Banding is done with from two to fifteen cooperators—usually students from biology and nature study classes at the college. We arrive at the colony soon after sundown. The first operation is to block the nest entrances with crumpled paper towels. One of the assistants who has been along several times—or myself—usually perform this operation with as little disturbance as possible, otherwise many of the birds leave the nest before we are ready to take them. This is especially true on bright moonlight nights.

Next we organize for capturing, banding, and returning the birds. Usually two individuals with focusing flashlights capture the birds by flashing the light into the burrow. The birds usually come to the light readily and can be picked up at the edge of the burrow with the bare hand. When one has a flashlight in one hand and catches as many as nine swallows from one burrow in the other hand —he has practiced! Extremely young birds will not come to the light, and brooding females come only with much coaxing, even prodding with a stick or wire.

The "catchers" pass the birds from a single burrow on to the "carriers" who bring them to the "bander." They are banded and the band numbers and family groupings read to the "recorder." The bander then passes the birds back to the carrier, who carries them to the catchers to return to their original burrows and close them in with the paper wad. The last operation of the evening is to remove all paper wads without disturbing the birds.—HAROLD C. BURDICK, State Teachers College, Mayville, North Dakota.

RECENT LITERATURE

Reviews by Donald S. Farner

BANDING

1. Report of the Bird-Ringing Committee. A. Landsborough Thomson 1943. *British Birds*, 16: 209–213. In 1942, 4,567 birds were banded as compared to 7,099 in 1941, and 55,817 in 1939. Since 1909, 715,314 have been banded. Species banded in greatest numbers in 1942 were the Starling (*Sturnus vulgaris vulgaris* L.), 444; Greenfinch (*Chloris chloris chloris* (L.)), 197; Song Thrushs (*Turdus ericetorum ericetorum* Turton), 349; Blackbird (*T. merula merula* L.), 191; Swallow (*Hirundo rustica rustica* L.), 480; Lapwing (*Vanellus vanellus* L.), 462; Arctic Tern (*Sterna paradisaea* Brünnich), 196. Species which have been banded in greatest numbers since the beginning of the banding program in 1909 are the Starling, 69,882; Greenfinch, 30,118; Chaffinch (*Fringilla coelebs* L.), 33,649; Song Thrush, 68,466; Blackbird, 61,019; Robin (*Erithacus rubecula* (L.)), 23,477; Hedge Sparrow (*Accentor modularis* (L.)), 15,292; Martin (*Delichon urbica* (L.)), 12,313; Manx Shearwater (*Puffinus puffinus puffinus* (Brünnich), 20,007; Lapwing, 40,135; Common Tern (*Sterna hirundo hirundo* L.), 19,670; Sandwich Tern (*Thalasseus sandvicensis sandvicensis*), 17,987; and Black-headed Gull (*Larus ridibundus ridibundus* L.), 14,112. The largest numbers of returns have been from the Starling, 3,106; Greenfinch, 2,433; Chaffinch, 1,472; Song Thrush, 1,373; Blackbird, 2,933; Robin, 2,268; Hedge Sparrow, 1,419; Mallard (*Anas platyrhyncha platyrhyncha* L.), 1,118; Manx Shearwater, 1,101. The highest percentage of recoveries has been in the following species (at least 500 banded): Greenfinch, 8.1%; Yellow Bunting (*Emberiza citrinella* L), 7.1%; Robin, 9.7%, Hedge Sparrow, 9.3%; Little Owl (*Athene noctua* (Scop.)), 9.1%; Barn Owl (*Tyto alba* (Scop.)), 10%; Kestrel (*Falco tinnunculus* L.), 10.1%; Sparrow Hawk (*Accipiter nisus nisus* (L.)), 14.0%; Common Heron (*Ardea*

cinerea cinerea L.), 12.3%; Mallard, 16.0%; Teal (*Anas crecca crecca* L.), 12.0%; Cormorant (*Phalcrocorax carbo carbo* (L)), 20.8%; Shag (*P. aristotelis aristotelis* (L.)), 10.1%; Stock Dove (*Columba oenas* L.), 8.5%; Turtle Dove (*Streptopelia turtur* (L.)), 11.3%; Woodcock (*Scolopax rusticola* L.), 7.7%.

2. Recovery of Marked Birds. E. P. Leach. 1943. *British Birds*, 36: 235–240. This is a list of 110 recoveries reported during 1942. Of interest are 18 recoveries of banded Teal (*Anas crecca crecca* L.) including three recovered in Holland (1941) and two in Denmark (1940 and 1941). Even more remarkable, considering the times, is the report of the recovery of a Black-headed Gull (*Larus ridibundus ridibundus* L.) September 18, 1942 in Denmark. There were 17 Lapwing (*Vanellus vanellus* L.) recoveries. A Rook (*Corvus frugilegus frugilegus* L.) was recovered at Wells thirteen years after it was banded at the same place.

3. The Age of Some More Birds. David Lack. 1943. *British Birds*, 36: 214–221. The author continues his excellent observations on the natural life span of birds as based on banding data. His calculations from returns on trapped Robins (*Erithacus rubecula melophilus* Hartert) show that 62% of this species die each year; hence the expectancy of life on August 1 is 1.1 years. Mortality during the year after the first August 1 of life is 1 year. Although surviving the first year increases the chances of further survival additional years do not affect the life expectancy.

In the case of the Lapwing (*Vanellus vanellus* L.) the expectation of further life for any adult, regardless of age, is 2.5 years; 33% of the adults die each year. It is possible that the first-year birds do not survive quite as well although the difference is small. These data imply that in order to maintain a constant population each 100 adult birds must each year raise 33 young which survive to breed. Since of each 100 juvenile birds alive on August 1, 62 survive to breed, each 100 adult birds must produce 53 young birds alive on the first of August following hatching in order to keep the population constant. This amounts to 1.06 young (alive on August 1) per breeding pair per season. Kraak, Rinkel, and Hoogerheide (Ardea, 29: 151–174, 1940) found in their studies in Holland that 40% of the population dies each year and that the life expectancy of adult birds is about 2.0 years regardless of age. These authors calculated that each 100 adult birds must raise 70 young (alive on August 1 following hatching) per season in order for the population to remain constant. This amounts to 1.4 young (alive on August 1 following hatching) per pair per season. Lack as well as Kraak, Rinkel, and Hoogerheide was unable to obtain information on the mortality rate between hatching and the time that the young fly.

Recoveries of European Woodcocks (*Scolopax rusticola* L.) were largely from birds collected by shooting. The author assumes that the older birds are shot as easily as the young, an assumption which he admits is unproven. Basing calculations on this assumption, however, it is concluded that the expectancy for first-year birds (on August 1 following hatching) is 1.7 years whereas the expectancy of the older birds is 2.2 years. About 37% of the adults die each year. "Of every 100 juveniles alive on August 1 about 44 survive to breed the next season, hence 37 first year breeding birds (number necessary to replace the annual adult deaths) correspond with 84 alive on August 1. This means that every 100 adults must each year produce 84 young which survive up to their first August 1, or 1.7 per pair."

In the studies on Black-headed Gulls (*Larus r. ridibundus* L.) there was considerable discrepancy between the data on those birds which were shot and those which were recovered by other means. The life expectancy as calculated for those shot was 0.7 years for the first year of life (August 1 to July 31), 1.6 years for the second year, and 2.7 years for the third year. In the other group life expectancy was 1.8 years for the first year, 2.4 years for the second, and 2.4 for the third.

