh (1934) in outlining the factors in a bird's environment. This gives the elementary student a satisfactory glimpse into this complex field. The section on bird communities appears to present an adequate introduction to the field for advanced students. The material on bird territory is adapted from Nice (1941). The section on mating contains a reasonably satisfactory classification of mating behavior. The detailed outline for the study of nests seems somewhat out of place in view of the lesser detail involved in other sections and even more so in view of fields omitted completely. The section dealing with eggs, egg laying, and incubation is elaborate but rightfully points out the inadequacy of information on incubation periods. It fails to indicate the very desirable approach of *experimental incubation* under *controlled conditions* which would give interesting and reliable comparative data. The section dealing with young and their development is one of the best in the manual although it fails to familiarize the student with the extensive European

literature in this field and mentions little of the interesting physiological information now available in this field. The section on parental care follows the classical pattern with no reference to the extensive Dutch and German literature in this field. The section on bird populations is one of the best, although it does not introduce the concepts of age groups and population turnover. The exercises, however, are well chosen for a one-semester course.

Appendix A deals with standard field methods including photography, weights, and measurements. It contains nothing on the significance, presentation, and statistical treatment of quantitative data, a field in which difficulties are frequent in ornithological investigations and publications. Appendix D is a bibliography and life history which omits all of the European classics except a few written in English because "space limits the bibliography primarily to American birds." It includes a considerable number of unpublished Cornell University theses. Appendices E and G are useful lists of state works on birds and North American ornithological journals respectively. The latter would have been many times more valuable had foreign journals been included.

Within the limits of the classical American concept of ornithology this is a well-conceived and prepared manual with considerable emphasis on systematics, field identifications, morphology, and life history. It takes a stride forward in its sections on ecology and bird populations. Of considerable concern to the reviewer is its extreme isolationism. It seems inconceivable, for example, that a chapter could be prepared on avian ecology with no reference to the brilliant investigations of Palmgren and other Finnish ecologists. Likewise, in no place is the general reference value of Stresemann's *Aves* in Kükenthal and Krumbach, *Handbuch der Zoologie* indicated. It is cited only once and then incorrectly! The paucity or complete lack of reference to *Journal für Ornithologie*, *Der Vogelzug*, *Ornis Fennica*, *Limosa*, *Ardea*, *Emu*, *Ornithologische Monatsberichte*, *L'Oiseau*, and others is almost alarming. American ornithology can benefit by an increasing familiarity with ornithological research in other parts of the world. Students should be impressed with this early in their development.

The interesting and poorly developed field of avian parasitology is reduced to a single sentence in the chapter on ecology. Nothing is said concerning nest parasites, a most interesting phase of ecology. Food habits and their investigation receive scant attention. There is also a consistent lack of attention to physiology either as a separate field warranting a separate section or in appropriate places in the existing chapters. For example, the material on migration contains nothing of the steadily increasing accumulation of physiologic data. At least rudimentary information on the organs could have been advantageously introduced into the section dealing with internal anatomy.

There are few typographical errors. The mechanical composition of the manual is such that it should be very usable both for laboratory and field exercises. It should be useful for courses which are based on the classical and restricted concept of ornithology. It will also be useful, with supplementary material, to those who wish to present ornithology as a more complete science.—D. S. F.

50. The Ring-Necked Pheasant and Its Management in North America. 1945. Pp. i-xi + 320. American Wildlife Institute, Washington, D. C. \$3.50.

W. L. McAtee, the editor, explains in his *Foreword* that "The foundation of this book is a report on the ecology, life equation, and management of the ring-necked pheasant in Ohio." This overflowing 73-page chapter stands out for the contribution that Leedy and Hicks have made concerning land use and economics as related to pheasant ecology. Seven supplementary chapters relate findings from Pennsylvania and New Jersey (20 pp.), New York and New England (24 pp.), Michigan (59 pp.), the northern prairie states (13 pp.), the Sandhill region of Nebraska (31 pp.), the intermountain irrigated region (20 pp.), and the Pacific Northwest (21 pp.). An eighth chapter (34 pp.) treats of artificial propagation. "All of these have been prepared by employees of the federal Fish and Wildlife Service

and are largely products of the Cooperative Wildlife Research Units, jointly sponsored by that Service, certain land-grant colleges, the respective state conservation departments, and the American Wildlife Institute. An introduction and a chapter on classification and distribution are by other authors," (5 pp. each).

The findings from each region have been boiled down and are presented to sportsmen, farmers, poultry raisers, game bird growers, and other readers young and old. By and large the boiling down process has eliminated techniques of study and analyses of data. As a result the book is easy and quick to read. The text is continuous and complete, not requiring stop-and-hunt-for references to tables and figures in every other paragraph which discourage reading of some scientific writings. This style of presentation is aptly suited to a heterogeneous group of readers, but it leaves the wildlife researcher without evidence for many of the important conclusions stated.

