60 yards from the nest. The other two color-banded young were still in the vicinity of the nest.

At the University Botanical Gardens in Ann Arbor, I found a nest with three eggs on May 2. The eggs hatched May 13 and 14. On May 21, I color-banded the three young (aluminum on the left leg and orange, white, and blue, respectively, on the right). The largest of the young, "Orange," left the nest after being banded. The female lark fed this bird out of the nest, then picked at the orange band for several seconds, foraged for food, returned to feed the young bird, and again picked at the colored band. "Orange" remained in the nest when replaced a second time. The following day I found "Orange" 46 yards from the nest and still being fed by the female; "White" and "Blue" were in the nest and were being fed by the male. The nest was plowed under on May 23, but I observed "Orange" and "Blue" being fed by both the male and female larks as late as June 4.—Andrew J. Berger, Department of Anatomy, East Medical Building, Ann Arbor, Michigan.

A Common Tern at Least 23 Years Old.—July 6, 1952, a Common Tern, *Sterna hirundo*, wearing band number A-335516 was found owl killed at Tern Island, Chatham, Cape Cod, Massachusetts, where it had been banded as an adult July 26, 1929. Since less than two percent of this species breed when one year old and less than one-fourth before their third year, it is likely this tern was older than its known 23 years.—Oliver L. Austin, Sr., Austin Ornithological Research Station, North Eastham, Cape Cod, Mass.

RECENT LITERATURE

BANDING

1. Report on Bird-Ringing for 1951. A. L. Thompson and E. P. Leach. 1952. *British Birds*, 45 (8): 265-277. This is the fifteenth report of the Bird-Ringing Committee of the British Trust for Ornithology. The total number of birds ringed from October 1950 to September 1951 was 85,743, of which 49,364 were trapped and 36,379 were nestlings. Most of the report is devoted to a "Selected List of Recoveries." Starlings, *Sturnus vulgaris*, ringed in winter in Great Britain were recovered in Finland, Sweden, Denmark, Germany and Holland. A young Goldfinch, *Carduelis c. britannica*, migrated to Spain, although the British race is regarded as mainly resident. Chaffinches, *Fringilla coelebs*, ringed in winter were taken in later autumns in Norway and Sweden. As to Pied Flycatchers, *Muscicapa hypoleuca*, "Return in subsequent summers to the place of birth or nesting has been shown in the following cases:—Of birds marked as young, seven in the second year, one in the second and third, three in the third, one in the fourth and one in the fourth and fifth. Of birds marked as adults, 26 (25 females, one male) in the second year, three in the second and third, one in the third." One bird was retaken in Portugal. Two Blackbirds, *Turdus merula*, moved 105 and 125 miles northwest during their first autumn or winter. A very remarkable longevity record is that of a Barn Swallow, *Hirundo rustica*, which showed "fidelity to the birthplace at the age of 16 years—the bird is stated to have been seen at the same spot in intermediate seasons." It was ringed as young June 13, 1935, in Norfolk and recovered nearby June 1, 1951. M. M. Nice.

2. Second Progress Report: Bird Ringing 1950-1951. E. H. Ashton. 1952. *The Ostrich*, 23 (1): 56-61. During the third year of banding by the South African Ornithological Society 4,031 bands were placed on 143 species, compared with 430 bands on 92 species during the first two years. Cattle Egrets, *Bubulcus ibis*, Cliff Swallows, *Petrochelidon spilodera*, and Cape Cormorants, *Phalacrocorax capensis*, are the most banded species. Tables summarize the number of each species banded in each year, and the details of all recoveries.—Hustace H. Poor.

3. Ringing Operations. Summary for the Year Ended March 31, 1952. J. M. Cunningham. 1952. *Notornis*, 5(1): 20-23. A table summarizes the birds banded in New Zealand (2797) and recovered (136) during 1951-52; also, the

cumulative totals to March 31, 1952 (9584 and 539 respectively). The species most banded and recovered are the Silvereye, *Zosterops lateralis* (4760 banded, 183 recovered), White-fronted Tern, *Sterna striata* (899 bd., 40 rec.), and Pheasant, *Phasianus colchicus* (710 bd., 197 rec.). Recoveries in 1951-52 are treated in some detail. Two Red-billed Gulls, *Larus novaehollandiae* were recovered near their hatching site at the age of seven years. Two Giant Petrels, *Macronectes giganteus*, were shot near Valparaiso, Chile, at about one year of age.—Hustace H. Poor.

4. Mechanical Aids Useful in Studying Bobwhite Quail. Maurice C. Reeves. 1952. *Journal of Wildlife Management*, 16(3): 316-319. Described in this paper are a new banding cage for mass-production procedures in banding, processing, and releasing birds; an improved, collapsible cock-and-hen trap; a modification of the Stoddard Standard Trap; and a slide rule for rapid determination of age and hatching dates. Anyone interested in trapping and banding for population studies will profit by reading this reference.—Helmut K. Buechner.

FOOD HABITS

(See also Numbers 13, 34.)

5. An Experience with a Saw-whet Owl. Earnest W. Steffen. 1952. *Iowa Bird-Life*, 22(3): 37-39. Interesting account with an attractive pen and ink sketch of an injured *Cryptoglaux acadica*. A live sparrow was put into the cage and "quick as a flash the owl struck with both feet and instantly the sparrow was dead." The owl plucked off most of the feathers of the victim, ate the carcass except for the legs and picked up and ate most of the feathers except the wings and tail.—M. M. Nice.

6. Some Food of the North Island Kiwi. *(Apteryx australis).* L. Gurr. 1952. *Notornis* 4(8): 209-210. A summary of earlier fragmentary knowledge of kiwi food is supplemented by a stomach contents analysis of an accidentally killed kiwi, and by analysis of droppings. Small pebbles are ingested for food grinding. A variety of crustacea, myriapods, insects, arachnids, land snails, and earthworms are eaten, as well as berries, leaves, and seeds of various plants. —Hustace H. Poor.

7. The Tui and Its Food Plants. Charles McCann. 1952. *Notornis*, 5(1): 6-14. The Tui (or Parson Bird), *Prosthemadera novaeseelandiae*, feeds extensively on the nectar of the kowhai, *Sophora tetraptera*, and the puriri, *Vitex lucens*, serving as an important pollinating agent for both species. The tongue of the Tui has a brush-like tip and a canalized body to aid in the collection of nectar, and the bill curvature conforms to the filaments of these flowers; the stigmas and anthers of the kowhai and the puriri are so arranged that pollination by the Tui is facilitated. McCann believes that these reciprocal symbiotic adaptations were evolved simultaneously, but concludes that neither bird nor plants are completely dependent on each other. Some behavior notes on the Tui are given, and the pollination of several other ornithophilous plants is discussed.—Hustace H. Poor.

NIDIFICATION AND REPRODUCTION

(See also Numbers 17, 18, 22, 27, 34, and 37.)

8. Bird Activity in the Continuous Daylight of Arctic Summer. Martin Karplus. 1952. *Ecology*, 33(1): 129-134. At Umiat, Alaska, at 69°N. lat. in late June a female Robin, *Turdus migratorius*, slept for 3.7 hours in 24 hours, a female Hoary Redpoll, *Acanthis hornemanni*, slept 3.4 hours, and a female Grey-cheeked Thrush, *Hylocichla minima aliciae*, 3.3 hours. The brood of four Robins when 4 to 5 days old was watched from a blind for 48 hours. The hourly rate of feeding corresponded closely to that recorded by Schantz *(Wilson Bulletin*, 1939) in central Ohio, but because of 21 hours of feeding in Alaska in contrast to 16 in Ohio, the northern birds received 137 meals per day instead of 96. There is no way, however, in which the *amount brought at each meal* can be compared in

the two cases. In the northern United States Robins may be frightened from the nest at the age of 9 days, but the average stay of 85 broods was 13.2 days. The "one brood of robins observed at Umiat left the nest 9 days after hatching. The feathering of these young robins indicated that they had developed to the normal fledgling stage and did not leave the nest because of disturbance." "The observation of a shortened nestling period in one pair of birds indicates that a factor from which migrations derive their survival value is the more rapid growth of young possible in the north."

