Banding Activities on the Arctic Slope of Alaska.—Bird-banding activity at the Arctic Research Laboratory, Alaska, in the summer of 1951, has resulted, up to August 15th, in the banding of 632 birds. Population studies of the Snow Bunting, *Plectrophenax nivalis* (Linnaeus), and Lapland Longspur, *Calcarius lapponicus* (Linnaeus), were initiated, and the numbers banded were 310 buntings and 220 longspurs. About 25 per cent of these were also color-banded. As plans are under way to continue these studies in 1952, we would like to obtain some winter-range returns for both species and hope that banders and observers in southern Canada and the northern United States will be on the lookout for banded individuals. Other species banded are as follows:

Baird Sandpiper, *Pisobia bairdi* (Coues)	35
Red-backed Sandpiper, *Pelidna alpina sakhalina* (Viellot)	23
Arctic Tern, *Sterna paradisaea* Brunnich	21
Red Phalarope, *Phalaropus fulicarius* (Linnaeus)	8
Semipalmated Sandpiper, *Ereunetes pusilius* (Linnaeus)	8
Golden Plover, *Pluvialis dominica* (Muller)	5
Ruddy Turnstone, *Arenaria interpres morinella* (Linnaeus)	1
Old-squaw, *Clangula hyemalis* (Linnaeus)	1

These studies are being conducted under a contract between the Office of Naval Research and the University of California.
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RECENT LITERATURE

BANDING

(See also Numbers 33 and 35.)

1. Bird Ringing at Night. W. J. Eggeling. 1951. *The Bokmakierie*, 3(2): 29. South Africa's most active bander explains his technique of capturing shorebirds at night. The requirements include a completely moonless night, the masking noise of waves on the beach, and soft-soled shoes. Dr. Eggeling shines a five-cell flashlight on the resting bird, approaches it stealthily, and drops over it a 13-inch diameter trout landing net having "a piece of light fish-netting stretched more or less tightly over the frame." In 1950 Dr. Eggeling captured several hundred birds in this manner, on one occasion 19 in a three-hour period.—H. H. Poor.

2. Banding Mourning Doves in Eastern Nebraska. Wilhelmina and LeRoy Gulotta. 1947. *The Nebraska Bird Review*, 15(2): 12-16. The dates of banding 508 nestling Mourning Doves, *Zenaidura macroura* (Linnaeus), in the vicinity of Lincoln, Nebraska, from 1940 to 1947, are presented. Over the eight seasons 14 were banded in May, 119 in June, 214 in July, 99 in August, and 62 in September. Nestling doves were banded in May during four of the eight years (1943-46), and in the other months from June to September in all eight years. Forty-nine of the 62 September bandings occurred from 1943 to 1945. An open hunting season on Mourning Doves in Nebraska during September of 1947 appears to have been responsible for the deaths of some September nestlings. Data indicate that some Mourning Doves have young in the nest into early October in southeastern Nebraska.—L. R. Mewaldt.

MIGRATION

(See also Numbers 21, 23, 35, and 46.)

3. The Question of Inherited Migratory Routes. (Zur Frage der angeborenen Zugwege.) Ernst Schüz. 1950. *Die Vogelwarte*, 15(4): 219-226. The author has considered recent experimental and field data in an admirable effort to rationalize the available information into some consistent pattern. It is proposed that migratory birds inherit the mechanisms for a definite migratory direction which in some cases is astonishingly constant whereas in other species it is more variable. This fundamental direction may be varied in two general ways. There may be variations resulting from the general disposition to follow

an "ecologic compulsion" associated with food requirements, type of flight, etc. These variations from the fundamental direction are transitory. A second general type of deviation is that resulting from response to a series of landmarks or types of landscape. The particular response may be characteristic of only a certain population within a species. This second type of variation of direction, which may occur in series, is characteristic of all "narrow-front migrants" and certain of the "broad-front migrants." Bearing in mind the innate hazards of generalizations involving more than a single species, the system herein proposed appears fundamentally logical.—D. S. Farner.