It is obvious that when shooting is the only cause of death life expectancy increases with age presumably because the birds become warier and harder to shoot. Excluding from the calculation the birds which were shot it was concluded that the adult death rate is 33% per year. Of every 100 juveniles which leave the gullery, 38 survive to the following summer. Therefore 33 birds (number necessary to replace the annual adult deaths) correspond to 87 juveniles which leave the gullery or 1.7 juveniles per pair per season. This figure seems high in considering the fact that the clutch is two or three eggs which suggest that many of the birds "found dead" were actually shot. Data on the Lesser Black-backed Gull (*Larus fuscus graellsii* A. E. Brehm) demonstrate the same point. The expectancy calculated on the basis of shooting data is much lower during the first year than in ensuing years. These examples should inject caution into age studies based on banding data.

This is further emphasized in considering the author's data on the Cormorant (*Phalacrocorax carbo carbo* (L.)) derived almost entirely from shooting. Seventy-nine percent of the first year and 29% of the second year birds died each year. If these data are used in calculated life span it would mean that each pair would have to produce 6.5 young per season which exceeds the average clutch size.

Because the average age of birds is far less (perhaps about one-tenth) than the potential age it appears that natural death is a chance proposition regardless of age although it is possible that in general the death rate is somewhat higher during the first year of life.

MIGRATION

4. Migration and Fate of Transported Juvenile Waterfowl. C. S. Williams and E. R. Kalmbach. 1943. The *Journal of Wildlife Management*, 7: 163–169. These experiments were conducted with the object of discovering whether juvenile birds which have not made a migratory flight show a homing instinct or whether they assume the migratory routes of the members of the species of the region to which they have been moved. A total of 131 juvenile Canada Geese, *Branta canadensis canadensis* (L.), were captured in the Bear River Migratory Bird Refuge in Utah and released in refuges in the Mississippi flyway. "Returns from these transported birds indicate that their migrations, when made, were similar to those of birds native to these refuges. There was no evidence of an urge to return to the Great Basin whence they came." There were only eight returns among 213 transplanted ducklings. Seven of these indicated that the birds remained in their newly adopted flyways. "The exception was a Pintail recovered in its ancestral flyway during the second fall after its release." There is an excellent bibliography.

ECOLOGY AND POPULATION STUDIES

5. A Revision of the Ruffed Grouse. John W. Aldrich and Herbert Friedmann. 1943. The *Condor*, 45: 85–103. This paper is an example of a valuable type of contribution which can be made to avian ecology through the use of museum material. The authors recognize 12 races of the Ruffed Grouse, *Bonasa umbellus* (Linnaeus). It has been possible to correlate the distribution of these races with each of the major biotic communities or biomes of the Upper Austral, Transition, Canadian, and Hudsonian Life Zones with the exception of the grassland biome. Because the Ruffed Grouse is primarily a species of the deciduous forest it is characteristic of the climax community in the Deciduous Forest Biome of the Upper Austral of the eastern United States. It is confined entirely to the subclimax communities, dominated by deciduous species, in the

Canadian and Transition Zones of the mountains of the Pacific Coast region of western United States where coniferous species are the climax dominants. The Hudsonian race is *yukonensis* which is found in White Spruce—Lodgepole and Black Spruce—American Larch associations of the Northern Conifer Ecotone (chiefly subclimax communities). Canadian Zone races (chiefly subclimax communities in Spruce—Fir Biome) are *umbelloides* of the Englemann Spruce—Alpine Fir and White Spruce—Balsam Fir Associations, *affinis* of the Lodgepole Pine—Mountain Hemlock Association, and *monticola* of the Red Spruce—Fraser Fir Association. The Transition Zone races can be divided according to biomes and ecotones. (1) The Northern Conifer-Deciduous Forest Ecotone (climax and subclimax communities) has two races, *togata* of the Eastern White Pine—Sugar Maple—Eastern Hemlock Association and *monticola* of the Eastern Hemlock—Yellow Birch Association. (2) Grassland—Northern Conifer Ecotone is characterized by a form intermediate between *umbelloides* and *incanus* found in climax and subclimax communities of American Aspen—Paper Birch Association. (3) Races of the Western Mountain Transition Biome (chiefly in subclimax communities) are *incanus* and *umbelloides* of the Ponderosa Pine—Douglas Fir Association, *affinis* of the Sugar Pine—Ponderosa Pine Association, and *phaios* of the Western Larch—Western White Pine Association. (4) The Pacific Moist Forest Biome has three races all found in the Western Red Cedar—Western Hemlock Association (chiefly in subclimax communities); these are *sabini, castaneus,* and *brunnescens.* Three races are Upper Austral all occurring in the Eastern Deciduous Forest Biome (climax and subclimax communities). These are *umbellus* which occurs in the White Oak—Pitch Pine Association and the Red Oak—Beech Tulip Association and the Beech Tulip Association in which *monticola* also is found, and *medianus* of the White Oak—Shag Bark Hickory Association. A map shows the geographic distribution of these races. The paper is commendable in that it brings together Merriam's Life Zones and the biome concepts of recent ecologists. It is hoped that this will further a mutual examination of the desirable concepts of both schools. "Several well marked clines or trends in geographic variation are noticeable. Generally speaking brownish hues prevail on the two coasts while grayish tones replace them in the interior and to the north. Other clines are found in the relative darkness and pallor of pigmentation and in the proportion of the tarsus covered by feathers. Tarsal feathering reaches its maximum extent in Alaska and decreases in amount to the southward. The difference is even more pronounced in progressing both to the east and to the west of the Rocky Mountain region."

6. The Prairie Chicken in Illinois. Ralph E. Yeatter. 1943. *Illinois Natural History Survey Bulletin,* 22: 377–416. The Greater Prairie Chicken, *Tympanuchus cupido americanus* (Reichenbach), was originally distributed over the grasslands of Illinois. These grasslands which covered almost 60% of the State were avoided by the early settlers who cleared the timberlands for agriculture. The prairie chicken extended its range into these areas from the adjacent prairies. When the prairie sod was broken and grain became common the prairie chicken population increased enormously. This increase apparently reached its maximum development in the decade of 1860. From this time on agriculture became more intensive and the prairie chicken population decreased. At the present time the range is about 9% of the original. It consists of 2,600 square miles of gray soil prairie in the southeastern counties, 50 square miles of sand prairie along the Green River in Lee County in northwestern Illinois, and about 200 square miles of small areas principally in northern and south central Illinois. The areas now occupied by the Prairie Chickens are those of prairie soils of low fertility where special agricultural procedures and idle land create favorable habitats. In the southeastern range redtop grass is grown almost exclusively and

provides favorable cover throughout the year. Of particular value is the protection afforded by red-top grass during the nesting season and while the chicks are very young. In this range there is a relatively high percentage of uncultivated land which gives a certain amount of food and protection. However, the author believes that this is a secondary factor in the survival of the species in the red-top areas.

