

Starlings were ringed with 3,106 "returns." This gives no idea of the number of birds which were recaptured at the site of original banding, which would be an important factor in explaining the homing instinct or the ability to follow a definite route or to find a distant locality. Students of banding desire to know what proportion of any species will arrive later at the point of banding. For purposes of determining flyways, or flying time, the number of birds of a species which have been banded in one locality and trapped by another bander is important. The old expression "return" does not determine these factors. Hence additional terms are desirable and are proposed, with a more exact restriction of the term "return."

RETURN—The re-trap at the original banding station of a bird after the lapse of a migration season. Some banders have designated this as a "station-return"; but the one word will suffice. It requires the reading of the numbered band. Return-I and Return-II signify returns one and two years after banding; Return-V would indicate the bird returned five years after banding, irrespective of any records of intervening years.

SIGHT RETURNS are of color-banded birds, and should be so indicated.

RECOVERY—The recapture by any means, trapping, finding dead or shooting, at a point distant from the original banding station. These are reported to Washington as "returns", with the method of capture described. Any bander should record in published reports his trap retakes as "returns" (because these birds do return), but his birds found elsewhere, and reported to him, as "recoveries" (by other persons).

RESCUE—The trapping by a bander of a bird which was banded by some other bander; for him this is a rescue, but for the original bander it is a recovery, when he gets his report. If a bander had had five percent of his birds reported by distant banders or gunners, and if two percent of his trappings were of birds banded elsewhere, his report would show "Recoveries 5%, Rescues 2%, in addition to his "Return" percentages.—HAROLD B. WOOD, 3016 North Second St., Harrisburg, Pa.

RECENT LITERATURE

Reviews by Donald S. Farner

BANDING STUDIES

1. **The Problem of Partial Migration.** David Lack. 1944. *British Birds*, 37(8) : 143-150. In the first part of this treatise (see *Bird-Banding*, 15(1) : 75-76) the author has demonstrated that certain Passerine and Limicoline species show typical partial migration. Many of the British partial migrants are trimorphic, consisting of (1) a resident group, (2) a group migrating westward to Ireland, and (3) a group migrating southward to France, Spain, and Portugal. In all partial migrants investigated thus far, including the author's studies on the British Robin, the female shows a greater tendency to migrate southward than the adult males. The author suggests that the male sex hormone may initiate or accelerate spring migration and prevent or retard the fall migration. Strangely, however, there is no tendency for the juveniles to migrate more than the adults in the westward migration to Ireland. This is true even in those species in which that tendency exists in the southward migration to France and Spain. Concerning the relation of the southward and westward migrations, the author has the following to say: "The suggestion may be hazarded that the southward migration to France, Spain, and Portugal is an old-established habit, homologous with the

migration of the representatives of the same species breeding on the mainland of the European Continent. Very possibly, as already discussed, this habit is gradually disappearing among a number of species breeding in Britain, since members of the Continental forms of the same species tend to be more migratory. On the other hand it is possible that the westward migration to Ireland is a relatively new habit. A westward or southwestward direction is favoured by many species during hard weather movements, i. e., movements occurring during the winter as a direct result of unusually cold weather. Possibly the Irish migration had its beginnings in such hard weather movements, but at the present time it seems far too regular and starts too early in the autumn to be classified as such. In any case it is hard to differentiate completely between true migration and a hard weather movement." There are diagrams which show the relative numbers of residents, southward migrants, and westward migrants in several species. A very interesting paper.

ECOLOGY AND POPULATION STUDIES

2. Biological Survey of the Bogs and Swamps of Northeastern Ohio. John W. Aldrich. 1943. *The American Midland Naturalist*, 30(2) : 346-402. This paper describes the composition and dynamics of the various biotic communities which occur in the transition of ponds and lakes into climax communities. Concerning the term, *swamp*, the author suggests that "it would seem advisable to restrict the term *swamp* to seres leading up to the more southern deciduous forest climaxes, characteristic of warmer climates where peat accumulation is slow or lacking." He defines *bog* as "a sere originating with a body of water, such as a pond or lake (not a river), and ending in northern coniferous forest climaxes, characteristic of colder climates where peat accumulation is rapid." Since northeastern Ohio is within the Eastern Deciduous Forest Biome of the Upper Austral Life Zone the bog sere is regarded as a boreal relic, being characteristic of succession to a northern coniferous forest climax. Factors involved in these boreal relics are probably lower temperatures, constant water supply, and high acidity "combined with the advantage of previous establishment in competition against invaders." In both bog and swamp seres the change in life form passes from aquatic plants and animals through semi-aquatic plants and amphibious animals to mesic plants and terrestrial animals. The shrub communities support the greatest numbers of breeding birds and small mammals. *Juncus-Scirpus* associates and the forest communities are the next most important habitats of small mammals and breeding birds. A detailed table shows the relation of vertebrate species to the various associates of the swamp and bog seres. Both the data and conclusions are too extensive to summarize adequately in a review of this length. This paper is recommended to ornithologists not only as an important source of information but also as a type of research which, if repeated in other areas in different biomes and life zones, should give interesting and valuable results. An important contribution to ecology.

3. Twelfth Annual Black Brant Census in California. James Moffit. 1944. *California Fish and Game*, 20(1) : 19-28. The results of the twelfth (1942) annual Black Brant census are compiled and discussed. In 1942, 64,703 brant were counted in six localities, whereas in 1941 the count was 61,399 birds. The average for the same ten areas and Drake's Bay, in addition, for the ten years preceding 1942 was 57,344. Of particular note in 1942 was the unprecedented large numbers in Mission and San Diego bays. Of particular interest is the relation of the infection of the Pacific eel grass with *Labyrinthula* and its subsequent decrease. This infection, which had brought disastrous results to the Atlantic eel grass, was first noted in 1940 when the eel grass was observed to be

becoming depleted. However, since 1940, in spite of the *Labyrinthula* infections most California localities reported an increase in abundance of eel grass. It is concluded that the Pacific eel grass is only mildly affected by the infection.

4. Relation between Fish and Fish-eating Birds. Vadim D. Vladykov' 1943. *The Canadian Field-Naturalist*, 57(7/8) : 124-132. The author attempts to evaluate, largely on the basis of opinions expressed in the literature, the role of various species of birds in fish predation and whether or not they should be considered harmful to fish populations. General statements are difficult to make because of the variance of opinion as to which species of fish are desirable. There are interesting discussions concerning food and parasite interrelationships between fish and fish-eating birds. The author's conclusion that in general fish-eating birds are sufficiently hardy to withstand "local control" in areas suffering particularly from their predation seems to be sound although a general practice of "local control" might produce unforeseen results.