4. The Nature and Causes of the "Coastal Hiatus." George G. Williams. 1950. *The Wilson Bulletin*, 62(4): 175-182. During the spring migration there is an area along the northern shore of the Gulf of Mexico extending several hundred miles inland within which transient birds are highly intermittent in occurrence, rare, or absent during many consecutive years. This recognized phenomenon is commonly referred to as the "coastal hiatus." The author states in his summary (p. 182) that the " 'coastal hiatus' of our Gulf States appears to be a lacuna south of and between two great spring migration triangles, one extending north and northeast from southern Texas, the other extending northwest, north, and northeast from Florida. In this lacuna few transient species occur during fair, warm weather. Periodic cold fronts, with northerly winds, striking the northern sides of these migration triangles, push migrants down against the coast, where they are often seen in great numbers immediately after the passage of a cold front. Sometimes the cold fronts push birds out over the Gulf itself, where they have been mistaken for trans-Gulf migrants." Although this hypothesis sounds reasonable and may correctly explain, at least in part, the "coastal hiatus," the author has failed to adequately demonstrate that cold fronts with northerly winds actually force migrants down against the coast from the north or northwest. Procedures used in making telescopic observations of night migrants are not mentioned, nor are the results from these observations adequately presented. The other data are suggestive, but subject to more than one interpretation. It is apparent that a fresh approach to the entire subject of migration in the region of the Gulf of Mexico, including the "coastal hiatus," would be desirable.—L. R. Mewaldt.

5. Barometric Pressure-Patterns and Spring Bird Migration. A. M. Bagg, W. W. H. Gunn, D. S. Miller, J. T. Nichols, Winnifred Smith, and F. P. Wolfarth. 1950. *The Wilson Bulletin*, 62(1): 5-19. This paper presents a study of barometric pressure-pattern factors as they may be correlated with spring migration in North America east of 100°W and south of 50°N. Several hypotheses are presented which state in part that northward movement of migrants in late winter and spring normally begins under conditions of a barometric gradient falling from east to west, and that a pronounced movement will take place into or through a given region during the interval between the passage of a warm front through that region and the subsequent arrival of a cold front. With the arrival of a cold front, usually accompanied by cloudiness and rain, an onrushing wave of migrants is arrested. The period of 17 to 22 April 1948 was selected as typical and briefly analyzed meteorologically and ornithologically. This description of those meteorological factors which apparently have an important modifying effect upon the more basic migratory patterns of many avian species, makes apparent the necessity for widespread coordination of effort to successfully study these phenomena. It is unfortunate that even in their review of "European References," the authors overlooked, or considered outside the "immediate scope" of their paper, several important European papers including contributions by H. Ahlquist, Göran Bergman, W. Hagen, O. Leivo, and Pontus Palmgren (1939). The methods employed, and the conclusions reached by these and other European workers might have proved useful to the authors of this paper.—L. R. Mewaldt.

6. Oriented Migratory Activity of Caged Song Birds. (Orientierte Zugaktivität gekäfigter Singvögel.) Gustav Kramer. 1950. *Die Naturwissenschaften*, 37(8): 188. In the fall of 1949 recordings were made of the orientation of migrating passerine birds placed in cages. A Blackcap, *Sylvia atricapilla* (Linnaeus), showed a distinct orientation between ESE and WSW when placed in a

cage in a quiet field. At a location from which the reflection of the lights of the city could be seen orientation was toward the city (NE) but only when the observation place was established after the fall of darkness. If established during twilight or earlier, orientation was toward the S or SE. Similar results were obtained with three White Throats, *Sylvia communis* Latham.—D. S. Farner.

7. Further Analysis of the Factors which Orient the Migratory Activity of Caged Birds. (Weitere Analyse der Faktoren, welche die Zugaktivität des gekäfigten Vogels orientieren.) Gustav Kramer. 1950. *Die Naturwissenschaften*, 37(16): 377-378. Experiments in a radially symmetrical cage which allowed the experimental Starlings, *Sturnus vulgaris* Linnaeus, to see only limited sections of the sky, demonstrate clearly that orientation is not dependent on landmarks but rather, in some manner, on sunlight. This is confirmed by experiments with mirrors. Orientation becomes less definite, or disappears entirely, with cloudiness. —D. S. Farner.

8. William Dreuth's Study of Bird Migration in Lincoln Park, Chicago. Charles T. Clark and Margaret M. Nice. 1950. *The Chicago Academy of Sciences Special Publication* No. 8. 43 pp. The authors have compiled the data from Dreuth's notebooks for the years 1926-1943 into useful tables which constitute a remarkably important set of data on migration. The list contains 256 species. For each is given the earliest date of arrival, average date of arrival, average date last seen, last date seen, number of days seen, and number of years seen; data are given for spring and fall migration.—D. S. Farner.