Much of the information used in this paper is derived from research of several years in a study area of four square miles in Jasper County, southeastern Illinois. In this area, "the evidence of sexual display in the male occurs on booming grounds in late January or February. This display reaches a climax in late April and ends about mid-June." The author presents evidence to show that there is a considerable difference in the development of the sexual cycle in the male and female. Hatching began in early May and reached a peak in the first half of June. In 1935–1936 in the study area 60% of the total nesting cover was red-top; it contained 36% of the nests, 57% of which were successful. Thirty-six percent of the cover was idle field and pastures containing 30% of the nests of which 33% were successful. Four percent of the cover was waste grassland containing 34% of the nests of which 54% were successful. The average clutch was 12.3. The highest density of nests observed in the study area was one nest per acre. Ninety-three percent of the eggs known to have received normal incubation hatched. Principal causes of nesting losses observed were predators, nest desertion by female, farming operations, and failure of eggs to hatch. Losses were greater early in the season. However these were replaced largely by renesting. Nests begun later than mid-June usually were unsuccessful. "Fall censuses of the Jasper County study area, beginning in 1935 and ending in 1941, showed a variation in population densities from one bird per 10 acres to one bird per 18 acres. The average was one bird per 14.3." Tabulations of stomach analyses show that the adult diet consists of 91% vegetable food and 9% animal food; the analyses of 14 young collected in late June, July, and August, 1936 and 1937, show 60.5% vegetable food and 39.5% animal food. Because of the abrupt transition from a diet consisting principally of animal food to one of vegetable food in the young of gallinaceous species, it is unfortunate that the author could not include more precise age data for the stomach analyses. It was found that flocking may begin as early as mid-August. Winter flocks contain from 12–75 birds. Dispersal from winter flocks takes place in March. This well-prepared paper contains much information, the result of an investigation of several years' duration. Its recommendations for future management, including a continued closed season, appear to be sound.

7. **Preferential Rating of Duck Food Plants.** Frank C. Bellrose, Jr. and Harry G. Anderson. 1943. *Illinois Natural History Survey Bulletin*, 22: 417–433. Speaking of previous studies the authors state: "In all these studies each plant species has been judged solely on its use, as determined in the laboratory analyses of stomachs. While this method ascertains the important duck food plants it does not reflect the relative values of these p ants, for no consideration is given the abundance of the plant species in the areas in which the stomachs have been collected." In order to correct this the authors have employed an "index rating" derived by dividing the "percent of use" of the various plants (calculated on the basis of the volume of seeds in the gizzards) by the percentage occurrence of the plants in the environment. Hence an index of 1.0 indicates that the plant is used approximately in proportion to its abundance. There are certain disadvantages in this method of study. Ducks may have fed at lakes distant to the lake where they were collected. Also there are local variations in the feeding habits of the species. The amount of seeds produced varies in each species of plant thereby changing their relative importance from year to year. Changes in water

level may affect the accessibility of certain plants. The authors base their conclusions on three years' study in Illinois during which 3,200 duck stomachs were examined. In this group there were 1,907 Mallards, 669 Pintails, 225 Green-winged Teal, 110 Blue-winged Teal, and 82 Baldpate. The following were concluded to be excellent duck food sources. Numbers given are the index value averages for 1938, 1939, and 1940. Rice cut-grass, *Leersia oryzoides* (Linnaeus) Swartz, 13; Walter's millet, *Echinchloa Walteri* (Pursh) Nash, 10; Wild and Japanese millets, *Echinochloa crusgalli* (Linnaeus) Beauvois and *E. frumentacea* (Roxburgh) Link, respectively, 3; Moist-soil smartweeds, *Polygonum pennsylvanicum* Linneaeus *P. lapathifolium* Linnaeus, *P. hydropiperoides* Michaus, and other *Polygonum*, spp., 4; Nutgrasses, *Cyperus erythrorhizos* Muhlenberg, *C. esculentus* Linnaeus, *C. strigosus* Linnaeus, 7. Lists of good, fair, and poor duck food plants are also given. This is an excellent piece of research.

8. Further Additions to the List of Birds Known to be Parasitized by the Cowbirds. Herbert Friedmann. 1943. The *Auk*, 60: 350–356. The author has listed new records of parasitism by the cowbirds for the last four years. New records of forms parasitized by the Eastern Cowbird, *Molothrus ater ater* (Boddaert) are the Black-billed Cuckoo, *Coccyzus erythropthalmus* (Wilson); Black-capped Chickadee, *Penthestes atricapillus atricapillus* (Linnaeus); Mountain Vireo, *Vireo solitarius alticola* Brewster; and Philadelphia Vireo, *Vireo philadelphicus* (Cassin). This increases to 149 the number of forms known to be parasitized by the Eastern Cowbird. New records for the Nevada Cowbird, *Molothrus ater artemisiae* Grinnell, are Wilson's Phalarope, *Steganopus tricolor* Vieillot; Sage Thrasher, *Oreoscoptes montanus* (Townsend); Western Robin, *Turdus migratorius propinqus* Ridgway; and Eastern Hermit Thrush, *Hylocichla guttata faxoni* Bangs and Penard. The Nevada cowbird is now known to parasitize 92 forms. New Records for the Dwarf Cowbirds, *Molothrus ater obscurus* (Gmelin) are the Texas Vireo, *Vireo belli medius* Oberholser; Yellow-headed Blackbird, *Xanthocephalus xanthocephalus* (Bonaparte); Gulf Coast Red-wing, *Agelaius phoeniceus littoralis* Howell and van Rossem; Brewer's Blackbird, *Euphagus cyanocephalus* (Wagler); Lawrence's Goldfinch, *Spinus lawrencei* (Cassin); San Francisco Towhee, *Pipilo maculatus falcifer* McGregor; Montana Junco, *Junco oreganus montanus* Ridgway; and Samuels's Song Sparrow, *Melospiza melodia samuelis* (Baird). There are now 96 forms for which there are records of parasitism by the Dwarf Cowbird. There are also two new records for the Argentine Shiny Cowbird, *Molothrus bonariensis bonariensis* (Gmelin), increasing its list to 115; one for the Western Shiny Cowbird, *M. b. occidentalis*, increasing its list to eight forms; and two new records for the Small Shiny Cowbirds, *M. b. minimus* Dalmas, increasing the number of hosts of this subspecies to 26. The Texas Sparrow, *Arremonops rufivirgatus rufivirgatus* (Lawrence), is listed as a new host record for the Bronzed Cowbird, *Tangavius aeneus* (Wagler).

9. Census of Swallows and House Martins in the Sedbergh District, N. W. Yorkshire. M. P. Winser and J. M. B. King. 1943. *British Birds*, 37: 32–34. These census figures are interesting and might be of value for comparison in similar work in this country. The territory which is covered contains "for the most part a valley which is grassland, parts of which are now under cultivation. The valley is no lower than 400 ft. above sea-level. The fields end at about the 700 ft. mark and the fells, which are good for sheep grazing, are covered with grass and bracken." The town of Sedbergh was not included in the censuses. In 1938 there were 17.2 pairs of Swallows, *Hirundo rustica rustica* L., and 6.5 pairs of Martins, *Delichon urbica urbica* (L.), per 1000 acres. In 1942 in exactly the same area there were 15.0 pairs of Swallows and 13.6 pairs of Martins per 1000 acres. "There seems to be no relationship between Swallows and House-Martins,

but on individual farms Swallows are rarely found if there are more than 4 or 5 pairs of Martins."