REPRODUCTION

5. Nesting of the Brown-capped *Leptopogon* in Mexico. Robert T. Moore. 1944. *The Auk*, 46(1) : 6-8. This is the first description of the nest of the Mexican race, *Leptopogon amaurocephalus pileatus* Cabanis, of this little known species of flycatcher. The three nests which were found were located either beneath a large rock or log in very dark places. In each case the nest was suspended from the rock or log by two roots or tendrils and constructed with tightly-woven moss. One of the nests contained eggs which were "immaculately white with a slight gloss." One egg measured 18.5 mm. x 14.8 mm. and the other 19.8 mm. x 14.5 mm.

6. Roof-nesting Killdeers. Clinton G. Abbott. 1944. *The Condor*, 46(1) : 3-5. The author records six nests of Killdeers, *Ozyechus vociferus* (L.), on graveled roofs in Los Angeles.

7. The Fledging Period of Birds. B. H. Ryves. 1944. *British Birds*, 37(8) : 151-154. The author discusses the inadequacy of the present information on the *fledging period* or *period in nest* of various species of birds. He feels that this is partly due to a lack of a uniform conception of the meaning of the term. It is therefore suggested that the *fledging period* or *period in nest* be defined as follows: "The period during which the young remain in the nest, which they finally abandon under natural conditions, in varying stages of general development."

PHYSIOLOGY

8. The Reproductive Cycle of the Male Red-winged Blackbird. Philip L. Wright and Margaret H. Wright. 1944. *The Condor*, 46(2) : 46-59. For the purposes of this study 215 male Red-wings, *Agelaius phoeniceus fortis* Ridgway, were collected in western Montana. Supplementary information was obtained from a series of *A. p. phoeniceus* (L.) males taken in Wisconsin. In order to study the entire reproductive cycle, Montana male Red-wings were taken in every month of the year. In this study four age groups of males were recognized: (1) *Juveniles*. Birds taken in June, July, or August before the postjuvinal molt. (2) *Immatures*. Birds collected from September through January. (3) *Year-olds*. Birds taken from the beginning of March until the beginning of the molt into adult plumage in July. There is considerable variation in this group; the "two-year" birds of other authors are, with apparent justification, placed in this group. (4) *Adults*. Birds over 13-15 months and in adult plumage. Quantitative data

were obtained by weighing the testes and measuring the diameters of the seminiferous tubules. These data were subjected to statistical analyses; all conclusions are based on these analyses.

The adult males come into active spermatogenesis in spring with the testes reaching their maximum size during the last week in April and maintaining this development until the end of June, a period of 50-75 days. The testes of the year-olds come into maximum development three weeks after the adult males and are maintained at this stage for 30-55 days. Correlated with the lesser and later development of the testes of the year-olds is the observation of the authors that these birds do not establish territories and usually do not breed. Considerable attention is given to the statistical treatment of the relation of tubule diameters to the size of the testis. These calculations show simply that in both adults and year-olds the tubule diameters increase with the increasing weights of the testis but at a slower rate. Although there is less intertubular tissue in adults than in year-olds the authors doubt that this indicates a difference in hormone production. The cells of Leydig, commonly assumed to produce the male sex hormone, apparently occur in the testes of Red-wings only during the early stages of active growth and are absent during the maximum development, regression, and during the inactive period. The significance of this observation cannot be indicated until more is known about the function of the male sex hormone in this species and furthermore until there is more precise evidence concerning the function of the cells of Leydig in birds. |

There is a significant correlation between the regression of the testes and the progression of the postnuptial moult. The moult begins when the testis weights are about 20 mg. Although the testes of the year olds regress sooner than those of the adults the moult does not begin sooner than it does in the adults. "*That the physiological factors which bring about the regressions of the testes may also bring about the moult is strongly suggested by the above data.*" The authors also have made observations indicating that males which take part in the rearing of a second brood remain in breeding condition (based on testes size) longer than those which rear a single brood. The suggestion is made that, since year-old birds are in active spermatogenesis during the breeding season and still do not usually breed, failure to mate is a "psychological phenomenon that purely anatomical studies cannot explain." "If the psychological behavior associated with the whole breeding process is conditioned by the physiological state of the reproductive system, it is indeed possible that the year-old males, coming into sexual activity at a later date than the adults, may find the females already mated with the adult males and be left out of the breeding activity. (The plausibility of this explanation could be checked by determining the sex ratio in the nesting populations.) "Perhaps the smaller testes of the year-old bird are producing less male hormone which in turn would render the bird less aggressive and less able to successfully compete with adult males in maintaining a territory." There is the possibility that the cycle as described may not be entirely typical for any single population since the winter data are from birds resident in western Montana, and, as the authors point out, it is not known whether they are non-migratory local breeding birds or migrants from farther north.

The authors have used the condition of the bursa of Fabricius as a criterion for checking the age as determined by the plumage. Although this has been a useful criterion when applied in certain game species, little is known about it in passerine species. The data given in this paper suggest that the condition of the bursa may be a useful criterion in the Red-wing. This is an important paper not only from the standpoint of its observations and conclusions which are primarily empirical but even more so in presenting important problems in relation to the physiology of reproduction and molting in this species.

9. Structure and Functions of the Neck Muscles in Inflation and Deflation of the Esophagus in the Sage Cock. Ralph F. Honess and Warren J. Allred. 1942. *Sage Grouse Studies. Part I. Wyoming Game and Fish Department, Bulletin No. 2*: 5-12. The authors describe the origins, insertions, and actions of the muscles of the neck concerned with strutting. The esophagus in the neck region is divided into four regions. The cephalic part is about the same diameter as the pharynx and varies from 2.5-5.6 cm. in length. The second part is a balloon-like thin-walled pouch and is the part which is inflated in strutting. The third part is a thick-walled tube about 0.7 cm. in diameter. The strong circular musculature of this part prevents the air in the inflated pouch from escaping. The fourth section is that of the attachment of the crop, a bilobed diverticulum. In strutting air is forced from the lungs and air sacs into the balloon-like pouch of the esophagus via the trachea, larynx, and pharynx. The air is prevented from entering the mouth cavity by two pairs of pads in the region of the glottis. These pads are brought together by elevating the base of the tongue. A contraction of the inferior superficial muscles of the neck compresses the air into the neck pouch, distending and extending the bare areas. According to the authors the vibration of the distended bare areas is responsible for the "plopping" sound accompanying this process.