Since such sweeping conclusions are based on the early fledging of *one brood*, one would have expected details of this event. The nest was checked "once or twice a day to determine when the birds would fly." If they left at one of the checkings, how was the author sure they were not frightened by him? If they left between checkings, how did he know they had not been frightened out or eaten by an enemy? He has failed to supply sufficient evidence of *undisturbed* fledging. As to some other species nesting in the far North, Baumgartner's Tree Sparrows, *Spizella arborea*, at Fort Churchill left at 9½ days (*Wilson Bull.*, 1937, p. 65); this compares well with Song Sparrows, *Melospiza melodia*, in Ohio, and with Chipping Sparrows, *Spizella pusilla*, in Michigan that fledged at 8-10 days (Walkinshaw, *Bird-Banding*, 1952, p. 102). In Snow Buntings, *Plectrophenax nivalis*, and Lapland Longspurs, *Calcarius lapponicus* at Point Barrow, Alaska, the nestling period does not appear to differ significantly from that of mid-latitude birds (Pitelka, ms.).—M. M. Nice.

9. The Interstitial Cycle in Relation to Autumn and Winter Sexual Behavior in Birds. A. J. Marshall. 1952. Proc. Zool. Soc. Lon. 121: 727-740. Based mainly on 17 adult Rooks, *Corvus frugilegus*, and 26 European Robins, *Erithacus rubecula*, it is shown that in autumn testes retain their small size following involution, but develop considerable interstitial activity, the Leydig cells becoming heavily lipoidal, strongly cholesterol positive, and sudanophilic. In all of the Robins and most of the Rooks only spermatogonia or primary spermatocytes were found; in 10-15 percent of the adult Rooks some tubules contained mature spermatozoa. Sexual display without courtship or fighting accompanied the increased interstitial activity from late July to early November, was completely extinguished by early December, and revived in late December and early January. Marshall proposes, almost entirely on histological evidence, that the testes maintain an internal gonadal rhythm that is independent of daylength, light variation, weather, and geography, although he offers somewhat disputable and contradictory evidence and fails to recognize that variations with respect to cause-and-effect relations between daylength and gonadal recrudescence can probably be expected among different species of birds and even between populations within a given species.—Helmut K. Buechner.

10. Social Behavior in Nesting Cliff Swallows. John T. Emlen, Jr. 1952. *The Condor*, 54(4): 177-199. The social and territorial behavior of Cliff Swallows, *Petrochelidon pyrrhonota*, was studied near Moran, Wyoming, during the summer of 1950. Colony A, consisting of 130 nests, was the largest of the four studied. Colonies B (36 nests) and C (91 nests) were subsidiaries of Colony A. Colony D, consisting of 18 nests, was about one mile north of the other colonies. Ninety-five adults and 144 nestlings were banded and marked with different colors of paint on their wings and tails for quick recognition of colony membership at a distance. Loafing aggregations on telephone wires and other suitable perches included members of all four colonies. A space about four inches on all sides of a perched bird was defended against all comers. Foraging aggregations, including members of all four colonies, covered from five to fifteen or twenty acres at a given moment, and were found as far as four miles from the colonies. Apparently as a result of positive social responses within each colony, the coordination of reproductive cycles of individuals within a colony was higher than the coordination between individual birds in different colonies. The peak hatching dates for different colonies were as much as ten days apart. The defended zone around the nest may be regarded as a true territory with a radial dimension determined by the reach of the occupant from the nest sill. The author discusses the evolu-

tion of colonial nesting in the Cliff Swallow and suggests that it may have resulted from the scarcity of sites meeting its rather exacting nesting requirements prior to the construction of bridges and other artificial sites by man.—L. R. Mewaldt.

11. The Refractory Period of Testis Rhythm in Birds and Its Possible Bearing on Breeding and Migration. A. J. Marshall. 1951. *The Wilson Bulletin,* 63(4): 238-261. The refractory period of the testis rhythm in birds is defined by the author as (p. 238) ". . . that period of the avian testis cycle when the tubules are in a state of post-spermatogenetic lipoidal metamorphosis and before the newly regenerated Leydig cells of the interstitium have become sufficiently lipoidal and mature to respond to neurohormonal influences *initiated by natural factors in the environment.*" The methods employed to trace the "lipoidal" cycle in the avian testis are presented in an appendix in sufficient detail so they can be duplicated. The avian testis cycle is discussed from histological and histochemical points of view. The author acknowledges that the anterior pituitary gland may have a refractory phase, but suggests (p. 242) that ". . . no anatomical evidence that such is the case has yet been adduced." A tendency in the literature to overemphasize the role of photostimulation in avian reproduction and migration is discussed. No single over-all factor such as day-length or light increment is believed responsible for the timing of avian breeding seasons. The author feels that a genetically controlled internal gonad rhythm is the most important single factor in the timing of the breeding season and the migration that is part of the breeding season. The breeding season is thought to be kept in step with (not by) the sun by external factors such as a safe nesting site, mild weather, and an abundance of the food on which the young are traditionally fed. The author has presented a plausible hypothesis and has used a considerable literature in its support. His paper certainly shows that the eventual solutions to problems in the regulation of avian breeding and of avian migration will probably be complex.—L. R. Mewaldt.

12. Cuckoo Studies on a South African Farm (Part II). C. J. Skead. 1952. *The Ostrich,* 23(1): 2-15. Life history notes covering the dates of occurrence, host species, incubation periods, and various behavior aspects, including parasitic habits, of the Diederick (or Bronze) Cuckoo, *Chrysococcyx caprius,* and Klaas' Cuckoo, *Chrysococcyx klassi,* at one locality. The Diederick Cuckoo regularly parasitizes the colonial Cape Weaver, *Hyphantornis capensis,* and the non-colonial Cape Wagtail, *Motacilla capensis;* there is suggestive evidence that it may be territorial. The incubation period is reported as 10-11 days, but this extremely low figure may be in error if incubation by the hosts began before completion of the clutch. It is strongly probable that the cuckoo chick ejects the eggs or young of the host from the nest. Klaas' Cuckoo parasitizes the Larger Double-collared Sunbird, *Cinnyris afer,* and the Bar-throated Warbler, *Apalis thoracica.* It apparently ejects eggs or young of the host from the nest. The author notes that hollowness on the back of the chicks, an aid in this behavior, is not found in the Black, *Cuculus clamosus,* Black-crested or Black-and-Grey (conspecific), *Clamator jacobinus,* or Diederick Cuckoos. Egg colors differ from those of the hosts.—Hustace H. Poor.

CONSERVATION

13. Notornis in March, 1951. A Report of the Sixth Expedition. G. R. Williams. 1952. *Notornis* 4(8): 202-208. In March 1951 a party of four investigated the known range of the Takahe, *Notornis hochstetteri,* in the Lake Te Anau area of New Zealand's South Island. At least seven chicks were hatched in the 1950-51 season. The adult post-nuptial moult, which starts in mid-January, is virtually complete by mid-March. Chicks lose their down and assume a first teleoptyle plumage similar to that of adults at about eight weeks age. Food of the adult consists of leaf bases and seeds of various grasses (with several species of *Danthonia* supplying the bulk of the material) and leaf parts of several other plant groups; fledglings are largely insectivorous. Territory appears to be held year round, suggesting a long pair bond. A total of 30 to 35 individuals were

discovered. Red deer, *Cervus elaphus*, threaten *Notornis* by food competition for *Danthonia* and by causing habitat change; stoats, *Mustela erminea*, and Australian phalangers, *Trichosurus vulpecula*, are direct predators. All three of these mammals have been killed to reduce the pressure on *Notornis*.—Hustace H. Poor.