9. The Arrival of Migratory Birds and the Beginning of Song in Northern and Western Germany in 1948 in Comparison to Earlier Years. (Ankunft der Zugvögel und Sangesbeginn in Nord-und Westdeutschland 1948 und im Vergleich zu früheren Jahren.) H. Bruns. 1949. *Ornithologische Abhandlungen*, 2:1-20. This is a useful and interesting compilation, mostly tabular, of more than 1600 arrival dates for 35 species. There are comparisons both with respect to species and locality. The data show a considerable influence of meteorologic conditions on arrival dates. Particularly influential are periods of low temperature which have a retarding effect.—D. S. Farner.

10. The Snowy Owl Migration of 1946-47. L. L. Snyder. 1949. *The Wilson Bulletin*, 61(2): 99-102. This is the third report of the Snowy Owl Committee which collects and evaluates data pertaining to southward migrations of the Snowy Owl, *Nyctea scandiaca* (Linnaeus), into southern Canada and the United States. In eastern North America the 1946-47 flight was a "mere echo" of the very heavy 1945-46 flight. In western North America the 1946-47 flight was again fully as heavy as it had been the previous winter. The committee report suggests that, in general, influxes into extreme eastern North America have their origin in the eastern Arctic (east and northeast of Hudson Bay). Influxes of Snowy Owls into the mid-continent area and western North America originate primarily in the western Arctic (west and northwest of Hudson Bay).—L. R. Mewaldt.

11. Mortality of Birds at the Ceilometer of the Nashville Airport. Walter R. Spofford. 1949. *The Wilson Bulletin*, 61(2): 86-90. During the predawn hours of 10 September 1948, approximately 300 migrating birds were killed or injured at the ceilometer of the Nashville Airport at Nashville, Tennessee. The ceilometer sends a vertical beam of blueish light from a mercury-vapor lamp of great intensity into the sky and is effective in recording cloud levels up to 15,000 feet. During the predawn hours of 10 September, the ceiling varied from 5,000 feet to 9,700 feet. Weather conditions were seemingly favorable for migration. Apparently those birds intercepting the beam of light became in some manner incapacitated, fell to the ground, and were killed or seriously injured upon impact with the ground. Birds were seen to fall down the shaft of light, and most fell within 50 to 100 feet of the ceilometer. A total of 248 birds of 34 species were recorded including six Pied-billed Grebes, *Podilymbus podiceps* Linnaeus; one American Bittern, *Botaurus lentiginosus* (Montagu); two Sora Rails, *Porzana carolina* (Linnaeus); and 31 species of passerine birds. The

author points out that the Nashville Airport ceilometer had been in use for years without a similar incident, and that such instruments are in common use on other airports. The actual combination of factors responsible for the incident remains obscure.—L. R. Mewaldt.

12. Homing Ability of Italian and German Homing Pigeons. (Heimkehrleistungen italienischer und deutscher Reisetauben.) Lore Dinnendahl and Gustav Kramer. 1950. *Die Vogelwarte,* 15(4): 237-242. The rate of homing of German homing pigeons appears to be an inverse linear function of the distance of the flight. The performances of the Italian birds seem to indicate that there is an optimum distance (200-400 kilometers) at which the greatest rate of homing occurs. This is explained by the more favorable atmospheric conditions of the Mediterranean summers.—D. S. Farner.

FOOD AND FOOD HABITS
(See also Numbers 34 and 35.)

13. Production and Utilization of Waterfowl Food Plants on the East Texas Gulf Coast. J. R. Singleton. 1951. *Journal of Wildlife Management,* 15(1): 46-56. The community productivity approach in this paper is fundamental to wildlife management. Fifty-five meter plots were established to obtain production from 14 important food plants. For beak rush and wild millet it was shown that competition from plants of other species reduced production of seed. Burning of leafy three-square and smartweed apparently had little effect upon seed production or vegetative yield. The air-dry yield of seed was 3,693 pounds per acre for all plants. Stems and leaves yielded 9,968 pounds (air dry) per acre. Corms of leafy three-square produced 9,580 pounds (air dry) per acre. An analysis of 410 duck stomachs collected in marshes along the Gulf Coast showed that of the plants studied spikerush, widgeon grass, smartweed, and pondweed were of great importance. Bulrush and sawgrass were of secondary importance. Rice formed the greatest portion of the diet (40 percent) and occurred 159 times in 410 stomachs. Despite sufficient available knowledge, the coastal marshes are improperly managed. Such practices as controlled burning, regulated livestock grazing, and regulated muskrat trapping to prevent "eat-outs," are not widely applied. Expanded agricultural developments, drainage, industrialization, and oil exploration are eliminating some of the most important winter range for waterfowl on the continent.—Helmut K. Buechner.