10. Seasonal and Sexual Dimorphic Variations in the So-called "Air Sac" Region of the Sage Grouse. L. Floyd Clarke, Hermann Rahn, and Malcolm D. Martin. 1942. *Sage Grouse Studies. Part II. Wyoming Game and Fish Department Bulletin No. 2*: 13-27. Two mature breeding males in May were found to have esophageal volumes of 4,100 and 54,000 cc. as compared to 90 to 100 cc. in mature males in fall and 25 to 33 cc. in immature males in fall. The two bare patches on one breeding male were found to average 69.4 sq. cm. as compared to 8.5 and 24.5 sq. cm. in two mature males in fall. The increased sizes of the bare patches and the increased esophageal volumes were found to be correlated with increased sizes of the testes. No significant differences in bare patches and esophageal volumes between breeding females and females in fall could be demonstrated. Unfortunately small numbers of birds were used in these observations with the consequence that confirmatory observations are desirable. Nevertheless the data are highly suggestive and important. Histological preparations show that both the esophagus and the bare areas have large quantities of elastic fibres thus accounting for their extensibility. Preliminary experiments using the male sex hormone, testosterone propionate, were inconclusive although there is some indication that it stimulates the changes in the esophagus and the bare areas.

FOOD HABITS

11. Notes on the Food of Australian Birds. Keith C. McKeown. 1944. *The Emu*, 43(3): 188-191. This paper contains brief notes on the stomach contents of 28 species of birds. In view of the paucity of information on the feeding habits of Australian birds this paper is an important source of information.

12. Food of the Snowy Owl. Alfred O. Gross. 1944. *The Auk*, 61(1): 1-17. The stomachs of 205 Snowy Owls, *Nyctea scandiaca* (L.), were collected in New England in the winters of 1926-27, 1930-31, 1934-35, and 1941-42. Of these 127 contained mammals of which the Norway Rat, *Rattus norvegicus* (Berkenhout), (38 stomachs) and the Meadow Mouse, *Microtus pennsylvanicus* (Ord), (18 stomachs) were most frequent; a total of seven species were represented. Seventy-seven stomachs contained bird. The Dovekie, *Plautus alle* (L.), was the most common species (16 stomachs). Among the other species found in the owl stomachs were the Snow Bunting, *Plectrophenax nivalis* (L.) (6 stomachs); Ruffed

Grouse, *Bonasa umbellus* (L.) (5 stomachs); Domestic Fowl (5 stomachs); and the Black Duck, *Anas rubripes* Brewster (5 stomachs). Eighteen species were represented in the stomach contents. The author has compared the results of these analyses with those published for other regions. Also there is a summary of correspondence concerning various species of animals attacked and captured by Snowy Owls. The bibliography of thirty titles contains no references to the work of European investigators, such as Sten Bergman. The observations of Stejneger on the Commander Islands and Kamchatka could also have been cited. "In summing up the results of the stomach examinations and field observations of food habits, the evidence is about equally for and against the Snowy Owl so far as the economic interests of man are concerned. The species is beneficial by reason of mice and, especially, that most despised of all rodents, the Norway rat, but it is also very destructive to game and song birds, poultry, and certain useful mammals."

BEHAVIOR

13. The Social Behavior of the Laughing Gull. G. K. Noble and M. Wurm. 1943. *Annals of the New York Academy of Sciences*, 45(5) : 179-220. This excellent treatise is based on observations on the Laughing Gull, *Larus atricilla* L., both in captivity and in the field, as well as observations on the courtship of certain other species of gulls in the New York Zoological Park. Because of the condensed presentation of the material in this account it is not possible to adequately represent its contents in a review of this length. Social reactions among Laughing Gulls out of the breeding season are confined to those caused by stimuli from a food drive or "a degree of individual irritability." The *aggressive call* is heard when there is a sudden movement in the flock. The *food begging pattern*, common also during the breeding season, is observed. As in other species of gulls social behavior becomes more complex during the breeding season and much larger numbers of behavior patterns are observed. Breeding colonies, which consist only of birds in nuptial plumage, are subdivided into a number of distinct groups. "The area occupied by each group serves as a communal courtship ground in which pairs form, and is also the center about which nests are distributed according to restrictions of the environment." Territory defense is carried out both on the ground and in the air. Nesting territories are relatively small, a fact correlated with the dense vegetation of the environment. "Sex recognition is mediated by a behavior pattern, essentially aggressive in character, which is initiated by the male and to which males and females react directly." Courtship display and courtship feeding continue throughout the incubation period. The following behavior patterns, characteristic of sexually stimulated Laughing Gulls, are described, frequently with illustrations: *wing call*, *flight call*, *warning call*, *pairing charge*, *feeding charge*, *head flagging*, the *moan*, *food begging*, and *copulation*. Comparisons are made with other species of Laridae. An important feature of this paper is its discussions of terms for the same or similar patterns by various authors in studies on other Laridae. There is also a brief description of the behavior patterns of sexually active Australian Silver Gulls, *Larus novae-hollandiae* Stevens. The preliminary observations of the authors indicate that they are similar to those of the Laughing Gull. Of interest also are the methods of sex determination in the field studies. "The more positive method of distinguishing the sexes was based on behavior patterns which included the following: male mounts female during copulation; male keeps head high during mutual food begging and tosses the head a few times, whereas the female shows incessant begging activity during which the head is kept low; only males pass food and only females accept it; only males perform the pairing and feeding charges from which other males always retreat while females may respond." In general

males appeared larger and stood taller. Average bill length of males was 59 mm., of females, 55 mm. Birds with 57 mm. bills were either males or females. This is a very significant paper.

14. Territory as a Result of Despotism and Social Organization in Geese. Dale W. Jenkins. 1944. *The Auk*, 61(1):31-47. This paper is the result of 420 hours of observation of six Blue Geese, *Chen caerulescens* (L.); two Lesser Snow Geese, *Chen hyperborea hyperborea* (Pallas); and 26 Canada Geese, *Branta canadensis canadensis* (L.), in the Jackson Bird Sanctuary, Chicago. The author concludes that there was a definite "peck-right" type of *intraspecific* social organization under "approximately natural social conditions." This intra-specific "peck-right" organization was modified, however, by the organized despotism of the family group in which there was strong organization and co-operation. In spring there was a change in the "peck-right" organization as the males became more attentive to the females. In one family group the father began to peck the young of the previous year. For a period the young were tolerated during cold weather and driven away during warm weather. In discussing territorial relationships in geese the author speaks of territory as follows: "It is any area in which despotism is shown resulting in the defense against other organisms, and is usually formed around some site or object such as nest, offspring, mate, food, etc. It is a result of despotism and social organization, and it may be fixed or evanescent in time and variable in size and shape. Establishment and maintenance of territorial boundaries appears to be the most important factor causing pecking in geese. However, the territory itself and the territorial boundaries are not the causes of pecking and social organization, but are expressions or results of despotism or dominance, defense, or both. The family organization was the most important factor in producing despotism and defense pecking in the fall and winter, but in the spring the female mate became most important, even to the extent of causing disintegration of the family." The following types of territories were recognized: (1) family including young, (2) female mate, (3) nest, (4) a territory established in defense of a place factor or location, or position with reference to the rest of the birds, or (5) combinations of these. Temperature was found to exert a definite effect on the territory. An increase in size was noted with average increase in temperature in spring and a decrease with the average decrease in fall.