14. A Two-Summer Study of the Effects on Bird Populations of Chlordane Bait and Aldrin Spray as Used for Grasshopper Control. Robert L. Eng. 1952. *Journal of Wildlife Management*, 16(3): 326-337. Application of chlordane bait at 10 pounds per acre reduced grasshopper populations about 50 percent, but did not result in a significant decrease in the average number of birds observed per day—8 percent reduction on the baited plot; 3 percent on the control plot. Nestling mortality was about six percent less on the baited plot than on the control, despite the fact that grasshoppers were fed to the nestlings on the baited area. Aldrin spraying effected nearly a 100-percent reduction in grasshopper populations, yet no significant decrease in the daily population indices occurred between treated and control plots. The greater mortality of nestling birds, most of which occurred among Red-wings, *Agelaius phoeniceus*, on the sprayed plot (28 percent) compared with the control plot (14 percent) indicates that aldrin spray does affect developing nestlings adversely. Examination of young found dead in nests suggested they may have died of starvation.—Helmut K. Buechner.

15. Sharptails Into the Shadows? Frederick and Frances Hamerstrom and Oswald E. Mattson. Wisconsin Wildlife No. 1, Wisconsin Conservation Department, 35 pp. This excellently written plea to save Wisconsin's Sharptail Grouse, *Pedioecetes phasianellus campestris*, presents an account of some changes that have taken place in Sharptail habitat and populations since 1930. Formerly the wild-land openings caused by burns, logging, frost pockets, and off-site aspen stands in the northern portion of the State provided most of the range. At present, because of fire prevention and reforestation in the northern counties, rough edges of brush land between farm land and forests in central Wisconsin have become the last remaining important habitat. New openings do not begin to balance the annual loss of Sharptail range. As "pioneer farming" gives way to mature, clean farming, much of this range will also vanish. Extensive controlled burning, reservation of open brush land, modified silvicultural practices, and other measures will be necessary within the next five years if the Sharptails are to be maintained.—Helmut K. Buechner.

BEHAVIOR

(See also Numbers 1, 7, 10, 12, 34, 35, and 39.)

16. "Derived" Activities, their Causation, Biological Significance, Origin, and Emancipation during Evolution. N. Tinbergen. 1952. *Quarterly Review of Biology*, 27(1): 1-32. A clear and thought-provoking analysis. The function of display is the elicitation of specific reactions in other individuals, usually of the same species. As to the origin of displays, analyses of the behavior of the herring gull, cormorant, ducks, stickelbacks and great tits have shown that their displays "are nothing but combinations of displacement activities and intention movements," p. 30. Displacement activities (formerly called substitute behavior) "are outlets through which the thwarted drives can express themselves in action," p. 12. "In all cases there is reason to suppose that there is a surplus of drive, due to the simultaneous activation of incompatible instincts," p. 14. It has long been suggested that "injury-feigning" or diversionary behavior arose as a "compromise" between the impulse to escape and to protect the brood. Tinbergen adds a third element—the drive to attack the enemy. These three drives result in displacement activity that "seems to be ritualized as an adaptation to a diversionary function," p. 16. Instead of interpreting pair-formation in terms of sexual dominance, the author says that "many male birds (and other animals) show, as the first reaction to an intruding individual, the same response to females as they do to males, and . . . this first reaction is often a hostile one. It is the function of the behavior of the female following such an encounter to suppress the male's aggressiveness and to elicit its sexual response," p. 16. A valuable, well-documented paper that will richly repay careful study.—M. M. Nice.

17. Leaf-display and the Sexual Cycle in the Tooth-billed "Bower-bird" (*Scenopoeetes dentirostris* Ramsay). A. J. Marshall. 1951. *Proceedings Zoological Society London*, 120, Part IV: 749-759. The male of this species clears a space on the rain-forest floor in North-eastern Queensland and "on this stage places freshly gathered leaves with their paler and more-contrasting under-surfaces uppermost. The indentations of the beak appear to be a development directly adapted to the laborious 'sawing' by which the bird severs the petioles." He sits above his stage and sings loudly for hours at a stretch, including imitations of other birds' calls. When silent he is inconspicuous, but as soon as he starts to sing, there is a reorganization of the feather pattern around the throat and yellow feathers are revealed. "Stage construction and leaf-gathering commence at about the period when the testes begin their seasonal maturation"; some 8 weeks later nesting takes place and the stages are deserted. "Gonad differentiation and the display season occur during the driest period of the year and the young appear at the beginning of the rainy season." Little is known of "courtship activities at the stage or anywhere else." Photographs show the leaf-strewn display ground, the "toothed" beak of the bird, present in both sexes, and three sections of testes: with narrow tubules at the beginning of the display season; with expanded tubules and mature spermatozoa at the height of the display season, and with beginning degeneration when the stages are falling into disrepair.—M. M. Nice.

18. Display and the Sexual Cycle in the Spotted Bowerbird (*Chlamydera maculata* Gould). A. J. Marshall. 1952. *Proceedings Zoological Society London*, 122, Part I: 239-252. An amazing and delightful account of the behavior of the mature male Spotted Bowerbird of the dry inland areas of Australia. It "builds a double-walled bower and at its entrance accumulates a display of hundreds of bleached bones, shells, fragments of glass, metal, green seedpods, pine cones, berries and occasionally coins and pieces of jewelry. It also paints the inner walls of its bower with a suspension of chewed dry grass in saliva." It starts these activities in winter or early spring, then "as the sexual season heightens, the male postures noisily and energetically with the erectile rose-lilac crest iridescent in the sunlight," holding a display object in his beak. The female, meantime, watches silently but intently from the shadows behind or within the bower. "Spermatogenesis occurs early in the spring, but for another two months the male directs his physical attention towards the bleached bones and other objects, sometimes throwing them violently about the display ground. Copulation occurs near the bower towards the beginning of summer. This delayed transfer of physical attention from inert display things to the watching mate is probably invited by some action on the part of the female when the environment becomes seasonally full of the insect food on which the young are fed." The author rejects theories that bowerbirds are especially intelligent and consciously aesthetic; he considers that "the long period of sex hormone liberation . . . has made possible the development of the various and elaborate display phenomena" which serve "to retain the female's interest until both she and the environment reach a seasonal condition appropriate for breeding."

Plates show a Bowerbird and his bower and details of the nuchal frill of the male, as well as four sections of testes. The Bowerbirds are an exceedingly interesting group and offer a wonderful field for thorough, objective behavior studies.—M. M. Nice.

19. The Post-Fledging Dispersal of Juvenile Titmice. Ivan M. Goodbody. 1952. *British Birds*, 45(8): 279-285. A total of 248 young Blue Tits, *Parus caeruleus*, and 191 Great Tits, *Parus major*, were marked with colored and aluminum rings. "The juveniles become independent of their parents about two weeks after leaving the nest, when they begin to gather into separate flocks." At this time there seems to be an "explosive dispersal of young birds" moving outwards from their birthplaces. Birds were seen one-half mile and one mile from their birthplaces.—M. M. Nice.

20. Habituated Fear Response in Blue Tits. John Ash. 1952. *British Birds*, 45(8): 288-289. In the course of trapping operations a number of *Parus caeruleus* "became very alarmed and called repeatedly with the usual alarm call,

whenever the trapper entered the wood in which the trap was located." They knew the trapper no matter what clothes he wore, but paid no attention to a stranger attending the trap.—M. M. Nice.

21. Comparative Aggressiveness of the First-year and Adult Black-headed Gull. R. G. Pettitt. 1952. *British Birds,* 45(9): 333-334. First-year *Larus ridibundus* seem to "reach a peak of aggressiveness in the spring corresponding to the breeding season in adults." Some 150 instances are tabulated, showing that in "all cases of mobbing, snatching food from birds on the water, excitable acrobatics and quarrels with other Black-heads over three-quarters of the birds involved were in their first winter or first summer." These observations naturally were not at a breeding colony. I wonder whether a like difference in aggressiveness in young and adult birds occurs in other species of gulls.—M. M. Nice.

22. Life of the Crowned Hornbill (Part V), *Lophoceros suahelicus australis.* Gordon Ranger. 1952. *The Ostrich,* 23(1): 26-36. After her final entry into the nest hole, the female devotes much time to plastering up the opening using her own excrement, various dry fragments from inside the nest cavity, and woody material and crushed millipedes brought by her mate. Except for bringing material the male plays no part in the plastering, which Ranger describes in detail. When first immured the female attempts to free herself, but after becoming "settled" in the nest she strongly resists removal through an observation door cut into the nest cavity, and eagerly reenters when permitted. Unwanted excrement is ejected directly and forcefully through the nest opening.—Hustace H. Poor.