PHYSIOLOGY
(See also Numbers 6, 7, and 33.)

14. Wisconsin Pheasant Reproduction Studies Based on Ovulated Follicle Technique. Irven O. Buss, Roland K. Meyer and Cyril Kabat. 1951. *Journal of Wildlife Management,* 15(1): 32-46. This is the third and last article in a series of three by the same authors dealing with an ovulated-follicle technique used to determine reproductive performance of Ring-necked Pheasant. The first two are primarily concerned with development of the technique; the last provides additional data on pen studies that reveal egg-laying behavior, and reports an application to wild populations. Studies on reproduction in game-farm hens showed that: (1) Most hens started to lay by mid-April; (2) first-laying dates varied up to 30 days; (3) the average laying rate for 1,790 eggs was 1.3 days per egg; (4) an average of 34 eggs per hen was laid by 11 hens; (5) of these eggs, 12.5 were laid at random, 11.5 (Table 2 erroneously indicates 5.8) were laid in nests but not incubated, and 10 eggs were incubated in nests; (6) only 36 percent of the clutches were incubated; and (7) the initiation of egg laying is not directly related to the phenomena causing incubation. A resume of 5,611 nests studied in various parts of the United States showed that only 34 percent were successful, indicating that laying eggs at random and deserting one or two nests may represent typical behavior whether the birds are in natural habitat or in pens. Studies of wild pheasants on two areas near Madison, Wisconsin, showed: (1) The rate of involution (resorption) of ovulated follicles is almost identical with

rates measured in game-farm birds, (2) wild and propagated pheasants respond alike to the phenomena initiating egg laying, (3) first-egg dates are similar to those of penned birds, (4) wild pheasants may lay up to 50 eggs, and (5) reproductive performance may vary with range conditions. In comparing the University Arboretum area (advanced succession) with the University Bay area (early succession) it was found that on the latter pheasants began laying earlier (April 20 compared with April 25), they laid fewer eggs (16 compared with 31), the average hatching date was earlier, the average brood size was larger, the number of broodless hens was fewer, and the number of young per adult was greater. Despite lower egg production, the population on the Bay area was more productive. High egg production seems to be correlated with relatively low reproduction.—Helmut K. Buechner.

15. The Effect of Age on Laying Dates, Size of Eggs, and Size of Clutch in the Yellow-eyed Penguin. L. E. Richdale. 1949. *The Wilson Bulletin*, 61(2): 91-98. From August 1936 to May 1948, the author carried out an intensive and significant study of the Yellow-eyed Penguin, *Megadyptes antipodes* (Hombron and Jaquinot), on the Otago Peninsula of New Zealand. The birds were banded to permit identification of individuals. This paper contains an analysis of data pertaining to egg-laying dates, egg size, and clutch size as they may be related to the age of the female. The age of the female apparently has no effect on the date of laying. Older females produce heavier and wider eggs than younger females. Among younger penguins, age, rather than laying history, seems the more important factor in the determination of egg size. Egg lengths show considerable variation in all age groups. The normal clutch size is two eggs. Forty two-year-old females averaged 1.68 eggs per clutch, whereas 39 four-year-old females averaged 2.00 eggs per clutch. It is significant to note that of 31 three-year-olds which did not lay as two-year-olds, only one did not produce the normal complement of two eggs to the clutch. Sixty-three females seven to fourteen years old averaged 1.95 eggs per clutch, which does not indicate a significant drop in egg producing capacity for this age group.—L. R. Mewaldt.

16. A Review of Experimental Investigations on Seasonal Reproduction in Birds. J. Wendell Burger. 1949. *The Wilson Bulletin*, 61(4): 211-230. This paper serves to emphasize the need for carefully planned investigations pertaining to the seasonal reproduction of birds. The author points out in speaking of reproductive cycles (p. 227) that all "truly wild species of birds tested have been influenced to some degree by photoperiodic manipulations," and that "photoperiodic changes are the only widely spread factor capable of modifying reproductive rhythmicity which is moderately well-known through experimental testing." Most experimental work has been done upon birds native to the northern hemisphere and which are either non-migratory, or do not migrate to the equatorial regions or beyond. That psychic factors and other environmental factors in addition to light are important in bringing about reproduction in birds is indicated, but evaluation of these factors has been more difficult. It is probable that genetic variability plays an important role in the differing responses of populations even within a given species. The importance of the refractory period, during which a bird does not respond reproductively to increased photoperiod is discussed.—L. R. Mewaldt.