15. Roosting Habits of Martins at Tucson, Arizona. Milam B. Cater. 1944. *The Condor*, 46(1):15-18. In the vicinity of Tucson where they nest in the giant cacti the first Martins, *Progne subis* (L.), apparently arrived early in May in 1943. By May 20 a large roost had been established in a grove of cottonwoods on a golf course. The number of roosting birds was estimated at 3,000. In the first week of June the Martins changed their roost to a grove of cottonwoods in a house-trailer park 1½ miles from the golf course. This roost had been used in 1941 but not in 1942. The birds were a nuisance to the inhabitants of the trailer camp who tried unsuccessfully to frighten them away. The roosting population was again estimated at 3,000 and remained at this strength throughout the summer except during the egg-laying and incubating periods when the numbers of females decreased markedly. There was evidence to believe that birds came as far as 19 miles nightly to this roost. After the middle of August young were observed to accompany their parents to the roost. By September 1 the roosting population had increased to eight or nine thousand. "In the first week of September the Martins discontinued assembling in the vicinity of the roost and began assembling on the wires near a gravel quarry one-half mile north of West Speedway Boulevard, on Silverbell Road; they flew to the roost some two miles to the northeast shortly before dusk each day. This practice

continued until their final departure. By September 7, the number had increased to an estimated 10,000 and on September 13, 11,000 were assembled on the wires with possibly 2,000 flying about in the vicinity, making a total estimate of 13,000 martins." From September 22 to October 1 the roosting population decreased from 13,000 to 250. It is estimated that Martins from an area of about 550 square miles were using this roost.

16. A Mockingbird Acquires His Song Repertory. Amelia R. Laskey. 1944. *The Auk*, 61(2) : 211-219. This paper is the record of the development of song in a captive male Mockingbird, *Mimus polyglottos* (L.), whose first song notes were heard at 27 days of age. The early songs are described as soft-toned and similar to the "whisper" songs of adults, although more primitive. When he was three months old he sang three evenings by the moonlight; this was not repeated. At four and one-half months it was possible to recognize the mimicking of other species. When nine months old he was noted to repeat the calls of outdoor birds immediately after their utterance. An interesting observation is that of the greeting of two Flickers near his window with Flicker calls, although the Flickers were silent at this time. Some songs were used for short time only and then dropped from the repertory; others were used sporadically. "Imitation was clear in the acquirement of much of his repertory." These are a very important group of observations.

17. Birds' Fear of Man. H. R. Ivor. 1944. *The Auk*, 61(2) : 203-211. The author records several interesting observations of the development of fear in young passerines and the suppression of this development as well as the suppression of the fear reactions in some adult passerines by association with man. "It seems evident from the casual observations reported above that instinctive fear becomes manifest in certain nestling passerine birds at about the age when they are physically capable of leaving the protective environment of the nest." Continuous association with man may suppress the development of fear at this time but there is in turn a tendency for it to develop at a second period when the young birds would ordinarily become completely independent.

18. Seasonal Territory Studies of Ruby-Throats. A. L. Pickens. 1944. *The Auk*, 61(1) : 88-92. This paper contains notes on territorial relations of nesting Ruby-throated Hummingbirds, *Archilochus colubris* (L.), as well as observations on nesting habitats and plants found in the vicinity of the nests.

19. Lincoln's Sparrow Notes for Michigan and Alberta. L. H. Walkinshaw. 1944. *Jack-Pine Warbler*, 22 : 7-10. *Melospiza lincolni* (Aud.) was found to be a strongly territorial species in some localities in northern Michigan, usually in boggy areas, but one was singing May 23 in a jack pine and sheep laurel region. Two males, one defending his territory from the other, each sang 7 to 11 times a minute, but while the second was occupied in feeding, the first sang 5 and 6 times a minute.—M. M. NICE.

LIFE HISTORY

20. Whero. Island of Sea-Birds. L. E. Riehdale. *No. 3 of Wild Life in New Zealand*, pp. 25-40. 2/ from author, 23 Skibo St., Kew, Dunedin. Whero is a waterless rock 60 feet above sea-level, one-half acre of which is covered with a thin surface of soil. Due to the difficulty of landing, the island is from reef "introduced pests, including the human species." There are seventeen species of plants, all native, and eight of nesting birds, five Petrels, Skua, Starling and Hedge Sparrow, the last two not indigenous. The author has camped on Whero for 29 weeks during three seasons studying the Petrels, banding and weighing

them; last year he had "350 occupied and about 100 unoccupied burrows under observation." He estimates a population of some "3,000 sea-birds."

The nightly return of the Petrels is vividly described: "The silence of day is broken as the darkness descends. This seemingly uninhabited spot is then transformed by the return of its inhabitants, each uttering its own particular plaintive and somewhat raucous cry, into a busy and noisy scene. The return of countless petrels to their island home must surely be one of the wonders of world, to be experienced by only a few of the human race." First come the Mutton-birds, then the Kuakas and when it is dark the Storm Petrels and Fairy Prions. "The whole night seems to be filled with a multitude of white butterflies. . . . Sleep amidst such a pandemonium is impossible." "The Mutton-birds alone remain at 3 a.m., the others having departed as soon as the first faint glow of light appears in the eastern sky. . . . The arch-enemy of little petrels, the Skua, has been abroad since 3 a.m." On moonlight nights hardly one of the small Petrels came in, while the large ones were quiet instead of noisy.

The Parara, or Whale Bird (*Pachyptila vittata*), is the first to start nesting; the egg is incubated about 56 days, the parents taking turns of five to seven days, fasting meanwhile; the chick is fed about three-fourths of its 49 days in the burrows. "Most of the chicks become very tame with handling." With the Kuaka, or Diving Petrel (*Pelecanoides urinatrix*), the incubation period is eight weeks, and the chick is fed each night till it flies at the age of 54 days; "unlike other members of the group it never becomes tame." The nesting habits of the Fairy Prion (*Pachyptila turtur*) "are identical with those of the Parara," but breeding starts two months later. In contrast with the wealth of life on this undisturbed island, Herokopare, that contained 400,000 birds before the advent of cats about 1931, now has only a few thousand left, while six species have entirely disappeared. Yet the Department of Internal Affairs takes no steps to bring an end to this tragedy.—M. M. NICE.