23. Homing Instinct in Cowbird. Emerson A. Stoner. 1952. *The Condor,* 54(4): 208. During May, June, and early July of 1950, and again from the middle of April to the middle of July of 1951, one female and two male Cowbirds, *Molothrus ater,* repeated frequently at the author's banding station at Benicia, Solano County, California. These three birds occupied a territory together, and the female was apparently mated with the two males. On 20 May 1951, one of the males was taken sixty miles by car to Sacramento, California, and released. Two days later he had returned to the banding station.—L. R. Mewaldt.

24. Homing Ability of Female Cowbirds. Harold B. Wood. 1952. *The Wilson Bulletin,* 64(1): 46-47. The homing ability of two female and two male Cowbirds, *Molothrus ater,* was tested by transporting banded individuals various distances in different directions from the author's banding station at Harrisburg, Pennsylvania. The females showed a greater tendency to return than did the males, and a much greater tendency to repeat. One female, banded on 10 May 1948, was transported six miles southwest on 28 June. Back on 1 July, she repeated eight more times that year. When on 5 April 1949 she entered the trap with a male, both were transported twenty-two miles northeast. Although the male was not seen again, this female returned on 7 April. Transported ten miles east on 30 April, she returned on 3 May. She was not seen again after being transported sixteen miles on 25 May. Another pair was banded on 10 May 1947. When the male repeated on 16 May he was transported three miles. He returned to the trap on 18 June. On 19 January 1948, he was shot at Leland, North Carolina. His mate, after repeating twelve times in 1947, returned on 15 April 1948. When transported fifty-six miles southwest on 9 May, she returned on 14 May. After being transported six miles south on 30 May, she returned the following day. On 11 June she was taken by train one hundred miles east to Philadelphia and released at 10:30 a.m. on 12 June. On 16 June she was back at Harrisburg. After a few more repeats she was not recorded again.—L. R. Mewaldt.

POPULATION DYNAMICS

(See also Numbers 1, 34, and 35.)

25. Survival Studies of Banded Birds. J. J. Hickey. 1952. Special Scientific Report: Wildlife No. 15, Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D. C., photo-offset. pp. 1-177. This important report

is based to a major extent on the author's doctoral dissertation (University of Michigan, 1949) with some revisions with respect to current literature through December 31, 1951. It can be said unequivocally that this treatise constitutes the most important single contribution thus far to the study of avian population dynamics by the use of banding data. It is essential reading for anyone interested in avian population dynamics in any way and particularly for those using banding data in such studies. The critical evaluations of the many methods and facets of the basic philosophy of this type of investigation are far too numerous for individual comment in a brief review of this type. Of particular usefulness is the succinct, lucid explanation of *dynamic, time-specific,* and *composite* life tables and the dynamic and time-specific treatments of composite life tables (pp. 7-9). Although these concepts have been generally recognized by many investigators in the field, there have been unfortunate exceptions, and heretofore no clear-cut description useful to the reader who does not have an intimate knowledge of the field has been available in ornithological literature. There is also (p. 14) an important discussion of the differences between the real population and the theoretical population of the composite life table. This again crystallizes ideas which have never been clearly portrayed in the literature. However, in my opinion still further thinking in this respect is necessary in order to understand the relation of the theoretical population of the composite life table and the population characteristics of the species, which from the aspect of time have allowed it to persist successfully. There must be a relation between the two, and beyond the manifest difficulties of sampling, the basic philosophy and its mathematical representation are obviously quite complex.

There has been much discussion by investigators in the field with respect to the best initial date for the beginning of a life table. To a great extent this hinges on the problem of bias of samples of young birds during the immediate period after leaving the nest. Lack has suggested, primarily for other reasons, that tables begin with the first January first in the life of the bird. I have accepted this suggestion as a good device for eliminating the possibility of bias in favor of very young birds. Hickey rejects it in favor of beginning the life table with the banding date, because of the importance of juvenile mortality rates. That a knowledge of juvenile mortality rates is important in the study of population dynamics is obvious. The problem is to obtain an unbiased rate. The author does make a good case, at least in some instances, for the accuracy of data collected earlier in the juvenile period. Nevertheless I do not feel that this can be regarded as generally true. The ideal situation, as Hickey indicates, is that in which the banding data on which a juvenile mortality rate is based can be verified by actual field observations. Unfortunately this is not possible in many cases.

Of importance also in this treatise is its evaluation of the basic accuracy of the banding method and banding data. Heretofore no one has evaluated the entire procedure so well, and this section (pp. 17-26) should be studied carefully by every student of avian population dynamics who uses data or draws conclusions from banding operations.

The bulk of the treatise consists of a critical analysis of the banding data for ten North American species. For each there is a discussion of the published information on the population dynamics, a summary of banding activities, an abridged life table with adequate explanations, and a discussion of its population dynamics including a rationalization of the mortality as indicated by the life table with the available information on productivity. This rationalization is extremely important for, at present, it constitutes the best single test of the reliability of the raw data on which the life table is constructed, though the problems of the statistical reliability of the raw data and the information derived therefrom are not as yet adequately solved. Calculations from the data presented in the life tables indicate the following annual mortality rates in percent per year for the first year after banding, and for subsequent years, respectively: Black-crowned Night Heron, *Nycticorax nycticorax,* 61, 31; Mallard, *Anas platyrhynchos,* 68, 50 (48 for a much larger group of unknown age at time of banding); Redhead, *Aythya americana,* 87, 54; Marsh Hawk, *Circus cyaneus,* 59, 30; Caspian Tern, *Hydroprogne caspia,* 44, 26 (2nd year), 18 (all subsequent years); Herring Gull, *Larus argentatus,* 60, 29 (2nd year), 21 (3rd year), 27 (4th year), 27 (subsequent years); Mourning Dove, *Zenaidura macroura,* 62-64, 56-58; Barn Owl,

Tyto alba, 58, 28; Great Horned Owl, *Bubo virginianus*, 51, 23; and Blue Jay, ?, 45. These data, together with accompanying critical comments constitute a major contribution to the field of avian population dynamics. The treatise is concluded with three thoughtful chapters on the population dynamics of Mallards. It is to be hoped the thinking and conclusions of these chapters will permeate extensively into the fields of wildlife management and conservation.—D. S. Farner.

26. Dispersal, Breeding Behavior, and Longevity of Banded Barn Owls in North America. Paul A. Stewart. 1952. *The Auk*, 69(3): 227-245. This interesting paper is based on analyses of the recoveries of banded *Tyto alba pratincola* reported to the U. S. Fish and Wildlife Service through early 1950. It presents several interesting facets of the biology of this species. The number of available records of Barn Owls banded as nestlings was 236, about 66 percent of which were taken within 50 miles of the place of hatching. Eighty-seven Barn Owls banded as adults were recovered, 77 percent within 50 miles of the banding place. Most of the displacement was southward. The greatest displacement was 850 miles. The data indicate quite clearly that the Barn Owls of the northern part of the range have a certain degree of migratory tendency whereas those of the southern part of the range do not. Southward movement apparently occurs from August to December, northward during March and April.

In the last section of the paper, which deals with longevity, it is stated that the mean survival of nestlings is 1 year, 5 months, and 25 days. Certainly such means can have no accuracy greater than that of the order of the nearest month because of such sources of error as the inevitable discrepancies between the date of death and the date of actual discovery of the bird, and the smallness of the sample. It is regrettable also that the preparation of this section involved no use of the extensive philosophy and analytic methods which have been developed in recent years with respect to survival curves. For example, Table 10 has little value other than as an accumulation of raw data since, without correction in terms of the number of banded birds available for each recovery age group, it cannot truly reflect the average situation in the population because of bias in favor of the younger age groups. Dr. J. J. Hickey in his doctoral dissertation (University of Michigan, 1949; see No. 25) uses most of the same records to formulate an abridged mortality series which affords a far more reliable summation of the average age-group composition and average survival curve of the species. Such an abridgement is necessary if all recoveries are used, regardless of age, from a program of continuous banding. The method employed by Dr. Hickey has been described in detail also by Paludan *(Videnskabelige Meddeleser fra den Naturhistoriska Forening i Kjøbenhavn*, 114: 1-128, 1951). It is a further disappointment that the data on survival and dispersal in this paper are not compared with the similar data for Barn Owls banded in Switzerland as presented by Schifferli *(Der Ornithologischer Beobachter*, 46(3): 61-75, 1949).—D. S. Farner.