10. Distribution and Habitat Relationships of the Phainopepla. James E. Crouch. 1943. The *Auk*, 60: 319–331. The author discusses in detail the geographical distribution of this species, *Phainopepla nitens lepida* Van Tyne. Breeding occurs in the Upper and Lower Sonoran life zones especially in the latter. The limiting factor appears to be the distribution of vegetation. The most important plant is the mistletoe (*Phoradendron*) which grows frequently on the mesquite (*Prosopis*) and ironwood (*Olneya*). Phainopeplas apparently have adjusted themselves somewhat to the changes in conditions caused by man. They have become quite common in orange groves and apricot orchards in some areas. Migration in this species seems to be complex. There is apparently a definite northward migration in spring although there is perhaps also a simultaneous migration from east to west across the mountains. Conversely it is possible that there is an eastward migration as well as a southward migration in fall. The author emphasizes the need for banding studies on this species.

11. The Index of Heron Population, 1942. W. B. Alexander. 1943. *British Birds*, 36: 206–208. This is a compilation of reports on 90 heronries, most of them in England, a few of them in Scotland. Fifty-two of these were also included in the 1928 survey when they contained a total of 1,204 nests. The same 52 contained a total of 862 nests in 1942. Seventy-nine heronries whose total average number of nesting pairs for "normal years" was 1,654, had in 1942 a total of 1,123 nesting pairs. There was a decrease of 5% in 1942 from the numbers of 1941. This decrease was greatest in southwestern England, eastern England, and northwestern England.

12. Ecology and Management of the Mourning Dove, *Zenaidura macroura* (Linn.), in Cass County, Iowa. H. Elliot McClure. 1943. Agr. Exp. Sta. Iowa State Coll. Agr. and Mech. Arts, Research Bull. No. 310: 355–415. Three seasons' observations on "nearly 4,000 nestings" showed a percentage of eggs producing successful young, i.e., reaching the age of 14 days, of 54, 44, and 38, averaging 45, which corresponds closely to the success found for passerines in open nests. The average number of young raised per nest was 1.82, and the percentage of successful nestings 48. Interesting observations are given on the ecology of the birds.

Of the 1,643 nestlings banded, 81 (4.9 per cent) were recovered the same season in or near Lewis where the study was made. (Iowa has no open season on Doves.) Twenty-one (1.3 per cent) were recovered in fall and winter in Oklahoma, Texas, Louisiana and Mexico. Only one was retaken in the breeding season; it was killed by a cat 8 miles from Lewis. "No banded birds were noted to return to Lewis," p. 409.

It is a pity that the author did not carefully study the pertinent literature before he started on his time-consuming enterprise; he is mistaken on the elemental matter of the intervals at which Mourning Doves lay their eggs; he is confused on the problem of 3 eggs to a nest; he assumes that a squab might start to migrate at 19 days, although telling us that "growth of flight and tail feathers continued until the young were over a month old." He says that a Dove population will treble in a season; his calculations on pp. 410–12 show them trebling and quadrupling! The undue size of these estimates are partly due to an error in the author's method, and also, I believe, to underestimations of the actual breeding populations and of their losses. For detailed criticism see the review in the September Wilson Bulletin.—M. M. Nice.

13. Territoriality, Display, and Certain Ecological Relations of the

American Woodcock. Frank A. Pitelka. 1943. The *Wilson Bulletin*, 55: 88–114. The data and conclusions in this paper are based on "approximately 40 hours" of observations on the American Woodcock, *Philohela minor* (Gmelin), during a single period, five weeks in the spring of 1939, in northern Illinois. Most of the observations were apparently confined to three males. The author has mapped the feeding and display areas of these three males. Feeding areas were 250–300 feet in diameter and were not defended. Display areas were located in open areas adjoining the respective feeding areas and were defended. The roles of the "call note of advertisement and display", the cackle note used in assault and attack, and song flight which functions "chiefly in territorial advertisements" are discussed. There is an elaborate treatment of the data involving six tables and ten figures some of which seem superfluous. Considerable meteorological data are included but there are scarcely sufficient observations of the birds to make reliable correlations. Although this paper contains some interesting and valuable observations it does seem that considerably more investigation is needed to amply establish its conclusions.

LIFE HISTORY

14. Notes on the Life History of the Silver-eye Based on Colour-banding. C. A. Fleming. 1943. The *Emu*, 42: 193–216. This is an interesting banding study conducted at Wellington, New Zealand. Silver-eyes, *Zosterops lateralis* (Lath.), and other members of the *Zosteropidae* occupy an ecological niche similar to that of the vireos of the new world. In the spring of 1939, 38 birds were banded. Most of these belonged to the local breeding population. (Silver-eyes are non-migratory.) Eight of these 38 were banded as young. During the winter 16 (42%) of the adults were recovered; none of the eight young were recaptured. In the winter and spring of 1940, 297 birds were banded; 65% were never recovered. About 18% remained until after the beginning of September; 4.7% were found breeding in 1940. A population density of 24 pairs per acre of garden (exclusive of roads) was found. This density was exceeded only by that of the house sparrow.

In April–June most birds have finished molting and are in foraging flocks. There is very little song. In July flocks continue to forage in the treetops but tend to break into pairs when disturbed. There is occasional song. During August the birds are renewing the plumage of the head. Single males begin to isolate themselves to restricted areas sometimes accompanied by females. "Some of the August couples noted were the same as later nesting pairs, but others were temporary associations." In September "temporary mating continued to be recorded, song territories were still held by solo males, occasionally accompanied by females. The challenge song, probably associated with a mated pair attached to territory, . . . comes from more and more territories as the month progressed." In October more and more permanent matings occur. Nesting begins and the first clutches are laid in the second week. During the third week of October the first clutches hatch. By this time most pairs are permanently settled. In November more clutches are completed and the first young take to flight. Territories break down although some parents have left the young and are again defending territory in preparation for the second nest of the season. Breeding continues through December and January. February–March is characterized by the resumption of song and the beginning of flocking.

Incubation began after laying of the first egg whether or not a third was to be laid. Incubation period is 10–11 days.

15. Annual Cycle of the Black-capped Chickadee—3. Eugene P. Odum. 1942. *The Auk*, 59: 499–531. Parts 1 (The *Auk*, 58: 314–333), 2 (The *Auk*,

58: 518–535), and 3 bound together, $0.25. The author, University of Georgia, Athens, Georgia. (For more detailed reviews of Parts 1 and 2 see BIRD-BANDING, 12: p. 179–180, 1941 and 13: p. 43, 1943.) This monograph summarizes a complete year of observations from banding of the Black-capped Chickadee, *Penthestes atricapillus atricapillus* (L.), at the Edmund Niles Huyck Preserve, Rensselaerville, New York. The author divides the annual cycle into the six major seasonal patterns: (1) *Prevernal* (March) with "spring movements characterized by increasing restlessness and singing, shifting of birds from one flock to another, appearance of new birds, and disappearance of others". (2) *Vernal Period* (April) in which the flocks disperse, pairs are formed "apparently resulting from a simplified courtship; beginning of territory establishment *following rather than preceding pair-formation*". (3) *Estival Period* (May–June) which is the period of actual nesting. The male and female both work at the excavation of the nest hole but only the female carries nesting material and incubates. The male feeds the female during egg-laying and incubation. The incubation period is about 13 days; the young remain in the nest 16 or 17 days and are attended by the parents for a month or less after leaving the nest. (4) *Serotinal* (July–August) "characterized by movement and flocking of juveniles and the molting of adults". Flocks reappear. "The family group does not form the basis of the flocks since juveniles scatter widely while adults remain for the time being on or near the former nesting territories." (5) *Autumnal period* (September–November) with large populations, mixed flocks, and "general high sociability". (6) *Hiemal Period* (December–February) when most individuals remain restricted to areas of 20–50 or more acres and are associated in small flocks.