21. **The White-faced Storm Petrel or Takahi-kare-moana.** L. E. Richdale. 1943. *Trans. Roy. Soc. New Zealand*, 73, Pt. 2: 97-115. A careful study of *Pelagodroma marina maoriana* for three seasons on Whero; detailed notes are given on growth of plumage and comparisons made on all life history matters with studies on other Petrels. The burrow may be dug by both birds of a pair; each bird incubates from one to nine days, usually four to five; eggs may be left unattended as long as 92 hours, yet hatch. In 1941-42 of 52 chicks hatched in burrows under observation, 47 ultimately left the island. Commenting on his own and others' experiences of large numbers of non-breeding birds, the author concludes, "It would seem that several species of Storm Petrels at least possess a large unemployed population which indulges in what may be called ritual or love-habits without breeding", p. 106. "Could it be, as seems to be the case in the Royal Albatross, that Storm Petrels pair up the preceding season and return to the breeding grounds already mated for that season at least?" p. 105.—M. M. NICE.

22. **The Parara or Broad-billed Prion, *Pachyptila vittata* (Gmelin).** L. E. Richdale. 1944. *The Emu*, 43(3): 191-217. This is another interesting paper emanating from the author's investigations on Whero Island. Because of the time of breeding of this species less data were accumulated than on the others studied. Nevertheless this paper contains much valuable information. The peak of the laying season is about September 6 and the peak of the hatching period is about November 1. It is assumed that the average incubation period is 56 days. The burrows of the Parara were found mainly in the hard banks around the edge of the island, under rocks, and in the *Muehlenbaeckia*. The food of the young apparently consists mainly of copepods and other crustaceans as

well as small fish. Numerous observations reveal that the young are unfed on about 26% of the nights. Generally they were not fed for three or four nights before departure from the nest. The average amount of food received per night is about 15 grams although the amount varies, being greatest (27 grams) during the 13th-16th days before departure, decreasing thereafter to a mean of 10 grams per day from the fourth to the last days before departure. The average meal varied from 16 to 32 grams. The majority of the chicks left the nest when there was but a trace of down left or within a few days after the down had disappeared. The average weight of 39 chicks decreased from 216 grams on the eighth day before departure to 172 grams on the last day before departure. Most of the young left the burrows between the 10th and the 21st of December. Measurements of the young at various ages, eggs, and adults are included. This is a very informative paper.

23. The Life History of the Prong-billed Barbet. Alexander F. Skutch. 1944. *The Auk*, 61(1) : 61-88. The Prong-billed Barbet, *Dicrorhynchus frantzii* (P. L. Sclater), is a common species in the cloud forests of the northern and eastern slopes of the Cordillera Central of Costa Rica. This is an interesting account of many aspects of its life cycle. During the non-breeding season this species occurs in small irregular flocks or sometimes singly. At night the birds sleep in holes in trees; as many as sixteen were noted to sleep in the same dormitory. With the approach of spring relations among the birds in the dormitory become strained and thereafter the numbers decrease until all of the occupants have disappeared. During pair-formation this restlessness is reflected in the fluctuating numbers of occupants in the various dormitories. By early April the barbets are paired and begin to sleep in the nesting holes. These are excavated by both sexes working alternately and are located in dead, but fairly sound, hardwood branches and trunks. At the time of completion of the excavation of the nesting cavity the birds become "territorial." Both parents share in incubation, brooding, and the feeding of the young. The incubation period is apparently about thirteen days. The normal clutch is four or five. The young are fed at first chiefly on insects. There is then a gradual shift to the completely vegetarian diet of the adults. This very interesting paper is a valuable source of information on this little-known species.

24. Notes on Flicker Life History. Amelia R. Laskey. 1943. *The Migrant* 14(4) : 67-70. This is an account of a hand-raised male flicker, *Colaptes auratus* (L.). The bird was obtained on June 10 at an age of about four weeks (just off the nest), and was force fed until June 16 after which he took food from the hand and gave "typical begging calls." The first bath was taken on June 13. On July 14, at about the age of two months, he was released, four days after his first drumming. Another bath was observed on August 26 and a dust bath on July 17. The "wicka" call was given first on July 23 when facing another flicker on a tree. In mid-September the "cuh-cuh" song was used. On October 6 the weight was 139 grams and the wing length was 155 mm. Until October 10 this flicker came to the house for food but thereafter although still in the vicinity showed no interest in being fed.

ANATOMY AND HISTOLOGY

25. Histological Study of the Digestive System of the English Sparrow. L. J. Gier and Ottis Grounds. 1944. *The Auk*, 61(2) : 241-243. This is a very brief description of the histology and microanatomy of the digestive system of the English Sparrow, *Passer domesticus domesticus* (L.). Unfortunately the authors apparently have not had access to the rather large European literature dealing with the subject.

SYSTEMATIC ORNITHOLOGY

26. **Discovery of a New Vireo of the Genus *Neochloe* in Southwestern Mexico.** Alden H. Miller and Milton S. Ray. 1944. *The Condor*, 46(2) : 41-45. *Neochloe brevipennis browni*, new subspecies, described in this paper is the second form described in this remarkable genus.

GEOGRAPHIC DISTRIBUTION

27. **Borders and Subdivisions of the Polynesian Region as Based on Our Knowledge of the Distribution of Birds.** Ernst Mayr. *Proceedings of the Sixth Pacific Science Congress* (Berkeley, Stanford, and San Francisco, July 24 to August 12, 1939) 5 : 191-195. Based largely on information derived from birds collected by the Whitney South Sea Expedition the author proposes the borders and a system of subdivisions of the Polynesian Region. The following definition is given: "The Polynesian Subregion comprises all the tropical and subtropical islands of the Pacific Basin which indicate by their impoverished fauna that they had no recent continental connection (after early Tertiary) and which derived the major part of their fauna directly or indirectly from the Papuan Region or jointly from Australia and the Papuan Region." The Galapagos Islands whose fauna is derived from America and New Zealand are excluded. Hawaii, because of the extensive Holarctic influence and the extreme development of the endemic family, the Drepanididae, is regarded as distinct from the Polynesian Subregion. The Solomon Islands show a much closer affinity to the Papuan Region, probably due to a relatively recent connection with New Guinea. In spite of a large number of endemic forms and a strong Australian influence, New Caledonia is included in the Polynesian subregion. The following subdivisions are proposed: (1) *Micronesia*, including Palau, the Marianas, Caroline, Marshall, and Gilbert islands. These islands have a poor avifauna. There is a distinct Palearctic influence. In the western part there is a Philippine influence, whereas the central islands have a typical Polynesian avifauna. (2) *Central Polynesia*, including Fiji, Tonga, Samoa, Phoenix, Ellice, Union, and adjacent islands. The avifauna is typically Polynesian; there are twelve endemic genera and subgenera. (3) *Eastern Polynesia*, including all islands east of 165° W; Society, Tuamotu, Marquesas, Austral, Cook, and Line islands. There are only eighteen genera represented; only four of these are endemic. (4) *Southern Melanesia*, including Santa Cruz, Banks Islands, New Hebrides, Loyalty Islands, and New Caledonia. This is a heterogeneous group. Santa Cruz is intermediate between Fiji and the New Hebrides with closer affinities to the latter; there are no endemic genera and only two endemic species. The New Hebrides and the Banks Islands have a poor avifauna with two endemic genera and four endemic species. The Loyalty Islands with no endemic genera and two endemic species are much more like the southern New Hebrides than New Caledonia. New Caledonia has seven endemic genera and a strong Australian influence.