27. The Pied Flycatcher. II. Population Problems. (Der Trauerfliegenschnäpper. II. Populationsprobleme.) Lars von Haartman. 1951. *Acta Zoologica Fennica*, 67: 1-60. 1951. Data were obtained by observation and recovery of banded *Muscicapa hypoleuca hypoleuca* at Lemsjöholm in southwestern Finland during 1941-1950. When additional nesting cavities are made available in a restricted area, the rate at which they are taken up varies considerably from one area to another. It appears, however, that this local increase in population is the result of immigration rather than the result of a local increase in productivity or survival. In this respect it should be observed that only a part of the females and a few of the young are *ortstreu*. In population fluctuations, "lows" through at least two years perhaps reflect the fact that a part of the birds do not breed until their second year. Annual adult mortality for the population for the period studied was about 50%; mean period of survival for birds surviving the juvenile period was about 1.5 years. The maximum age record was 15 years. Mean clutch size was eight; there appeared to be no relation between clutch size and the age of the female. The percentage of eggs resulting in fledglings also was independent of clutch size. From 916 eggs in clutches producing at least one fledgling, there were 789 fledglings produced. In order to maintain a constant

population, 27-30 percent of the fledged young must survive to the beginning of the following year and about 22 percent must breed. This treatise is a contribution of major significance to the study of population dynamics.—D. S. Farner.

28. On the Numbers of Land-Birds in Finland. Einari Merikallio. 1951. *Acta Zoologica Fennica,* 65: 1-16. In this paper the author revises his earlier estimates of the populations of certain species. These revisions are the results of improved methods and in conformance with the altered boundaries of Finland. The estimates are based on linear-transect censuses for a large variety of habitats. Estimated populations are proposed for 90 species. Densities for all land birds vary from 42 pairs per square kilometer in the Enontekiö and Inari districts to 242 for the Saimaa district. About 80 percent of the land birds migrate out of the country in the winter. The most abundant species and their estimated numbers are *Fringilla coelebs* 6,678,000; *Emberiza citrinella* 1,390,000; *Anthus trivialis* 2,185,000; *Parus atricapillus* 2,043,000; *Muscicapa striata* 1,114,000; *Sylvia borin* 1,000,000.—D. S. Farner.

ECOLOGY

(See also Numbers 7, 15, 34, 35, and 36.)

29. On the Stratification of the Avian Population of the Querceto-Carpinetum Forest Communities in Southern Slovakia [English summary]. Frant. J. Turček. 1951. *Sylvia* 13(3): 71-86. Five strata are defined for this oak-hornbeam broad-leaved forest in reference both to nesting-sites and feeding areas for the bird population: I ground, II shrubs and the general undergrowth, III tree trunks, IV tree canopy, and V open air spaces between the canopy, trunks, and shrubs. Distinction is also made between forest-edge and forest-interior. Twenty-eight families, 52 genera, and 74 species are listed. The "index of specific distribution," obtained by dividing the number of genera by the number of species and multiplying by 100, is 70, which may be a useful concept for comparison with bird populations in other areas. Fifteen percent of the species nest in stratum I, 25% in II, 31% in III, and 29% in IV; 52% of the species feed in stratum I, 9% in II, 10% in III, 23% in IV, and 6% in V. Transgression of species from one stratum to another both for feeding and nesting excludes any possibility of ecological isolation, but stratification does establish a greater variety of microhabitats and permits related species or species with similar ecological requirements to occur in the same community.

The bird population is measured during the summer by the number of individuals observed during one hour's time spent on each hectare (2.5 acres) and is expressed as number of individuals per 100 hectares. The summer aspect has a density of 2038 birds per 100 hectares (equivalent to 408 pairs per 100 acres) but this decreased 53% during the winter.

The biomass of the bird population is computed by multiplying the number of individuals of each species by the average weight for the species. The total biomass during the summer is 141,042 grams per 100 hectares (56,417 gms. per 100 acres). This is compared with a biomass of 600,000 kg. for the larvae of the gypsy-moth during an outbreak, and 30,000 grams for woods mice *(Apodemus* sp.). This comparison indicates to the author that birds cannot check any outbreak of an insect pest once it gets under way. The distribution of the biomass of the bird population that feeds in the various strata during the summer is 49.5% in I, 3.4% in II, 6.5% in III, 38.3% in IV, and 2.3% in V. During the winter the loss of biomass in each stratum is calculated theoretically as 39% in I, 71% in II, none in III, 37% in IV, and 100% in V, yet the relative proportions of the biomass in each stratum remain markedly similar.

This is one of the best studies available of stratification of bird populations in a forest community and deserves serious attention. Calculation of biomass is an improvement over the use of number of individuals, which vary widely in size between species, for evaluating the influence exerted by birds in community dynamics.—S. C. Kendeigh.

FAUNISTICS

30. The Birds of Elk Island National Park, Alberta, Canada. J. Dewey Soper. 1951. Canadian Wildlife Service, Ottawa; Wildlife Management Bulletin, ser. 2(3): 1-60, 4 figs., 1 map (multilithed).

This is a list of the birds of Elk Island National Park, a 75-square-mile area in the Cooking Lake Highlands of Alberta, some 25 miles east of Edmonton. Introductory pages describe the physical geography, climate, life zone affinities, and vegetation. The annotated list, under binomial names, is derived from observations of the author and Thomas Randall, covers all seasons, and comprises 190 bird species. Local distribution and relative abundance are emphasized. Rare extralimitals include the Varied Thrush, *Ixoreus naevius;* Townsend's Solitaire, *Myadestes townsendi;* Rosy Finch, *Leucosticte tephrocotis;* and an occurrence, previously recorded by another, of the Crested Flycatcher, *Myiarchus crinitus.* Of interest to students of periodicity is the observation concerning the Sharp-tailed Grouse, *Pedioecetes phasianellus*: "It is apparent that the birds were holding their numerical status well, or actually increasing, during the period when the ruffed grouse was undergoing a sharp decline in numbers." Four figures illustrate local habitats.—W. Earl Godfrey.

31. The Birds of Prince Albert National Park, Saskatchewan. J. Dewey Soper. 1952. Canadian Wildlife Service, Ottawa; Wildlife Management Bulletin, Ser. 2(4): 1-83, 10 figs., 1 map. (Multilithed).

Prince Albert National Park, near the geographical centre of Saskatchewan, is the third largest of Canada's national parks. This account of the birds of that Park is the result of field work done mainly by the author during periods in 1940, 1942, 1943, and 1946, these periods staggered as much as possible to cover early spring to autumn. Some winter data by others are included. The physiography, climate, vegetation, and the main lakes in relation to wildfowl are described. The annotated list (pp. 14-83) comprises 175 bird species which are dealt with under binomial names with emphasis on local distribution, relative abundance, and seasonal status. Locally unusual birds observed include Pinnated Grouse, *Tympanuchus cupido;* Willet, *Catoptrophorus semipalmatus;* Crested Flycatcher, *Myiarchus crinitus;* and White-breasted Nuthatch, *Sitta carolinensis.* Ten figures illustrate habitats and some breeding birds.—W. Earl Godfrey.

FLIGHT

32. Some Thoughts on Natural Flight. James L. G. Fitzpatrick. The Technology Review, Vol. 54, No. 1, November, 1951, p. 21-24. This excellent review paper examines natural flight from an engineering viewpoint. As would be expected, most of the papers and ideas discussed pertain to the flight of birds and insects. After commenting on the confusion existing in this field, which is due to the several scientific disciplines involved, each with its own specialized and unique language, the author discusses one typical problem in each of four major fields. In the field of biology he examines the problem of the power or energy demanded for the natural flight of birds. The exact nature of the air-flow about a beating wing is discussed under aerodynamics. In the field of engineering theory the relations existing in a given natural flyer between its weight, its wing area, its wingspread, its speed, and the frequency of the wingbeat are examined. Here the author contributes a mathematical expression of his own development involving the frequency of wingbeat, weight, and wing area and span. The author's discussion of engineering construction is general rather than specific, pointing out that nature's flying machines ignore many of the precepts of conventional engineering.