Like other higher animals, a pheasant's life is surrounded with innumerable problems. Research can not solve these problems simultaneously or with equal effort. Regardless of species, game problems can be considered of three types: those that are (1) easy to study and yield readily to management, (2) easy to study but do not yield readily to management, and (3) difficult to study and require long-time research. The last type is usually bypassed initially in lieu of more productive study although it may be equally significant to management. The number of workers from Maine to Oregon who are today studying habitat requirements of the Ring-necked Pheasant reflect the nearly universal choice of research problems of the first type. Every chapter in this book deals in some way with food and cover requirements! This does not indicate inferior research; it tells the age of wildlife research in North America.

Pheasant research has pipped the shell and is ready to start more mature growth. The question is, who will start it? We need to know more about the "inside workings" of a pheasant population, and we need some kind of organization that will orient studies to the various regions where they can be carried out most advantageously. Integration and coordination are indispensable. Some one should start dipping beneath the "cream" and set up experiments that will ultimately give us the answers to many population phenomena. John Pearce recognizes the need for such study when he says (p. 53) that "A great deal of valuable information on the fate of stocked game birds has been lost in the past through failure to band them before release." "... each band is the potential clue to what happens to several hundred dollars of sportsmen's funds. . . ." How many studies under way today base their findings on banding returns? Again, Errington says (p. 195), "Of the several explanations advanced to account for repeated failures of pheasant plantings, most are about as lacking in either proof or disproof as they were years ago." Errington also says (p. 197), "Mixed populations of pheasants, bobwhites, and other gallinaceous species have shown the same recovery phenomena as have nearly 'pure' populations of bobwhites, with rates of increase of the birds collectively being in inverse ratio to their collective breeding densities. . . ." If pheasant reproduction is in inverse relation to breeding density then management needs to know what density factors are responsible for inversity. This calls for physiological studies. Have any of the many pheasant projects recently initiated in the United States included such studies in their programs?

Research is costly. A large machine must produce many or valuable products to offset the cost of production. The machinery that produced this book is large—very large. Surely there are more products forthcoming. The ecology-laden work of Ohio would easily fill the covers of another book. This monumental work would not only set a pattern for numerous other wildlife ecologists, but the details would give short-cuts to more efficient studies of other species. Michigan has contributed more than the average amount in this book, but most of it is not recent and comprises but a fraction of their findings. The contributions of Errington and McClure are infinitely disproportionate to their researches. Will these findings come out in print, or will they end up as financial ghosts in a cobwebbed file?

A timely lesson comes from the emphasis given to management of the pheasant. Recent research of midwestern grouse shows that these birds are displaying successively lower cyclic peaks. Grouse studies are admittedly more difficult than those for pheasants, but grouse research has at least yielded enough tools that management need not "sit" idly by while our native game birds slowly but inevitably fade from our landscapes. It looks like John Ringneck's future is being watched very carefully.

Bringing together findings from coast to coast has also brought together an unusual number of authorities. Lack of space precluded inclusion of unsolved problems or questionable findings. Some readers might sense a dogmatic air to the continually positive statements in the text. It is very probable that this could have been prevented by some discussion together with a summary and conclusions for the findings from all regions. A brief paragraph summary for each chapter would have been a welcome addition.

The frontispiece, 12 figures, and 31 plates (except two color plates) add considerably to the monograph. The size and style of type facilitates reading. In bringing together the widely-differing work of seventeen authors, McAtee has done an incredible job. Long will it serve as a goal for other technical writers.—IRVEN O. BUSS.

51. Bird Life. Palmipeds. (La Vie des Oiseaux. Les Palmipèdes.) Paul Géroudet. 1946. Delachaux & Niestlé, Neuchatel, Switzerland. 291 pp. 15 fr. This is the third of five volumes of M. Géroudet's series on European birds; it covers the Petrels, Gulls, Terns, Auks, Grebes, Cormorants, Gannets, Pelicans, Ducks, Geese and Swans. Latin and French names with a few synonyms are given, followed by the German, Italian and English name, then comes a brief description with dimensions and sometimes weight, and after that a section on habits written with charm and feeling. M. Géroudet, editor of *Nos Oiseaux*, gives us vivid word pictures of his own experiences in the field and quotes judiciously from the work of others. With 24 excellent colored plates and 48 spirited sketches by Robert Hainard and the admirable text, this delightful little book should awaken much interest in bird study and win many friends for the birds.—M. M. NICE.