The author has recorded some interesting data on population density. On the preserve the population density reached a maximum, 30 birds per 100 acres (not corrected for non-suitable habitat) in October; at this time the density in the village vicinity was about 10 birds per 100 acres. In December the densities were about the same for the Preserve and the village, 15 birds per 100 acres. In February the Preserve density remained at 15 birds per 100 acres whereas that of the village increased to 25 per 100 acres as the population probably shifted toward the valleys. In March the village density increased to 29 per 100 acres and the Preserve density to 17 per 100 acres. In May the density in both areas dropped to five or six birds per 100 acres as the winter visitants departed. It would be of tremendous value if similar data could be obtained for this area for subsequent years.

The sixteen notes and calls are described in detail and discussed in reference to their role in behavior. Territories varied in size from 8.4–17.1 acres (mean, 13.2 acres). The numbers of eggs per clutch varied from five to eight, with four out of seven having seven eggs. Eggs are laid one each day. Of the nests observed carefully 60% were successful; 70% of the eggs laid were fledged. Detailed study of the dominance order in one of the winter flocks revealed that "dominance seemed to be well established and uni-directional between many individuals but the dominance order was not entirely linear or fixed". Part 3 contains a good general summary of the entire study. The bibliography is well selected although Palmgren's excellent study, "Zur Biologie von *Regulus r. regulus* (L.) und *Parus atricapillus borealis* Selys." (Acta Zoologica fennica, 14: 5–113, 1932), might have been studied and cited. This study not only supplies some valuable information on the chickadee but also provides an example of the type of study that needs to be done on many species.

REPRODUCTION

16. Observations on the Colonies of the Arctic Tern (*Sterna macrura* Naumann) **on the Farne Islands.** W. S. Bullough. 1942. *Proceedings of the*

Zoological Society of London, 112, Sec. A: 1–12. "The Arctic Tern has nested on the Farne Islands for as long as records exist, and its colonies are situated side by side with the nests of the Sandwich Tern (*Sterna sandvicensis sandvicensis* Latham), Common Tern (*S. hirundo hirundo* L.), Roseate Tern (*S. dougalli dougalli* Montague), Eider Duck (*Somateria mollissima mollissima* (L.)), Lesser Black-backed Gull (*Larus fuscus fuscus* L.), and occasionally Oyster Catchers (*Haematopus ostralegus* L.) and Ringed Plovers (*Charadrius hiaticula hiaticula* L.)." Nesting territories of the Arctic Tern were found to be small and nests were usually nine or ten feet apart. Territorial lines were found to be very flexible. Intruders were driven away when they approached the nest. Actually the distance from the nest which intruders were allowed to approach varied considerably. Although quantitative data are not given the author states that the eggs and young in the larger colony on Inner Farne Island were on the average much further advanced that those in the smaller colonies on the other islands. This agrees with the observations of Darling (1938) on gulls. Nesting was with equal success on several types of ground including sand, pebbles and rocks, thick vegetation, and short grass turf. At first the chicks did not understand the territorial system. However in the course of a day or two the young learn the boundary lines of the parents' territory "taught partly by the hostile reception it receives when it crosses them (territorial boundaries) and partly by the fact that it is only fed when near its own nest". Adults do not recognize their own chicks unless they are within the territory; they neither feed nor protect them outside of the territorial limit.

17. Size of Breeding Populations in Relation to Egg-laying and Reproductive Success in the Eastern Red-Wing (*Agelaius p. phoenicius*). Harry M. Smith. 1943. *Ecology*, 24: 183–207. Areas were selected so that large and small breeding aggregations could be compared. The largest marsh was five acres in area with cat-tails (*Typha latifolia* and *angustifolia*) as the principal type of cover. The nesting aggregation (Group A) in this area had 128 completed nests in 1940 and 167 in 1941. There were 24 smaller localities (Group B) with various types of cover including *Typha*, *Typha* and *Sparganium*, *Sparganium*, *Cephalanthus*, *Scirpus*, and *Solanum*. Group B had 75 complete nests in 1940 and 189 in 1941. The total area of the Group B habitats was 12.8 acres. Egg laying in Group A began 2 days earlier in April than Group B and had a higher degree of synchronization. (Brood II data are scarcely sufficiently extensive to draw conclusions.) This is in agreement with the observations of Darling (1938) on breeding colonies of gulls. However the reproductive success in Group A and Group B was identical (59.7 and 59.3% respectively) whereas in gulls (Darling) it was found that the larger colonies were more successful. Among the smaller groups of Redwings there were no positive correlations between reproductive success and the size of the colony. Group A had an edge of about 3,000 linear feet whereas Group B had an edge of about 16,000 feet; hence there was no apparent "edge effect" on reproductive success or the number of nests. There was likewise no correlation between population density and nesting success. An interesting paper.

18. An Investigation into the Roles of Males in Relation to Incubation. B. H. Ryves. 1943. *British Birds*, 37: 10–16. The author emphasizes the importance of distinguishing between *brooding* and *incubating* in reference to clutch. *Incubation*, especially in passerine species, requires a physiological adaptation to enable the bird to warm the eggs sufficiently for development. *Brooding* of the eggs is merely the occasional sitting on them without raising their temperature enough to produce development. Three categories are proposed: (1) Species in which the females undertake incubation and males may occasionally be observed brooding the eggs. (2) Those in which the males undertake a definite

and proved part in incubation throughout the period. Seabirds, shorebirds, some hawks, and others. (3) Those in which the male alone undertakes incubation. Phalaropes. Most of the paper is concerned with a critical examination of the "incubation" habits of the males of several species of British Birds.

19. Brood-Patches and the Physiology of Incubation. B. W. Tucker. 1943. *British Birds*, 37: 22–28. This is an interesting summary of the literature dealing with brood-patches. "In some types of birds, such as passerines, birds-of-prey, grebes, and pigeons, there is a single median brood-patch. In others, such as waders and gulls, there are a pair of lateral patches and a median posterior one. In the gallinaceous birds there are also three patches, but the median one is between rather than behind the other two, with which it becomes more or less confluent." It is emphasized that an increase in vascularization occurs with the loss of feathers. Cormorants and Gannets do not have brood patches; however, in the Gannets the feet which are well vascularized, are used to warm the eggs. There also are no brood-patches in ducks and geese although the extra insulation provided by the down placed in the nest apparently results in temperatures high enough for the development of the eggs.

20. A Nesting Study of the Wood Thrush. Hervey Brackbill. 1943. The *Wilson Bulletin*, 55: 73–87. This paper summarizes 75 hours' study of a color-banded pair of Wood Thrushes, *Hylocichla mustelina* (Gmelin), in Baltimore in 1942. The male established territory on April 29. Incubation was entirely by the female who was on the nest 68% of 940 minutes observed during the first brood incubation and 80% of 1014 minutes during the second brood incubation. Twenty-three complete periods ranged from seven to 58 minutes. Attentive periods during the first brood averaged 8.5 minutes as compared to 6.5 during the second. Brooding also was done only by the female. Both parents shared feeding and nest sanitation. The first brood left the nest at 12–13 days; the second at 8–10 days. After leaving the nest the young were fed by the parents until the age of 25–32 days. The first brood was fed at the rate of 9.3 feedings per hour as compared to 4.7 for the second.