By emphasizing the meagreness of current knowledge of the nature and mechanics of avian flight the author has performed a real service. His paper should suggest many fields of research to serious ornithologists and perhaps may restrain them from reaching premature conclusions on the subject of natural flight. Mr. Fitzpatrick has succeeded in preparing a readable paper in a field where most authors immediately lose their readers in a maze of specialized words. It is hoped that his example will be followed by others.—R. O. Bender.

PSYCHOLOGY

33. The Visual Acuity of some Passerine Birds. K. O. Donner. 1951. *Acta Zoologica Fennica,* 66: 1-40. Subjects were trained to distinguish between a minimum separable pattern (grating) and a gray object of the same brightness in order to obtain food. The pattern was made finer and finer until positive reactions ceased. The relation of acuity to light intensity was also investigated. The maximum acuity of *Turdus merula, T. pilaris, Alauda arvensis,* and *Fringilla coelebs* is between 1'20" and 0'40"; *Erithacus rubecula,* 2'38"-1'55"; *Emberiza citrinella,* 3'07"-2'38"; and *E. schoeniclus,* 3'50"-3'07". Decrease in visual acuity with decreasing illumination was most marked for *Emberiza* and least for the thrushes. Morphological acuity was determined and found to be in good agreement with the experimental data. The visual acuity of these species is better than that of most mammals and about the same as that of man.—D. S. Farner.

BOOKS AND MONOGRAPHS

34. The Fulmar. James Fisher. 1952. Collins Publ., 14 St. James's Place, London. 8vo, pp. i-xv, 1-492, illu. Price 35 shillings. James Fisher admits he has "been haunted by the fulmar for half my life; and have needed no spur to explore its history, and uncover its mysteries, save the ghost-grey bird itself, and green islands in grey seas." Anyone with less than an all-consuming obsession for the bird would never have undertaken the appalling task of compiling and setting down "what is known about the fulmar—its ecology; its evolution, distribution, history, spread, exploitation, colour-phases, behavior, life-cycle, parasites, predators and food." Only a happy combination of careful scientist and inspired zealot could devote 15 or more years to such a task and bring it to so successful a conclusion.

The prospect of amassing the bibliography alone would have frightened lesser men. It is so immense it could not be published with the book, and will make a separate volume of its own (which we hope for soon)—some 2400 items in many languages. The chore of reading, digesting, and evaluating all this material, including such obstacles as Icelandic and the various Scandinavian tongues, is staggering. Yet Fisher has done it, and well, with a fine sense of scientific judgment and integrity. Never content to quote second-hand, his consultation of original sources, even in such elusive media as the Icelandic sagas, the accounts of old travellers and voyages, local natural history society records, "Service" documents, sporting magazines, and similar tracts seldom referred to for such purposes, has enabled him to correct the record and eliminate many false statements in the literature. He spices much of the information he quotes, particularly the more ancient, with delightful and entertaining sidelights on the men to whom we are indebted for it. His historical and personal details of such men as Holboell, Pallas, and Steller make them very real persons instead of the unmeaning but convenient common bird names they have become to the modern bird-watcher.

The most important and most interesting aspect of the Fulmar is its amazing increase in the North Atlantic during the last 200 years, which has accelerated during the last 50 years, and is evidently still continuing. Fisher traces the Fulmar's spread in exhaustive detail. He attributes it not to recent protection and the discontinuation of harvesting the young for food (which he shows was never a serious restrictive factor), but to the availability of more food in the form of fatty offal from the pelagic fisheries, first from whaling, more recently from the trawlers which discard their waste. This has allowed a greater survival of both young and adults. He believes, and makes an excellent case for his hypothesis, that the "increase was, and is, dependent on this food rather than climate, nest-site supply or predation." How long and how far the spread will continue is speculative, and Fisher's thesis may soon be put to the test by the current trend of the fishing industry to eliminate waste as its resources decrease, by turning the formerly discarded offal into fertilizer and cattle food.

The only disappointment in the work is the paucity of the information available from banding, which is no fault of the author's. The species is a difficult one to handle because of the inaccessibility of its nesting sites, which can be reached only by accomplished alpinists, and with much trouble, work, and risk. Up to 1950

only 1003 Fulmars had been ringed under the British ringing scheme; how many elsewhere, in Norway, Iceland, and Greenland from whence returns are listed, is not stated. The total returns and recoveries listed is only 15, and we look in vain for the sort of information that only an adequate banding program can supply, on life-span, individual distribution, territorial relationships, site tenacity, group adherence, and the like. These are problems for the future, and Fisher's book will doubtless stimulate and encourage further investigation.

The book is a "must" for the library of every ornithologist. One of the most detailed, thorough, and authoritative treatises yet to be published on any species, it is a landmark in species monographs. At the same time it is so simply, beautifully, and entertainingly written it can and will be read for pure enjoyment.—O. L. Austin, Jr.

35. Proceedings of the Xth International Ornithological Congress. Edited by Sven Hörstadius. 1951. Almquist and Wiksell, Uppsala. 662 pp. (531 in English, 28 in French, 93 in German). $6.75. Procurable from Professor Sven Hörstadius, Zoologiska Institutionen, Uppsala, Sweden. The papers presented at the Xth International Ornithological Congress, convened in June 1951 under the presidency of Doctor Alexander Wetmore, constitute a monument to progress in ornithology since the previous congress at Rouen in 1938. The present volume differs from its predecessors in the presentation of four extensive review papers in fields of active ornithologic research, prepared by Ernst Mayr, N. Tinbergen, David Lack, and Rudolf Drost. These four papers together with the presidential address, an important synoptic paper itself, and an introduction to Swedish ornithology by Sven Hörstadius, are published unabridged and with complete bibliographies. Consequently the remaining 80 contributions had to be presented in a somewhat more condensed form. In an important compilation of this type it is foolhardy to attempt to select individual papers for comment. All are important contributions in one manner or another.

The presidential address, "Recent additions to our knowledge of prehistoric birds," (pp. 51-74) should receive the attention of all ornithologists because it summarizes critically such a vast amount of information from widely scattered sources. Doctor Wetmore reasserts his belief that the birds as a class had their maximum abundance in the tertiary ages, and that the genera and species of living birds evolved in Miocene and Pliocene times. Since then the history of birds has been one of "rigor, pressure, and extermination. . . ."

"Speciation in birds, progress report on the years 1938-1950" (pp. 91-131), by Ernst Mayr, is a masterful, lucid exposition of the progress in the knowledge of avian systematics and speciation from the originally restricted realm of morphologic taxonomy to a broad biologic philosophy integrating the necessary concepts of genetics, zoogeography, and ecology. Although some of the restrictions of the old taxonomy are still somewhat in evidence, *e.g.* Doctor Mayr's assertion that the recognition of subspecific status be extended only to morphologically—not to physiologically—distinctive populations, the progress has been remarkable and transcends that of the systematics of other groups of animals. Of great importance is Mayr's clear discussion of the matter of "geographic" and "ecologic" races. Every race is actually geographic and ecologic. Geographic separation, of course, precedes ecologic differentiation; the latter cannot be initiated without the former. This paper should be read by every serious ornithologist.

"Desert Coloration" (pp. 155-162), by R. Meinertzhagen, is an interesting discussion which, after showing quite clearly that desert coloration is not always cryptic in function, suggests that in many cases it has been selected on the basis of light reflection and its relation to thermoregulation. This suggestion appears very plausible and certainly merits experimental study. Obviously the whole matter is complicated by such factors as edibility and other predator-prey relations.