28. **Birds of Pine Valley Mountain Region, Southwestern Utah.** William H. Behle. 1943. *Bulletin of the University of Utah, Biological series* 7(5). 85 pp. In Washington County there are avian habitats varying in altitude from 2,500 feet in the Virgin River Valley to heights of 7,200 feet in the Beaver Dam Mountains and 10,324 feet in the Pine River Mountains. In terms of life zones the range is from the Lower Sonoran to Hudsonian, although the latter is poorly represented. Aquatic habitats and the extensive river bottom vegetation contribute much to the diversity of the avifauna. Next to the river bottom habitat the spruce-fir forest (Canadian Zone) contains more birds than any other habitat. There is an excellent discussion of the relation of the various species to

the habitats in the county. Washington county is the meeting place of at least three avifaunae. A number of southern desert (Lower Sonoran) forms occur in the Santa Clara and Virgin River Valleys. Among these are the Gambel Quail, *Lophortyx gambelii gambelii* Gambel; Road-runner, *Geococcyx californianus* (Lesson); Yuma Ladder-backed Woodpecker, *Dryobates scalaris yumanensis* van Rossem; Scott Oriole, *Icterus parisorum* Bonaparte, and others. There is also the influence of the Great Basin fauna (Upper Sonoran) in the north via the Escalante Desert involving such forms as the Sage Grouse, *Centrocercus urophasianus* (Bonaparte); American Magpie, *Pica pica hudsonia* (Sabine); Sage Thrasher, *Oreoscoptes montanus* (Townsend); Black-throated Gray Warbler, *Dendroica nigrescens* (Townsend); and others. The Pine Valley Mountains have several forms similar to the Rocky Mountain forms of the same species. Included among these are the Dusky Grouse, *Dendragapus obscurus obscurus* (Say), Rocky Mountain Nuthatch, *Sitta carolinensis nelsoni* Mearns; Audubon Hermit Thrush, *Hylocichla guttata auduboni* (Baird); etc. The check-list contains 250 species and subspecies; 27% are permanent residents, 37% summer residents, 9% winter visitants, and 25% are transient. A hypothetical list based on records in the surrounding regions contains 36 species and subspecies. There are "species accounts" of 141 species and subspecies. There are critical discussions of the interesting problems raised by the taxonomic status of the Steller Jays and Canyon Wrens of this region. This is a very interesting and valuable regional avifaunal treatise.

29. Concerning the Fronted Blackbird of Switzerland. (A propos de nos Merles á plastron.) P. Revilliod. 1943. *Nos Oiseaux*, 171 : 297-306. The Alpine Fronted Blackbird, *Turdus torquatus alpestris* (Brehm), nests at about 4,000 feet in Switzerland. The eggs are laid during the second week of May in the Jura Mountains and somewhat later in the Alps. During June while the young are leaving the nest the adults are noisy and conspicuous but from July on during the molt they are relatively silent. By October the young and adults have left the mountains. However, persistent flocks in the mountain valleys in autumn raise the question as to whether these are the nesting race, *alpestris*, or the Northern race, *T. torquatus torquatus* (L.). The variability of *alpestris* and the difficulty of distinguishing the two in the field has led to confusion. On the basis of museum skins and records the author has concluded that the northern race does migrate down the Jura Mountains since there are records from this area from September to December.

30. Apparent Status of the European Widgeon in North America. Edwin M. Hasbrouck. 1944. *The Auk*, 61(1) : 93-104. From a careful search of the literature the author has collected and mapped 596 records of the European Widgeon, *Mareca penelope* (L.), in North America. It is logically concluded that there is a definite southward migration along the entire Atlantic coast in fall and winter as far as east-central Florida and a similar movement on the Pacific coast as far south as extreme northern Mexico. There is a marked northward migration in spring up the Mississippi flyway. "The southerly fall and northerly spring migrations strongly suggest a fixed American stock breeding somewhere in Arctic America, the locality yet to be discovered."

31. Check-list of the Birds of Utah. William H. Behle. 1944. *The Condor*, 46(2) : 67-87. This is an annotated list containing 306 species and 350 species and subspecies. Eighteen percent are permanent residents, 46% summer residents, 7% winter visitants, 16% transients, 2% casual or irregular, 9% accidental, and 2% introduced.

32. A Winter List from the Tweed River District, N. S. W., with Remarks on some Nomadic Species. J. A. Keast. 1944. *The Emu*, 43(3) : 177-

187. An annotated list of 134 species observed from July 25 to August 14, 1942.

33. Some Alaskan Notes. Ira N. Gabrielson. 1944. *The Auk*, 61(1) : 105-130 and 61(2) : 270-287. These are notes on birds observed and collected by the author from June 3, 1940 to August 13, 1940. More than 150 species and subspecies are listed.

34. Notes on Birds of the Yuma Region. Gale Monson. 1944. *The Condor*, 46(1) : 19-22. This an annotated list containing 33 species known to occur in the region of Yuma and the Imperial Dam. Most noteworthy is the addition of the Roseate Spoonbill, *Ajaia ajaja* (L.), to the state list of Arizona. This addition is based on a sight record in Maricopa County, July 6, 1940; a specimen collected in the same county in July or August (date unknown), 1942; and a flock of ten, eight adults and two immatures, observed in Yuma county, September 30, 1942. The only previous record (1916) is questionable.

35. Notes on Summer Birds of Guerrero. William B. Davis. 1944. *The Condor*, 46(1) : 9-15. There is an annotated list of 153 specimens of 67 species collected from August 3 to August 18. Two collecting stations were operated: Rio Aguacatillo, 30 km. north of Acapulco at 1,000 feet and a station 15 km. south of Chilpancingo at 4,300 feet. *Colymbus dominicus brachypterus* (Chapman), *Heterocrus cabansi* (Heine), *Coccythia alba* (Pallas), and *Progne chalybea chalybea* (Gmel.), "seemingly constitute new records" for the state of Guerrero.

36. Summer Birds of the Gothic Area, Gunnison County, Colorado. Dorothy Anderson Knox. 1944. *The Auk*, 61(1) : 19-30. This annotated list contains 51 species. It is particularly important in consideration of the fact that the ornithology of this region is not well known. The area studied lies in the Transition, Canadian, Hudsonian, and Arctic Zones on the west slope of the divide.