17. A Study of Absorption and Retention of Lead in Wild Waterfowl in Relation to Clinical Evidence of Lead Poisoning. Don R. Coburn, David W. Metzler, and Ray Treichler. 1951. *Journal of Wildlife Management*, 15(2): 186-192. Fourteen adult mallard ducks, which had been captured in the wild, were subjected to dosage levels of 3, 6, 8, and 12 milligrams of lead (aqueous solution of lead nitrate) per kilogram of body weight. Daily ingestion of 6 mg./kg. produced no toxic symptoms in two birds over a period of 137 days. When the dose was increased to 12 mg./kg., death resulted in 14 days for one bird and 22 days for the other. The critical intake level appeared to be between 6 and 8 mg./kg. Six ducks receiving the latter amount died following an average survival period of about 28 days. The average amount of lead ingested was 158 mg., or approximately the weight of one No. 5 shot. Birds receiving 12 mg./kg. survived an average of 3.5 days less than those receiving 8 mg./kg., but there was

no significant difference in the deposition of lead in the tissues of the two groups. Anemia and emaciation; atrophy of the liver, in part caused by necrosis; atrophy of the gizzard muscles and heart; and an above-normal production of bright-green bile were characteristic symptoms of the lead poisoning. Body weight, erythrocyte count, and hemoglobin content dropped sharply when poisoning became acute. Anisocytosis and poikilocytosis appeared soon after the birds were poisoned, and showers of poikilocytes occurred regularly as the rate of mature-red-cell destruction increased. The most significant increases in lead content were noted in the livers, the average value for poisoned birds being 40 times that for the normal controls. In pathological birds the lead content of the skeletons was seven times higher than in the controls. Chemical analysis of liver or skeleton is suggested as a diagnostic tool for the determination of plumbism in the wild.—Helmut K. Buechner.

LIFE HISTORY

(See also Numbers 14, 15, 24, 26, 33, and 35.)

18. Ruffed Grouse Hatching Dates in Wisconsin. James B. Hale and Robert F. Wendt. 1951. *Journal of Wildlife Management,* 15(2): 195-199. A reference chart is presented for dating the events associated with nesting in Ruffed Grouse *Bonasa umbellus* (Linnaeus). Using this chart, hatching dates were computed for 69 broods from each of which one specimen was collected during the summer of 1949. Forty-two (61 percent) hatched during the two-week period, May 27-June 9. The sharp peak of hatching and the short nesting season indicated high success of first nests and little renesting.—Helmut K. Buechner.

19. Notes on the Artificial Propagation of Wood Duck. Harold C. Hanson. 1951. *Journal of Wildlife Management,* 15(1): 68-72. To test the homing instincts of pen-reared Wood Ducks, *Aix sponsa* (Linnaeus), attempts were made by the Illinois Natural History Survey to propagate the bird artificially. Of 467 eggs brought to the hatchery in 1944, 297 (64 percent) hatched successfully. Out of 297 ducklings taken from the incubator, 242 (81 percent) were successfully reared to 5-6 weeks. At this age they were transported to points in Wisconsin, Indiana, and Illinois for an additional 1-3 weeks of captivity prior to release in the wild. Ducklings were reared on turkey starter mash in small pellet form. Light bulbs were used to attract insects, and it is believed that the large number of insects eaten contributed greatly to the physical condition and health of the birds. The principal known cause of fatalities in 1944 and in two previous rearing experiments was the paratyphoid bacterium, *Salmonella.* Apparently the disease is transmitted in the wild through infected eggs. Success in artificial propagation of the Wood Duck depends primarily on control of paratyphoid disease. The results of the release of pen-reared Wood Ducks made in Wisconsin by the Natural History Survey were reported in 1947 by Robert A. McCabe in the *Wilson Bulletin,* 59(2): 104-109.—Helmut K. Buechner.