Of particular interest to the readers of *Bird-Banding* will be Rudolf Drost's "Study of bird migration 1938-1950" (pp. 216-244). Actually this paper suffers considerably, as noted by the author, from restriction of space and unavailability of certain materials. In general it is more of a perfunctory review than a synthesis with new conclusions. It is important in indicating the highlights of research and thinking with respect to problems of migration. In the conclusion to his

"Reproduction, migration and moult; factors controlling the annual cycles in birds" (pp. 241-244), A. Landsborough Thomson makes the observation that ". . . there emerges the general conception of an annual physiological cycle, established to a greater or less extent as an inherent rhythm, linked proximately to one or more environmental factors of various kinds which control the timing, and adapted ultimately to conditions of the environment of which food-supply is the most important."

R. E. Moreau in "The migration system in perspective" (pp. 245-248), is of the opinion that migration is as old as well-developed flight and that the Pleistocene climatic fluctuations have been responsible only for the details of the present patterns. A very important paper is that of Ernst Schüz, "Überblick über die Orientierungsversuche der Vogelwarte Rossitten (jetzt Vogelwarte Radolfzell)" (pp. 249-268), which reviews the classical experiments on orientation by birds. These involve displacement of adult birds, young, and eggs before hatching. The question of orientation towards a particular goal or towards a particular direction is discussed. Obviously in the cases of displaced young birds only an orientation towards a definite direction is involved whereas displaced adults, particularly breeding individuals, show a tendency to orient toward a definite goal. The sensory basis for these phenomena is still quite enigmatic.

In my opinion, the most significant single contribution in the entire volume is Gustav Kramer's "Eine neue Methode zur Erforschung der Zugorientierung und die bisher damit erzielten Ergebnisse" (pp. 269-280). Kramer reviews the techniques, apparatus, and initial results of his new laboratory approach to the problem of orientation in migration, the basic principle being the recording of the direction tendencies in the movements of caged migratory birds. Landmarks can be obscured and light direction altered by the use of mirrors. The experiments with Starlings show quite convincingly that the sun and the qualities of sunlight from various directions are the basis for orientation in this species. It then must be assumed that, in migration, the bird "knows" the time of day in order to "compute" direction from the position of the sun.

"The Ottenby Bird Station" (pp. 295-309) by Carl Edelstam is well worth careful reading by American ornithologists not only for the interesting data presented but also as a source of ideas for approaches to the study of migration. Of a more specific nature with respect to migration, but nevertheless of general interest are the papers of R. B. Sibson, "Some aspects of bird migration in New Zealand" (pp. 320-325); Alfred van Beneden, "Quelques aspects de la migration d'Août en Belgique" (pp. 326-329); Torsten Malmberg, "Bird Migration in NW Scania" (pp. 330-334); Gunnar Svärdson, "Swift movements in summer" (pp. 335-338); G. Bouet, "Les Cigognes Blanches *(Ciconia ciconia* (L.)) en Afrique du Nord" (pp. 344-350); and Axel M. Hemmingsen, "Observations on the migration of the Eastern White Stork *(Ciconia ciconia boyciana* Swinhoe)" (pp. 351-353).

"Population ecology in birds—a review" (pp. 409-448) by David Lack is an able synthesis of the mass of ideas and trends of thought which impinge on the broad field of population dynamics. The great increase in research and thinking in this field indicates a changing orientation in ornithologic research. Included are discussions of population changes, irruptions, cycles, and changes in range as manifestations of the dynamic nature of populations and then reproduction, mortality, breeding season, clutch size, hatching success, competition for food, etc. as the factors underlying the dynamic nature of populations. Of notable interest also is "The changes in the distribution of the fulmar *(Fulmarus glacialis)*" (pp. 447-462), by James Fisher, in which the increase in range and numbers of this species on the British Isles is reconstructed. The author feels that the great increase has been the result of the vast expansion of trawling east and north of Iceland and the abundant food which fulmars can derive therefrom. In another paper, "The present population of the North Atlantic Gannet *(Sula bassana)*" (pp. 463-467), James Fisher and H. G. Vevers estimate that the breeding population has increased from about 70,000 nests in 1939 to about 82,000 nests in 1949.

An interesting series of papers deals with the effects of recent changes in climate on the avifaunae of various regions. Included are A. Keve and M. D. F. Udvardy, "Increase and decrease of the breeding range of some birds in Hungary" (pp. 468-475); J. Peitzmeier, "Beobachtungen über Klimaveränderungen und Bestandsveränderungen einiger Vogelarten in Nordwestdeutschland" (pp. 477-483); Einari

Merikallio, "Der Einfluss der letzten Wärmeperiode auf die Vogelfauna Nordfinnlands" (pp. 484-493); Gunnar Svärdson and Sigfrid Durango, "Spring weather and population fluctuations" (pp. 497-501); Finnur Gudmundson, "The effects of the recent climatic changes on the bird life of Iceland" (pp. 502-514); Finn Salomonsen, "The immigration and breeding of the Fieldfare *(Turdus pilaris* L.) in Greenland (pp. 515-525); and Ilmari Välikangas, "The expansion of the Greenish Warbler *(Phylloscopus trochiloides viridanus* Blyth) in the Baltic Area, especially in Finland, towards the North and Northwest, and its causes" (pp. 527-531). All of these describe changes in ranges and abundance apparently caused by recent changes in climate, mostly in the form of warmer mean temperatures in late spring and early summer.

The volume is concluded with a miscellany of short papers on behavior, ecology, food habits, physiology, regional faunal notes, and photography. It is heartily recommended to all ornithologists.—D. S. Farner.

36. The Recent Climatic Fluctuation in Finland and its Consequences. A symposium edited by Ilmari Hustich for the Geographical Society of Finland. 1952. *Fennia,* 75. 128 pp. Although there are many complicating facets, there can be no doubt that Finland and Scandinavia have experienced a general amelioration of climate since the turn of the century, which apparently reached its climax during the 1930's. The changes are described briefly and interestingly by J. Keränen, Director of the Central Meteorological Institute. The milder winters are attributed to changes in the Azores high pressure area and the Icelandic low pressure mass which allow for an enhanced northward flow of warm air. The warmer summer temperatures are ascribed to increased periods of sunshine and increase in warm air currents from the continental masses to the south and east. It is possible that the general clearing of the earth's atmosphere of fine volcanic material has been a factor. The ramifications of these changes in climate are manifold and the remainder of the symposium is devoted to them. Included are changes in the degree and pattern of freezing of the Baltic and the sequelae thereof, changes in foliation and flowering time of many species of plants, changes in distribution of certain species of plants, changes in carbon dioxide content of the atmosphere (cause or effect?), changes in the salinity of water along the Finnish coast and the effect on the distribution of aquatic organisms, changes in the distribution of certain insects, changes in the abundance and distribution of certain game species, changes in fish populations and fishing success, changes in the success and yield of certain agricultural crops, etc. Of particular interest to ornithologists is the discussion by Olavi Kalela (pp. 38-51) of the effects on geographic ranges of birds and mammals. Among the rather complex series of changes which have occurred the following are recognized: (1) Northward expansion since the turn of the century of a number of permanent resident birds and several species of mammals, both of which suffered heavily during the severe winters of the 1940's. (2) Several species of migratory birds of the "weather type" have extended ranges northward and northeastward. This is associated with the ameliorated winters and higher spring temperatures since the 1880's. (3) Northward extension in the ranges of certain species of "instinct migrants" since the 1920's and 1930's. This is associated with the increase in temperatures in May and June. (4) A pronounced northward expansion of certain species which live in conjunction with shallow eutrophic waters. This is associated with the drying up of lakes to the south and southeast in conjunction with the changes in climate. (5) The northward recession, independent of human influence, of the southern limits of certain northern species. (6) Increased northern wintering of many species in recent decades, with the exception of the 1940's. (7) "Accidentals" recorded in Finland in 1880-1941 have been mainly southern species.—D. S. Farner.