21. The Breeding of the Marabou Stork in East Africa. M. E. W. North. 1943. The *Ibis*, 85: 190–198. Although the Marabou Stork (*Leptoptilos crumeniferus* Lesson) is a common bird in East Africa, breeding records are scarce. The author has listed both previously published records as well as new records. In Kenya and Uganda he lists five records of colonies varying in size from 8 to more than 100 nests each. There is a single known colony in Tanganyika with about 100 nests. Colonies along the Juba River in Italian Somaliland have decreased from 1500 nests to no more than 300 in 1941. There are probably also colonies on the Webi Shebelli River in Italian Somaliland. The breeding season begins in October or November during the short rains. Nests are either in tall forest trees or thorned acacias.

22. Breeding Notes on the Phainopepla. A. L. and R. M. Rand. 1943. The *Auk*, 60: 333–341. This paper is based on observations made by the authors near Tucson, Arizona, during the period, February to June, 1940. The males established territories and "advertised themselves visually, by conspicuous perching and display flights instead of singing". The first eggs were observed on March 3. The males started nest building before they were mated; females aided in completing the nests. Courtship flights, including both sexes, and courtship feeding were observed. "Usually male and female shared nest duties, but at one nest the male alone fed the young." Territory defense ceased during incubation but reappeared after the young had hatched.

23. Some Observations on the Marsh-Harrier. Eric J. Hosking. 1943

British Birds, 37: 2–9. In the 60 years prior to 1927 there were only two authentic breeding records of the Marsh Harrier, *Circus aeruginosus aeruginosus* (L.), in Great Britain. Since 1927 a very small number, no more than three breeding pairs per season, have been recorded from Norfolk. The author made observations on these Norfolk birds during the summer of 1942. Among the more interesting of his observations was that of observing a male feeding two females occupying nests about 300 yards apart, the first record of polygamy in the species. The paper contains many interesting observations on feeding habits, both of adults and young. There are four excellent photographs.

24. Nidification of the Passerine Birds of Hispaniola. James Bond. 1943. The *Wilson Bulletin*, 55: 115–125. Primarily an annotated list of nests of passerine species of Hispaniola with remarks on the bearing of nidification in the relationship of certain species.

PHYSIOLOGY

25. Light Requirements of the Weaver Finch. Marie Rollo and L. V Domm. 1943. *The Auk*, 60: 357–367. These experiments have been performed with 39 male Weaver Finches, *Pyromelana franciscana* (Isert), in eclipse plumage. It was found that the optimum daily light period necessary for producing nuptial plumage was 13–14 hours and that longer and shorter daily periods actually retarded the appearance of the nuptial plumage. It was found that it was possible by regulating the daily periods and intensity of light to bring the birds into nuptial plumage at any time during the year and to sustain the nuptial plumage indefinitely. When exposed to nine or ten hour daily periods of light birds in eclipse plumage do not assume nuptial plumage and those in nuptial plumage pass into eclipse plumage. The optimum light intensity was found to be about 126 foot candles; however, "given enough time, any intensity sufficient for the survival of the birds will produce nuptial plumage provided that they have the optimum period". It is stated that there is an increase in the size of gonads correlated with the change to nuptial plumage. It is of further interest to note that an excessively long light period may cause birds in nuptial plumage to go into partial molt. These are significant experiments in avian physiology. It would be of great interest if the actual physiological mechanism involved could be ascertained. The possible roles of the pituitary and the gonads should make very interesting research.

26. The Spring Molt of the Gambel Sparrow. Harold Michener and Josephine R. Michener. 1943. The *Condor*, 45: 112–116. Interesting data on the spring molt of this species, *Zonotrichia leucophrys gambelii* (Nuttall), are recorded in this paper. These data indicate that the spring molt may begin any time between late January and early February. At least among those starting to molt in January and February the duration was about two months. Details of the molt in relation to the tracts involved are given.

27. The Nature of the Red, Yellow, and Orange Pigments in Woodpeckers of the Genus *Colaptes*. Frederick H. Test. 1942. *University of California Publications in Zoology*, 46: 371–390. Carotenoid pigments from the flight feathers of *Colaptes auratus* (L.) and *Colaptes cafer* (Gmelin) and their hybrids as well as those from the malar stripe feathers of *cafer* and the nuchal crest feathers of *auratus* were extracted, separated, and studied spectroscopically. It was concluded that the yellow color of *auratus* is due principally to xanthophylls and to a lesser extent to carotenes and that the scarlet of *cafer* is due in the larger part to red carotenoids with absorption maxima of 475–500 millimicra.

The presence in the flight feathers of *cafer* of some xanthophylls and carotenes like those of *auratus* was also detected. Flight feathers of the hybrids contained carotenes, red carotenoids, and xanthophylls as in *cafer* but in different proportions. Red in the malar feathers of *cafer* and the nuchal crescent of *auratus* is due mostly to red carotenoids; these feathers contain also small amounts of xanthophylls and perhaps carotenes.

28. Geophysical Phenomena and the Activity of *Otus asio*. Leon Kelso. 1942. *Biological Leaflet No.* 15, 4 pp. Published by the author. The author in studying five young Screech Owls, *Otus asio naevius* (Gmelin), reports that at or shortly before the new moon phase there was a drop in average weight of five or more grams. Certain correlations are made with the departures of the male from perch and territory during the various moon phases. The observations recorded here are very interesting but it is necessary that sufficient data be obtained for reliable statistical analyses. Also caution should be exercised in nterpreting such correlations as cause and effect.

29. Nighthawk Activity and Lunar Cycle. Leon Kelso. 1942. *Biological Leaflet* No. 16, 2 pp. Published by the author. In this paper it is asserted that the bulk of the daytime activity of Nighthawks, *Chordeiles minor chapmani* Coues and *C. m. minor* (J. R. Forster), excluding that preceding storms, occurred in the last quarter and early new moon phases. It appears that more data are needed to fully establish this observation.

30. The Moon and *Strix*. Leon Kelso. 1942. *Biological Leaflet* No. 71, 2 pp. Published by the author. According to the author there is a tendency in the Barred Owl, *Strix varia* Barton, to leave the perch earlier during high tide stress. Since the observations are based entirely on the behavior of a single female and further because the average difference in departure between high and low tide stress is very small (3.5 to 8.0 minutes) many more data are needed to establish this point firmly.

31. Weight Variation in *Otus asio*. Leon Kelso. 1942. *Biological Leaflet,* No. 18, 4 pp. Published by the author. The author's data and graph show a weight rhythm in five young Screech Owls, *Otus asio naevius* (Gmelin). Weight tended to increase more noticeably during the first quarter and full moon phases. Unfortunately a statistical analysis was not made to determine whether or not the observed differences (in the order of seven grams in 160) are true differences.

BEHAVIOR

32. Sexual Behaviour in British Birds from October to January. Averil Morley. The *Ibis*, 85: 132–158. The author has compiled notes on the winter sexual behavior of seventy-five species of British birds. Both the compilation and its bibliography of 150 titles should prove to be valuable.