52. The Life History of an American Naturalist. Francis B. Sumner. 1945. 298 pp. Jacques Cattell Press, Lancaster, Pa. \$3.00. My first acquaintance with Dr. Sumner came 26 years ago through his eloquent paper in *The Scientific Monthly* on "The Need for a More Serious Effort to Rescue a Few Fragments of Vanishing Nature." In 1935 I reviewed in *Bird-Banding* an experiment of his on "Protective Coloration" in which Galápagos Penguins ate fewer fish that matched the environment than that contrasted with it. In this fine autobiography the writer traces dispassionately the influences of heredity and environment in his early years and tells of experiments and expeditions concerned mostly with fish and deer mice. The final chapters on "Man Versus Nature," "The Real Value of Science," etc., have a very wide interest. Over-population and mechanization are fast ruining the beauty of the world as well as destroying our irreplaceable natural resources.

"The automobile has almost banished the wilderness from our continent." "The plane may prove to be as destructive to our scenery and wildlife as it has been to the cities of our enemies." Speaking of predators, he says, "Man can brook no competition in his career of destruction." "The conservation which chiefly arouses my interest is the move to arrest, so far as possible, the despoliation of our landscape and the extermination of our native species of plants and animals . . . I agree most fervently with those who believe that the world is already greatly over-populated," and he emphasizes "the desperate need of checking the multiplication of the human species before it fills every nook and cranny of the world which can be made habitable." An intensely interesting, honest, and thought-provoking book, one that should be in the hands of all interested in science and the preservation of wildlife and natural scenery.—M. M. NICE.

53. The Ducks Came Back. S. Kip Farrington. 1945. xvi+138 pp. Coward-McCann, Inc., New York. \$5.00. This is a story of Ducks Unlimited, its inception, its organization, its leading personalities both in the United States and in Canada, and its waterfowl-management activities. The author further attempts to evaluate the results of the activities of Ducks Unlimited. The book is persuasively written for the non-critical layman and the duck hunter. Both its attractiveness and its persuasiveness are enhanced by illustrations by Lynn Bogue Hunt and by an array of fine photographs.

During the early 1930's the nation was becoming aware of the decrease in waterfowl populations. Preliminary investigations and surveys were made by More Game Birds, Inc. The Migratory Bird Conservation Act of 1929 was beginning to function although the Congress had failed to supply the funds to which it had committed itself at the time of its passage. Following the submission to the White House of a prospectus by More Game Birds, Inc., President Franklin D. Roosevelt appointed the President's Committee on Wildlife Restoration consisting of Thomas H. Beck, J. N. Darling, and Aldo Leopold. The report of this committee resulted in the initiation of a program of projects designed to benefit and increase waterfowl in the United States. In 1934 the Migratory Bird Hunting Stamp Act was enacted thus providing for the purchase and development of sanctuaries for migratory birds within the United States. In 1935 More Game Birds, Inc. presented "The 1935 International Wild Duck Census" in which it was estimated that there were 42 million wild ducks in the mid-continental duck range, an estimated one fifth of the 1900 population. The U. S. Biological Survey estimated only 27 million for the entire continent. Drought was reducing breeding areas at an alarming rate. Federal funds could not be used in the Canadian provinces where the bulk of American waterfowl breed. It was this situation that produced, with the aid of More Game Birds, Inc., the organization and incorporation of Ducks Unlimited in 1937 and subsequently Ducks Unlimited (Canada). The purpose of this non-profit organization was and is to employ funds supplied by American sportsmen for the improvement and increase of duck-breeding areas in Canada. The policy of Ducks Unlimited has been to improve land for duck-breeding purposes without actually purchasing the land since the improvements involved are thought to be almost always beneficial to the owner in one way or another. The author has tabulated 138 projects involving construction work done by Ducks Unlimited from 1938 to 1944. These were mostly the building of dams, spillways, and water-diversion devices. The operation plan is to establish five to eight "kee" waters in each good duck-nesting township of 36 square miles. Ducks Unlimited does the planning and construction. Actual management procedures are executed by volunteer "kee men." It is asserted that under this system a million and a quarter acres in 155 projects have been improved.

The Ducks Unlimited data concerning loss of waterfowl place losses due to crow and magpie predation at 15 percent (1.5 times the legal kill plus crippling losses) and that due to jackfish predation at eight percent. Chapter IX is devoted to crow and magpie control. Although crow populations have been reduced there is no evidence to indicate that it justifies the necessary time and expense and even more important the somewhat questionable biologic soundness in game management of decreasing one species in order to increase another. Drought and fire are calculated to cause 20 and 12 percent respectively of the losses and are logical subjects for Ducks Unlimited Management policies.