37. Bird Observations Taken at Albany, Nova Scotia. R. W. Tufts. 1943. *The Canadian Field-Naturalist*, 57(7/8) : 142-146. An annotated list of 115 species and subspecies based on observations and collected specimens made over a period of nineteen years. Of particular interest is the record of several Chimney Swifts, *Chaetura pelagica* (L.) nesting in an old well about four or five feet below the surface of the ground and two or three feet above the surface of the water. The nests were attached to the rocks lining the well.

HEREDITY, VARIATION, AND EVOLUTION

38. The Origin and Age of Bird Races. (Ueber die Entstehung und das Alter von Vogelrassen.) Georg and Joachim Steinbacher. 1943. *Zoologischer Anzeiger*, 141(7/8) : 141-147. Stresemann and other authors in accounting for the origin and age of the races of certain European passerine species proposed that these species had been split during the ice age into geographically isolated populations which differentiated into races. It was proposed further that with the recession of the glaciers, at least in the cases of some species, the races extended their geographic ranges until they overlapped resulting in an area of interbreeding and a "mixed" intermediate population. On the basis of these assumptions the ages of such races should be placed at about 20,000 years. Hartert and subsequent authors placed a different interpretation on the "mixed" intermediate populations. It was concluded that they were the *original stock* of the species from which the geographically extreme races had differentiated. According to the authors of this paper the theory of the separation of a species into isolated populations during the ice age is not tenable because of the presence, during the ice age, of a con-

tinuous forest belt (containing a northern pure birch-pine-fir section, a central birch-pine section mixed with more southern species, and a typical central European deciduous forest section) extending from the mouth of the Loire River to Asia Minor in which there was geographical continuity in the species. It is proposed that the formation of races has been caused primarily by changes in floral geography due to changes in the climate of Europe since the ice age. The changes affect race formation because of the close adaptation of certain species to particular forest types such as *Troglodytes troglodytes*, *Regulus regulus*, and *Parus palustris* to the deciduous Atlantic Forest and *Pyrrhula pyrrhula* to the taiga (fir, pine, white birch, etc.). The various post-glacial climatic changes (outlined in some detail) have resulted in profound geographical changes in the "forest types" which have in turn been followed by the formation of races among the accompanying species of birds. Consequently the authors concluded that most races of European passerines are much younger than previously supposed; many are perhaps no older than three or four thousand years.

39. Six Years with a Brewster's Warbler. T. Donald Carter. 1944. *The Auk*, 61(1): 48-61. Observations of a male Brewster's Warbler, *Vermivora leucobronchialis* (Brewster), were made during six nesting seasons during which five nests were discovered. In each of the seasons in which the nest was found the mate was a Golden-winged Warbler, *Vermivora chrysoptera* (L.), apparently a different female each year. Observations on a pair composed of a male Lawrence Warbler, *Vermivora lawrencei* (Herrick), and female Golden-wing and their young as well as two other Lawrence Warblers and four other Brewster's Warblers, a pair composed of a female Blue-winged Warbler, *Vermivora pinus* (L.), and a Golden-wing male and the offspring are described. Birds showed various degrees of hybridization such as Golden-winged Warblers with distinct yellow coloring on their breasts, and a Blue-winged Warbler with distinct yellow wing-bars. Details of the plumage of the various adults and young are carefully described. Suggestions (by John T. Nichols) concerning the mechanism of inheritance in the hybrid birds and their offspring are made. "It should be noticed that in all mixed nestlings observed, the female was a Golden-wing; the male, a Brewster's (five times), a Blue-wing (once), a Lawrence's (once). In the few mixed nestlings that have come to our attention in true Blue-wing territory, the female has been a Blue-wing, the male usually a Lawrence's." This interesting and significant paper contains many important contributions to the Blue-wing-Golden-wing hybrid problem.

40. Hybridization of Hermit and Townsend Warblers. Stanley G. Jewett. 1944. *The Condor*, 46(1): 23-24. Four skins are described which are obviously hybrids of the Hermit Warbler *Dendroica occidentalis* (Townsend), and the Townsend Warbler, *Dendroica townsendi* (Townsend). It is stated that the plumage of two of the specimens shows that the hybridization has gone further than a single generation. The suggestion of hybridization between these species is strengthened by the observations of songs which are intermediate between the typical Hermit and Townsend songs, presumably the songs of hybrid males.

PARASITOLOGY

41. Notulae Mallophagologicae. IX. *Oedicnemeceps* nov. gen. and other Interesting Birdlice from Unusual Hosts. (Notulae Mallophagologicae. IX. *Oedicnemeceps* nov. gen. und andere interessante Federlinge von bemerkenswerten Wirten.) Wolfdietrich Eichler. 1943. *Zoologischer Anzeiger*, 141(3/4): 47-61. This paper describes four new species and one new genus of Mallophaga. Five species are renamed. This series of papers demonstrates well a productive field

of research that could be developed to a much greater degree in American ornithology.

42. *Tetrophthalmus vigua* nov. spec., a Mallophaga from the Mouth Cavity of *Phalacrocorax olivaceus*. (*Tetrophthalmus vigua* nov. spec., ein Federling aus der Mundhöhle von *Phalacrocorax olivaceus*.) Wolfdietrich Eichler. 1943. *Zoologischer Anzeiger*, 141(3/4): 133-136. Members of this genus are common in pelicans. This record is apparently the third from cormorants.

BOOKS AND MONOGRAPHS

43. *Strange New World*. Alec H. Chisholm. 1941. Angus Robertson, Ltd., London and Sydney. xx + 382. 9/6. In the spring of 1838 John Gould, the father of Australian ornithology, with his wife, nephew, two servants, and John Gilbert arrived at Hobart Town. One hundred years later the author of this book was in London seeking additional documents concerning the life and work of John Gould. A grand-daughter of the great Australian ornithologist recalled dividing a group of papers belonging to her grandfather among her two sons. Among these were letters written by John Gilbert but more important his diary written while he was a member of the first Leichhardt expedition. This diary together with the letters of Gilbert, Gould, and others as well as Leichhardt's journals are among the sources used in assembling an authentic account of the activities of Gilbert, who until his death was Gould's principal collaborator, and Leichhardt with whom Gilbert was associated on the former's overland expedition in 1844-45. In tracing the activities of these two men an excellent picture of the natural history of early Australia is drawn. The vividness of this picture is enhanced by a careful selection of accounts of pertinent observations and historical events by contemporaries. Much of the book is devoted to the first Leichhardt expedition based largely on the diary of Gilbert and the Journal of Leichhardt, the former apparently being the most accurate source. The expedition proceeded overland from Brisbane and was joined in August 1844 at Darling Downs by Gilbert. In northern Queensland, in June 1845, Gilbert was killed in a skirmish with natives. The expedition eventually reached Port Essington in Northern Territory. A section is devoted to the disappearance of Leichhardt on a subsequent expedition which still remains a mystery. This book is recommended as an interesting account of the activities of Gilbert and Leichhardt and as a record of the natural history of Australia of that period.