37. Poultry Breeding. Third Edition. Morley A. Jull. 1952. John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, New York. vii + 398 pp. $6. In this excellent little book one of America's most eminent poultry scientists has presented a critical resume of many aspects of the field of poultry breeding. The reviewer has often lamented the fact that poultry science and ornithology have gone such completely distinct and separated ways, and has frequently urged both groups to make greater use of the knowledge accumulated by the other. This

excellent book is a good case in point. Most ornithologists could profit tremendously by a careful reading of many of the chapters. Particularly useful would be chapter two, "Physiology of Reproduction," in which the author has prepared a very useful summary. Although the careful student of this field will find some omissions, particularly with respect to recent foreign literature, the chapter is nevertheless one of the very best English-language accounts of the basic physiology of avian reproduction available. Other chapters of importance to the ornithologist are those on the mechanism of inheritance, color characters, morphological characters, and gene linkage and blood group antigens. Each chapter has a very useful set of references.—D. S. Farner.

38. The Little Bird Book. (Das kleine Vogelbuch.) Rolf Dircksen. 1952. C. Bertelsmann Verlag, Gütersloh, Germany. 69 pp. DM 2.20 (about $.50). This little book will interest the professional ornithologist almost in direct proportion to his interest in photography. The 41 photographs are all exquisite, and many are outstanding portraits. The 24 pages of text give brief readable accounts of most of the species pictured. For each bird its status in Germany, characteristic notes, field marks, and habitat are described. Its weight is given, the number of eggs laid, length of incubation, and something on parental care. The importance of protecting birds of prey is stressed.—Frances Hamerstrom.

39. Laysan and Black-footed Albatrosses. Alfred M. Bailey. 1952. Museum Pictorial. No. 6. 80 pp. $1.00. Denver Museum of Natural History, Denver, Colo. "Three species of albatrosses formerly nested on the islands of the Pacific Ocean north of the equator, the short-tailed *(Diomedea albatrus)*, the Laysan *(D. immutabilis)* and the black-footed *(D. nigripes)*." The first has been exterminated by the Japanese, and the others are now confined to the Leeward islands northwest of the main Hawaiian group. They return to their nesting grounds in late October and early November, the males arriving first. "The mated pairs return annually to nest, usually on or near their old nest sites, and some banded birds have been recorded for more than ten years." The 'dances' seem to take place mostly between 'unemployed' birds and probably have pair-formation significance. Mates share incubation, one bird sometimes staying on the egg for as long as 24 days, but the average spell is about 18 days. Incubation lasts about 65 days with both species. Although many of the people on Midway are greatly interested in the albatrosses, "the operation of aircraft and the actions of some—human beings" cause considerable mortality, especially to the young. In 1951 these operations "so disturbed the Black-foot that they departed Sand earlier than usual, leaving hundreds of their young to starve." The author makes no suggestions as to how this situation can be ameliorated. Besides nesting biology, enemies —chiefly man, flight, plumage, food—mostly squid in the nesting season, and general range are discussed with many citations of other authors. The nesting population is estimated to be 200,000 adult Laysan and 75,000 Black-footed Albatrosses. There are 45 magnificent photographs of these notable birds.—M. M. Nice.

40. Stepping Stones across the Pacific. Alfred M. Bailey and Robert J. Niedrach. 1951. *Museum Pictorial.* No. 3. 56c. Denver Museum of Natural History, Denver, Colo. 64 pp. Experiences in 1949 on Midway and Wake Islands, telling something of the wild life of the islands and the history of Wake during the last World War. Very fine photographs of the Albatrosses.—M. M. Nice.

41. An Introduction to Acarology. Edward W. Baker and G. W. Wharton. 1952. The MacMillan Company, New York, New York. xiii + 465 pp. $10.00. Among the many interesting facets of the intense scientific progress of the past decade has been the markedly increased interest and progress in acarology. This has been prompted by the increased realization of the medical, veterinary, agricultural, and other economic importances of the mites. Beyond this is the fascination of the great diversity of habits, habitats, life cycles, and adaptations of this tremendous group of small animals. A product of the enlightened interest in acarology is this important and useful treatise, an important landmark in American acarology, of great value especially because it is the only useful *introduction* to the

field. It is written so that it can be used successfully by any intelligent biologist. Included are introductions to biology, morphology, and terminology, as well as keys to families, diagnoses of families, brief notes on the individual families, lists of genera, and a few references for each family. From this treatise the reader can go to the literature of the individual groups and such monographs as the treatises of the Acari by Vitzthum in Bonn's "Klassen und Ordnungen des Tierreichs" and Kükenthal and Krumbach's "Handbuch der Zoologie" as well as the older contributions of Trouessart, Oudemans, Canestrini, and others.

The book is of very substantial interest to ornithology since no less than thirteen families, in the classification adopted by the authors, have species parasitic on birds. Among these the families of "feather mites" (including the Analgesidae, Dermoglyphidae, and Proctophyllodidae, as recognized by the authors) offer great possibilities as clues to phylogenetic relationships among groups of birds. Perhaps the Rhinonyssidae, parasitic in the nasal pasages, have similar potentialities.

The book displays well the fragmentary nature of our knowledge of the mites and indicates the directions toward which research should be oriented. It is to be hoped that as research in acarology progresses there will be further editions in which page space and available information will permit keys to genera and a more complete bibliography for each family. The authors are to be congratulated on a very important service to acarology and to biology as a whole.—D. S. Farner.

42. A Textbook of Evolution. Edward O. Dodson. 1952. W. B. Saunders Co., Philadelphia & London, 8vo, 419 pp., ill. $5. The modern civilized world accepts the theory of evolution without question. The average well-informed layman today understands enough about it to realize that man is not directly descended from monkeys, but that both man and monkeys have developed from a common ancestor lost in the dim and distant past. Beyond that, few people other than biology majors can discuss the subject intelligently.

Professor Dodson's textbook is recommended for those who wish to know more about evolution without going too deeply into any phase of the subject. It is very readable, apparently designed for a general undergraduate college course, and not necessarily for students with Biology A as a prerequisite (though that would help). It is written lucidly, with a minimum of technical details, so few in fact that it may incur the displeasure of the specialists in any of the many fields that the study of evolution now embraces. It traces the development of evolutionary thought from Lamark and Darwin through the "romantic" and "agnostic" periods to the present "period of modern synthesis" with clarity, simplicity, and fair impartiality, though some might consider the author leans more to the ultra-modern Goldschmidt doctrines than to the conservative neo-Darwinism of Dobzhansky and others which is more widely adhered to by my generation of biologists.

Unlike most previous texts, this volume places little emphasis on the fossil record, which it treats rather sketchily, but accents instead the field of genetics, where the greatest advances in the study of evolution have been made in the last few decades. Illustrative material is taken from throughout the plant and animal kingdoms, and birds seem to receive their full share of attention. The ornithologist will recognize many references to Mayr's "Systematics and the Origin of Species." An unexpected omission is reference to Lack's work on the Galapagos finches, but selective differentiation on oceanic islands is adequately illustrated instead by Amadon's diagnosis of the Hawaiian honey-creepers. In fact the only group to receive more notice than the birds is the primates and man, which under the circumstances is quite understandable and excusable, and should not deter ornithologists from buying it as a most useful reference book for their shelves.—O. L. Austin, Jr.

43. Fleas, Flukes & Cuckoos. Miriam Rothschild & Teresa Clay. 1952. Collins Publ., St. James's Place, London. 304 pp. Price 21 shillings. The interrelationships of parasitism and bird life is a matter of magnitude and importance little realized by many naturalists. For the first time the present knowledge of the subject has been summarized and presented in book form. The coverage has been adequately complete with the inclusion of an incredible amount of fundamental data. An exhaustive presentation has been impossible, so with a fine recognition of values, less important subjects have been discussed with relative brevity. No

emphasis has been given the bizarre, but rather an obvious effort to show the inherent value of many of the unusual occurrences investigation has revealed. The literary style is superior, making almost all the volume as easy reading and as entertaining as a story book.

No ornithologist can be well rounded until he has a general knowledge of parasitism. Lacking it he will find a perusal of this book an enjoyable remedy. Even the systematists may find in it suggestions for solving some of their problems. The book was not written for laymen, nor for parasitologists, but rather for the edification of the average ornithologist and zoologist. This purpose has been accomplished so well, and the book is so superior in all major requirements that only a pedant would point out the inevitable minor inaccuracies and shortcomings.—O. L. Austin, Sr., M.D.