ANATOMY AND EMBRYOLOGY

33. Some Additional Anatomical Factors Bearing on the Phylogeny of the *Struthiones*. Percy R. Lowe. 1942. *Proceedings of the Zoological Society of London*, 112, Ser. B: 1–20. The author supplies further evidence to support his theory that the struthioniform birds are not a group with degenerate organs of flight but rather "surviving relics of a primative avian stock which had advanced a few steps further toward flight and the complete avian status than certain bipedal dinosaurs such as *Ornitholestes hermanni hermanis*". The hand

bones of this reptile "exhibit a perfect adumbration of what is to come in the bird". He cites as further evidence of this relationship the fact that the preaxial division of the *Flexor carpi ulnaris* muscle in Rhea is nothing more than a "very thin fleshy slip" whereas neognathous birds, flight and flightless, have a much larger and better developed preaxial division which is larger than the postaxial portion of the muscle. The author regards the condition in Rhea as primative and not degenerate. He cites as further evidence of primativeness the fact that the muscle has no connections with "neither lesser, median, nor greater under wing coverts". The paper also considers the phylogenetic position of the tinamous "All evidence appears to fully substantiate the claim of the tinamous to be paleognaths." They are regarded as a more modern and successful development of paleognaths than the *Struthiones* and the only paleognaths known to be even partially successful in flight. Accordingly the author recognizes three or four categories of paleognaths. (1) *Cursorial group* represented by present-day *Struthiones* as well as the *Diornithiformes* and such fossil forms as *Gastornis*. (2) *Flying group*, the tinamous. (3) *Apteryx*, "difficult to classify". (4) *Aquatic or swimming group* represented by *Hesperornis*, a provisional suggestion, depending on whether or not the palate is paleognathous.

34. Comparison of the Embryo of the Emu with the Corresponding Stages of Carinate Birds. (Vergleich zwischen Emu-Embryo und entsprechenden Caranitenstadium.) Hardy Lutz. 1942. *Revue Suisse de Zoologie*, 49: 299–399. Two embryos, 15 and about 20 days old, of the Emu, *Dromiceus novae-hollandiae* (Latham), have been studied comparatively with the embryos of carinate species including *Fulica atra* L., *Podiceps cristatus* (L.), *Meleagris gallopavo* L., *Anser anser* L., *Cygnus olor* (Gmelin), *Columba livia* L., *Syrium aluco* (L.), *Melopsittacus undulatus* (Shaw), *Serinus canarius* (L.), as well as the lizard, *Lacerta agilis* L. The glass plate reconstruction as well as other methods was used. Most of the conclusions on the Emu are drawn from the study of the 15 day embryo. This paper is important as a source of information on comparative avian embryology. From this standpoint it is far too extensive to review. Certain observations, however, are also of importance in ascertaining the phylogenetic origin of the Emu. At fifteen days the general external form, the general aspects of the skeleton, heart, blood vessels, and digestive system of the Emu embryo are similar to those of corresponding stages of the carinate embryos. However in some respects the Emu embryo is more primative. In the Emu embryo the *Pars canicularis* (otic capsule) ossifies independently of the *Pars occipitalis* of the basal plate. The basal portion of the columella in the Emu, *Anas*, and *Gallus* represents the final development of the hyomandibular. It ossifies in connection with the hyomandibular and independently of the *Pars canicularis*. Ossification of the ribs in the Emu, *Anas*, and *Gallus* is independent of the ossification of the vertebrae. There are independent centers of ossification in the dorsal and ventral parts of each of the sternal ribs. The sternal plate ossifies independently of the ribs. Whereas in the carinate embryos there is a single unpaired opercular fold the Emu embryo has a pair of circular opercular papillae. In the Emu the scapula, coracoid, and humerus ossify independently as in *Gallus* and *Anas*. At fifteen days the wing structure although definitely retarded in the Emu as compared with the carinate embryos has essentially the same structure. The leg structure at this time is fundamentally similar to the carinate species although there is a definite change toward the cursorial adaptation. At fifteen days the reptilian nature of the circulatory system is much more evident in the Emu embryo than in the corresponding carinate stages. The *truncus arteriosus* still has three branches and there is a functional left aorta. "The relationship between the proventriculus and gizzard shows in the Emu embryo in comparison to the carinate embryo the primative relationship in which

the proventriculus is more developed than the gizzard." The paired caeca open into the cloaca as in the carinate embryo. The author feels that the Emu must have been derived from an arboreal flying protocarinate stock from which it was separated at a very early date.

HEREDITY, VARIATION, ADAPTATION AND EVOLUTION

35. Notes on the Mearns Quail. Loye Miller. 1943. The *Condor*, 45: 104–109. The author discusses in some detail the anatomy and habits of the Mearns Quail, *Cyrtonyx montezumae mearnsi* (Nelson), and makes certain comparisons with the California Quail, *Lophortyx californica* (Shaw). The Mearns Quail has a color pattern of advantage to a species which stands immobile when alarmed. The relatively large eye of this species may indicate a former forest habitat. The large foot and claws and strong beak are said to be correlated with the feeding habits of tearing sod in search of tubers and larvae as well as shelling and breaking up acorns. According to the author there is a secondary resemblance to the forest dwelling tinamous due to convergent evolution in a similar environl ment. The author feels that the original habitat of the species was the tropica forest and that its present arid habitat is secondary. It is suggested that the small heart and white pectoral muscle reflect the habit of quick flight with rapid fatigue. An interesting paper.

PARASITOLOGY

36. The Protozoan Blood Parasite, *Haemoproteus lophortyx* O'Roke in Quail at the San Joaquin Experimental Range, California. Carlton M. Herman and Ben Glading. 1942. *California Fish and Game*, 28: 150–153. This malarial parasite of the California Valley Quail, *Lophortyx californica vallicola* (Ridgw.), is transmitted by the hippoboscid, *Lynchia hirsuta* (Ferris). A greater percentage of infection was found among immature birds (93.5%) than in adults (83%) except during the months of August and September when 97% of the adults and 83% of the immature birds were infected. A total of 424 birds were found infected; 259 had 1–10 parasites per 10,000 red blood cells; 112 had 10–50 parasites per 10,000 red blood cells; 41 had 50–100 per 10,000 cells; and 12 had more than 100 parasites per 10,000 red blood cells.

GEOGRAPHICAL DISTRIBUTION

37. Australian Faunal Regions. A. G. Campbell. 1943. The *Emu*, 42: 242–245. The author has proposed a system of faunal regions for Australia based primarily on the distribution of passerine birds. Twelve faunal regions are recognized. (1) the *Tasmanian Region* (Island of Tasmania) has 13 species of passerines peculiar to it alone although all except one have closely related species on the mainland. The Tasmanian Region shares twenty passerine species with the continent. The author regards the species of Tasmania as the "isolated original stock". (2) The *Southwest Region* (extreme southwestern Australia) has 38 species "almost identical" with those of the Tasmanian, South Australian, and Southeast Regions. (3) The *South Australian Region* (small area lying east of the Spencer Gulf and Lake Torrens) and (4) the *Southeast Region* (Broad coastal area of Victoria and New South Wales) have 28 species not found in the Tasmanian. The Southeast has 16 species not found in the South Australian. (5) The *Western Region* (Southwestern Australia and southern Western Australia) has 101 species not found in the Tasmanian, Southwest, South Australian, and Southeast Regions. Many of these are typical interior species. (6) The *South Queensland* (southeastern

Queensland) has 12 species peculiar to it. (7) *Cape York Region* (Cape York Peninsula) has 17 species in common with the South Queensland and no less than 55 of its own peculiar species most of which are similar to Papuan species and doubtlessly Papuan in origin. (8) The *Northern Region* (northeast Queensland, northern part of the Northern Territory, northwestern part of Western Australia) has 84 species peculiar to it alone and 15 species which it shares with (9) the *Northwest Region* (western part of Western Australia). (10) The *Interior Region* (interior of Queensland, Northern Territory, New South Wales, Victoria, and South Australia) has 49 pallid species which are probably derived from the coastal stock. (11) The *Desert Region* (eastern Western Australia) is entirely riverless and with an extremely sparse bird fauna. (12) The *Central Region* (central mountainous mostly in the southwestern part of the Northern Territory) has "several older forms of bird life" which have managed to persist while the Interior and Desert species are well represented. The author stresses the importance of rainfall in establishing faunal regions; altitude and temperature are not considered as factors of importance.