44. *The Ecology and Management of the American Woodcock*. Howard L. Mendall and Clarence M. Aldous. 1943. Maine Cooperative Wildlife Research Unit, Orono, Maine. x + 201 pp. This bulletin summarizes the results of investigations on the American Woodcock, *Philohela minor* (Gmelin), extending over a period of almost six years. In general this research was directed towards population studies and those phases of the life history having a more or less direct bearing upon management and management policy. In this respect it is complementary to Pettingill's monograph, "The American Woodcock" published in 1936, although in many instances there are supplementary observations and data. The importance of American Woodcock as a game species is well indicated by the fact that the legal kill for 1939 in the United States and Canada is estimated at about a quarter of a million birds, a significant number for a species of low breeding potential and more or less restricted range. At present the breeding range of this species includes all or part of about 35 states and provinces. Although it winters in eleven southeastern states the vast majority of the birds spend this season in Louisiana. The studies described in this report are confined largely to New England and particularly to Washington County, Maine. Data on migration are, in general, very meager. Both the spring and fall migrations are apparently

very irregular and dependent on weather conditions. It appears that the birds wintering in Louisiana come from all parts of the breeding range. It is possible that the breeding birds of the lake states reach these areas by direct route up the Mississippi Valley. The route of the New England breeding birds is obscure. There is some evidence, based on hunters' bags, that there is some sexual segregation in fall migration. The authors indicate that there is as yet insufficient evidence to establish whether or not there is a homing instinct although two interesting records are cited from banding returns in which adult birds were recovered very near the place where they were banded as young. There is a misleading caption, "Yearly return of female to nesting territory", in which the authors merely wish to discuss the use of the same nesting territory in successive seasons. There are few records both in the literature and in their data of nests being located near a nest of the preceding year.

The authors have recorded valuable data contributing to the general knowledge of the species such as measurements of body weight, wing length, bill length, and tail length according to sex. Although in all cases mean female measurements were larger than the mean male measurements the overlapping between the sexes was too great to allow such data to be useful as criteria for sex determination of live birds. The authors feel that the Woodcock is completely monogamous, contrary to previous suggestions that it is on occasion polygamous. The authors agree with previous suggestions that the incubating birds are doubtless females although banding observations are needed to establish this point with certainty.

Considerable attention was given to censuses and census methods. Use of strip counts in sample areas which have been found successful with the Roughleg Grouse were found impractical because of the restricted habitats of Woodcocks and the irregular manner in which they flush. A drive method in which several men walked abreast, about six feet apart, across the area was found to give reliable results but was too time-consuming. The most successful method was found to be an *annual count of the occupied singing grounds*. This method is described as valuable in establishing population trends. In general, the section on population trends (p. 167) is not well developed. In the Maine area a 21% increase was noted from 1937 to 1938, a 2% increase from 1938 to 1939, a 37.5% decrease from 1939 to 1940, an 18.5% decrease from 1940 to 1941, and apparently a 24% increase from 1941 to 1942. Although some data from Nova Scotia and Pennsylvania are cited it seems that more information could have been compiled to help show trends. It is concluded that the Woodcock populations have been gradually increasing following a low point in the early part of the twentieth century. The authors' calculations indicate that the maximum concentration of Woodcock possible is one pair per six acres. The concentration is much lower in most areas. An analysis of breeding cover in the northeastern part of its range shows that first choice is open mixed growth in which there is a preponderance of hardwoods. Alder or alder-willow types and young hardwood types are second and third choices. Late summer and fall preferences for cover are for the alder and the hardwood types. The singing ground is an essential requirement of the breeding cover and consists of a clearing, usually of an area of one-quarter to one-half acres, and adjacent or near the male's daytime cover. One of the limiting factors in the carrying capacity of an area can be the lack of sufficient clearings for singing grounds. One of the important contributions of this research project is the recognition of this fact and the possibility of increase in carrying capacity by the creation of artificial clearings.

Adult food consists predominantly of earthworms with Coleoptera larvae and various vegetable items as minor sources. Apparently the food of the young is similar although even more exclusively of animal origin. More research could have been devoted to this point. Nesting losses are about 30%, about one-third due to predation. Juvenile mortality was 10%. Fire and hunters are concluded

to be the most important lethal factors in the northeastern part of the range. Three general types of suggestions for management are made: (1) adequate closed season and bag limits, (2) establishment of sanctuaries and refuges, and (3) cover improvement. The following suggestions are made for the improvement of woodcock habitat: (1) creation of artificial singing grounds, (2) creation of new cover by thinning and selective cutting, and (3) the control of fire. It appears that the bulletin could have been improved by condensation of certain parts and the use of briefer citations of the work of other investigators which could be consulted in the original by interested readers. Nevertheless this report will be found to be an important source of information on the Woodcock.

45. Travels in Georgia and Florida, 1773-74. A Report to Dr. John Fothergill. By William Bartram. Annotated by Francis Harper. 1943. *Trans. American Philosophical Soc., New Ser.*, 33, Part 2 : 121-242. A splendidly edited and illustrated printing of Bartram's diary "during the first two years of his extended southern trip." The day by day accounts of primitive conditions, the flora, birds, alligators, Indians, etc., are of much interest. Dr. Harper's scholarly introduction, the notes, the impressive "Annotated Index," the general index, the maps, fine photographs of the country in its present state, and the valuable reproductions of Bartram's drawings of plants, birds, fish, and "bellowing" alligator, all combine to make this a real contribution to historical natural history.—M. M. Nice.

46. Shrubs of Michigan. Cecil Billington. 1944. Cranbrook Institute of Science, Bloomfield Hills, Michigan. Bulletin No. 20. 244 pp. \$2.50. The increasing emphasis on the ecological aspects of ornithology enhances the necessity for tools such as this manual. Of particular importance to ornithologists is the fact that it is adjusted to a non-technical knowledge of botany. All terms used in the descriptions and keys are clearly illustrated. The keys to the genera and species are clear and concise. There is a brief but adequate description of each species, maps showing the distribution of each, and drawings of the leaves and stems, as well as flowers and fruits of most of the species. In general, varieties are omitted. There are directions for collecting material for identification, a brief discussion of the plant ecology of Michigan, and a section on botanical literature. This manual should prove itself invaluable to those whose work requires the identification of shrubs in Michigan and adjoining areas.