From 1937 through 1944 the census data of Ducks Unlimited claim an increase in Canadian ducks from 40 million to 140 million. The U. S. Fish and Wildlife Service estimates give an increase from 27 million in 1937 to 125 million in 1944. Mr. Farrington uses the correlation between the activities of Ducks Unlimited and these estimated increases in duck populations as the basis for almost fantastic claims for Ducks Unlimited. For example: "It is the author's firm conviction that Ducks Unlimited is responsible for a real contribution to the phenomenal increase of waterfowl in North America over the period covering the last eight years, I

would attribute but part of the credit to God. It is the conservation miracle of all times, and if D. U. didn't do the job, who else was there to do it? It is to me a very convincing fact which cannot be overlooked that ducks immediately began to show an increase the minute D. U. started the job in the prairie provinces, and as they increased their efforts, the water population has steadily increased with them. The good Lord may have supplied them with a trifle more moisture than had come from the heavens during the drought period, but rain is of little value in that country if proper preparations are not made to receive and hold it for the web-footed friends." (p. 119) "It is my belief that Ducks Unlimited has accomplished the conservation miracle of all times. . . . If this is not so, the increase in the population of our feathered friends along with the birth and growth of Ducks Unlimited has been a very unusual coincidence." In making these statements the author overlooks the growth of the migratory refuge system under the U. S. Fish and Wildlife Service from nine projects involving 146,478 acres in 1930 to 188 totaling 2,971,414 acres in 1943, the 20,000 projects completed by the Prairie Farms Rehabilitation Administration, and even more important the favorable change in climate between 1939 and 1943. Also omitted is the fact that the U. S. Fish and Wildlife Service census data show that duck populations were increasing in the early thirties, presumably due at least in part to more stringent hunting restrictions, *at least two years before the programs of Ducks Unlimited, the U. S. Fish and Wildlife Service, and the Prairie Farms Rehabilitation Administration were actually under way*. Recent estimates by the U. S. Fish and Wildlife Service, presumably unavailable to Mr. Farrington at the time of the preparation of the manuscript, show the superficiality of the above cited claims for the effect of the Ducks Unlimited projects. In 1944 the estimate was 125,350,000; for 1945, 105,500,000; and for 1946, 80,000,000. In the face of this the author's recommendations for the return of live decoys, baiting, batteries, sink holes, and the opening of refuges for shooting for returning servicemen are even more unthinkable to any person cognizant of the rudiments of wildlife conservation and management.

Ducks Unlimited is supported by hundreds of loyal American sportsmen who believe in the obviously sound principle that improving Canadian duck-breeding areas will send larger flights through the United States. Although one can find disagreement with its philosophy of predator control and with much of its propaganda and publicity it is nevertheless recognizable that Ducks Unlimited has done excellent work in Canada both in actual improvement of duck-breeding grounds and in education in conservation principles. Ducks Unlimited can ill afford the type of publicity given it in this book. If it solicits or even condones such publicity its survival will soon be precarious. It will convince many, especially those who are awaiting the slightest pretense to be convinced, that the duck problem is permanently solved and that restrictions can and should be relaxed. When ducks decrease as they are now, many will blame Ducks Unlimited for false claims and for failure to do its job. Disillusioned sportsmen may fail to continue their support.

Of particular interest for banders is Chapter VII which contains a summary of returns from ducks banded by Ducks Unlimited in Canada. The returns constitute a real contribution to our knowledge of migratory routes of ducks. Of further interest and value is Chapter VIII on census methods. This was written by B. W. Cartwright who has had much experience in aerial censuses and who has developed the estimating system now in use by Ducks Unlimited.—D. S. F.

54. Field Book of Eastern Birds. Leon Augustus Hausman. 1946. pp. i-xvi + 659, 6 col. plates and over 400 black and white text figures by Jacob Bates Abbott. G. P. Putnam's Sons, N. Y., \$3.75. The first question that comes into any one's mind when asking about a new "Field Guide" is, how does it compare with other standard books of the same kind; what features does it possess that the others do not; is it going to supersede Peterson's Bird Guide for instance? I cannot really see much difference between the two except that Hausman's guide presupposes a more elementary knowledge of birds than does Peterson's. The

latter does not use keys while the former makes free use of them. For instance, the first sixty pages in Hausman are devoted to a series of keys (freely interspersed with black and white text figures), based on haunts, habits and color, while under each family is a key to the different species in winter and summer plumage. An entire page is devoted to each species, headed by a black and white figure and divided into paragraphs giving other names, field marks, field description, characteristic habits, notes, habitat and range. The weakest point in the book is that it makes little or no effort to point out the differences between two similar species. The illustrations in Peterson are definitely superior. Hausman's book will fit in the pocket but is bulkier than Peterson; the latter contains but 180 pages while it takes 659 pages to cover approximately the same field in the former, but the extra thickness is somewhat compensated for by its being about half an inch narrower and half an inch shorter.

To sum up, then, here is a bird guide no better nor more revolutionary than Peterson's. And just one more word, no one can afford to have his (or her) ornithological library consist of a single "field guide"; Chapman's "Hand Book" or Coues' "Key" plus the student's latest "state list" is the bare minimum.—J. L. PETERS.