38. Distribution and Abundance of the Mississippi Kite in the Texas Panhandle. Philip F. Allen and Palmer R. Sime. 1943. The *Condor*, 45: 110–112. The Mississippi Kite, *Ictinia misisipensis* (Wilson), occurs in at least thirteen counties in the Panhandle. This species nests in wooded river bottoms and seldom ranges more than a half mile from its nest. The bulk of the population arrives in May. Fall migration occurs from mid-August to the latter part of September.

39. Some Recent Bird Records from Canada's Eastern Arctic. T. M. Shortt and H. S. Peters. 1942. *Canadian Journal of Research*: 338–348. This is an annotated list of birds observed on two voyages of the "Nascopie" (1938 and 1939). There are notes on numbers, distribution, habitats, etc., for 82 species. It should be a valuable source of information for this region.

40. The Noisy Scrub-bird (*Atrichornis clamosus*). Major H. M. Whittell. 1943. The *Emu*, 42: 217–234. The Noisy Scrub-Bird before its extinction had a limited local distribution in the coastal districts of southern Western Australia with the greatest numbers of records from the region of King George's Sound where it was last seen in 1889. The author suggests that human interference does not account completely for its disappearance. Most of the paper is devoted to a listing and discussion of the existing skins of this species.

BOOKS

41. The Life of the Robin. David Lack. 1943. London. H. F. & G. Witherby. 200 pp. 7/6. In this engaging little book the author has succeeded admirably in giving the modern outlook on the biology of birds with *Erithacus rubecula* as the chief example. In non-technical language, enlivened by quotations from folk-lore and poetry, and with references unobtrusively consigned to a special index, he gives us the results of four years of banding (119 adults and 121 nestlings), of breeding Robins in aviaries, and of experiments with mounts. An excellent feature lies in the numerous analogies between bird and human behavior, as the threat value of a red sweater on Tibetan tribesmen, intimidation of Crusaders by the singing of Hussites, courtship feeding, childishness of some human invalids, shifting of territorial boundaries through vocal encounters as in Munich 1938. Although the life of the Robin is "devoted almost exclusively to fighting," it "is so inhuman as to achieve its victories without bloodshed," p. 5.

Two interesting points are made in the introduction: "First, though in birds

the main patterns of behaviour are the same for all the members of one species or sub-species, individual differences exist and are by no means negligible. Secondly, birds act much more quickly than human beings, and it is often difficult to see the whole of what takes place."

The Robin is one of the most territorial of birds, holding territory throughout the year except during the molt, while females hold territory alone in the fall. Its chief occupations are singing and fighting, although most of the fighting is bluff-intimidation of the intruder by prominent display of the red breast. As to singing, the popular theory is that birds sing "because they are happy. From which it could be concluded that whereas cock robins are happy most of the year the hens are happy only in autumn, that cock robins are happier before than after obtaining mates, and that they are happiest of all when fighting," p. 26. As to the red breast, "When a bird possesses a bright patch of colour, one may guess that it plays a part in its life sufficiently important to outweigh the disadvantages of added conspicuousness to enemies," pp. 37–38. "Like song, but coming into operation at close quarters," the function of the threat display "is to save actual fighting," p. 38.

In the chapter on "The Significance of Territory," two classical writers are quoted: Aristotle in the 4th century B.C. who mentioned spacing because of food requirements with eagles and ravens, and Zenodotus in the next century who said "One bush does not shelter two robins." Mr. Lack gives evidence against the food value theory and "optimum spacing"; he believes that if double the normal number of Robins were available in an area, the territories would be halved in size. With an over-population of Song Sparrows in 1932 I found territories as large as in preceding years with smaller populations: a few of the banded males were crowded out of their territories into unfavorable positions and soon disappeared. The author does not give as clear a statement of what he considers the function of territory as might be desired. A telling summing up of the territorial situation is given: "Victory, in fact, goes not to the strong but to the righteous, the righteous, of course, being the owner of the property," p. 46.

One new item concerns the technique of pair formation. With the Robin the main factor involved seems to be "that the hen in search of a mate persistently flies right up to the cock and does not retreat when he postures, whereas intruding robins normally avoid the owning cock and leave the territory when attacked," p. 64. This agrees with behavior in many other birds as well as in some fishes and the cuttlefish.

Space forbids mentioning more than a fraction of the interesting observations given. Of the 121 nestlings ringed, 13 settled down near their birthplaces. In an important chapter on "Age," calculations are made from banding returns as to life expectancy in this species: 62 per cent of the adults die each year; a fledgling just leaving the nest has an expectancy of 10.8 months; an adult on August 1st 13.3 months. An 11 year old hen Robin was found by J. P. Burkitt (1938)[1] in Ireland; a ten year old bird was taken on Heligoland.

The final chapter is a "Digression upon Instinct"; here various definitions are discussed and found wanting. "The term instinct should be abandoned," p. 177, but we are not told what we are to use instead.

There are indices of species (common names only) and of persons mentioned; instead of a subject index topics discussed in each chapter are given in the table of contents. This is a book that can be highly recommended to the general reader, to all people interested in birds and to the serious student.—MARGARET M. NICE.

42. Dream Island Days. R. M. Lockley. 1943. Witherby. London. 144 pp. 10/6. The author's *Shearwaters* (1942) has established his authority on

[1]Eleven-year-old Robin. *Irish Nat. Journ.*, 7: 85.

the breeding habits of the Manx Shearwater, *Puffinus puffinus puffinus* (Brünnich). In *Dream Island Days* he describes his life and adventures on the lonely island of Skokholm where he and Mrs. Lockley lived for thirteen years and where his remarkable studies of shearwaters were made. This book is an interesting popular account which provides the background to the author's scientific studies. Although primarily non-scientific there is a chapter on the breeding habits of the Manx Shearwater as well as notes on other species. There are lists of birds (without scientific names) recorded on Skokholm, 1927–1940. There is also a list of plants (with scientific names). The attractive illustrations consist of plates from photographs and sketches by Mrs. Lockley.

43. Criteria for Vertebrate Subspecies, Species and Genera. Charles M. Bogert, W. Frank Blair, Emmet Reid Dunn, E. Raymond Hall, Carl L. Hubbs, Ernst Mayr, and George Gaylord Simpson. 1943. Annals of the New York Academy of Sciences, 14, Art. 2: 105–188. This is a series of papers presented at a joint symposium of the American Society of Ichthyologists and Herpetologists and the American Society of Mammalogists, April 3, 1942. Each of the papers presents an interesting summary of concepts of subspecies, species, and genus as they are applied to that particular class of vertebrates. Collectively they show the tremendous diversity of taxonomic criteria employed in the various classes. The papers are well done and the entire collection is recommended as an excellent cross section of contemporary taxonomic thought especially for vertebrate zoologists not engaged primarily in taxonomic work.