20. The Life History of the Cedar Waxwing. Loren S. Putnam. 1949. *The Wilson Bulletin,* 61(3): 141-182. Several thousand hours were involved in this intensive study of the Cedar Waxwing, *Bombycil'a cedrorum* Vieillot, during six summers between 1939 and 1946 on South Bass Island in Lake Erie north of Sandusky, Ohio. Birds were color banded to facilitate identification of individuals. Only two of 54 banded adults returned a following year and none of 174 banded as nestlings were again recovered. From eight to fifteen pairs nested simultaneously during any one year in the study area. The subjects treated include formation of pairs, territory, courtship, voice, nest and eggs, the role of the sexes during incubation, attentiveness during incubation, incubation period, care of young, development of young, renesting, social behavior, and nesting success. Incubation was performed entirely by the female who was fed on the nest by the male. During 402 hours of daylight observation during incubation, 236 periods of attention by the female averaged 44.8 minutes. Frequently, daylight periods of attentiveness longer than 120 minutes were observed. Of some interest is the observation that males start bringing insects instead of fruit to the nest at hatching and for about the next three days, after which time fruit is again the principal food carried to the nest. Some overlapping of broods was observed when eggs were

deposited in second nests before the young were fledged from the first nest.—L. R. Mewaldt.

21. Nesting Behavior of the Red-Wing Blackbird. James R. Beer and Douglas Tibbitts. 1950. *The Flicker,* 22(3): 61-77. A colony of *Agelaius phoeniceus* (Linnaeus) in a 2.4-acre marsh on Lake Wingra, Madison, Wisconsin, was studied by means of banded individuals. Spring migration began with the arrival of vagrants which were followed by resident adult males, resident first-year males, resident adult females, migrant first-year males, and finally migrant females. Red-winged Blackbirds are highly territorial; evidence is presented that first-year males may locate although not defend territories. Once established there is a pronounced tendency for males to return to the same territory year after year. At least six basic display patterns are recognizable. Of 118 nests observed started, 101 were completed; 321 eggs were laid in 91 nests; 258 eggs hatched in 78 nests and 170 young were fledged from 57 nests.—D. S. Farner.

BEHAVIOR

(See also Numbers 3, 6, 7, 9, 11, 12, 16, 17, 20, 21, and 33.)

22. Related Species in Mixed Bird Parties in Northern Rhodesia. J. M. Winterbottom. 1950. *The Ostrich,* 21(2): 77-83. A study based on field observations in Northern Rhodesia providing detailed specific compositions of 276 bird parties. After discussing the instances where two or more different species of the same family were found in the same party, the author uses statistical methods to measure the degree of association between species, and concludes that the figures "lend little support to the hypothesis that closely related species cannot exist together in the same environment unless their feeding habits differ."—Hustace H. Poor.

23. Role of the Family in the Formation of Goose Flocks. William H. Elder and Nina L. Elder. 1949. *The Wilson Bulletin,* 61(3): 132-140. An analysis of counts upon 4,598 small flocks (20 or fewer birds) of Canada Geese, *Branta canadensis* (Linnaeus), while in migration in the United States is presented. These data indicate that in the fall of the year, before the hunting season, the most common flock size is six. Additional increases in the frequency of flock sizes occurred at ten and fifteen birds. Available evidence indicates that Canada Geese tend to remain in family groups for nearly a year, with two or more family groups frequently banding together at least part of the time. A comparison of small flock sizes before and after a hunting season revealed that post-season flocks tended to be smaller than pre-season flocks. The authors suggest that a count of several hundred small flocks arriving at a refuge in the fall might provide a good index of the success of that year's hatch.—L. R. Mewaldt.

24. Territory and Song in the Least Flycatcher. Peggy Muirhead MacQueen. 1950. *The Wilson Bulletin,* 62(4): 194-205. Territory and song of the Least Flycatcher, *Empidonax minimus* (Baird and Baird), were studied during the summers of 1942, 1944, and 1946 in the vicinity of Douglas Lake, Cheboygan County, Michigan. Three nesting females were banded to facilitate identification of individuals. The territories of 44 pairs studied were of two types: one in which a pair mated, nested, and fed throughout the "reproductive cycle"; and the other in which the pair mated and nested, but fed in a neutral feeding area nearby. Thirty-three measured territories varied in size from 0.03 acres to 0.5 acres (average 0.18 acres). Territories were defended principally by the males, with females participating less frequently. At least from egg-laying to scattering of the young, the males devoted a definite part of each morning to their morning song which began before dawn and ended about sunrise.—L. R. Mewaldt.

25. Cowbird Behavior. Amelia R. Laskey. 1950. *The Wilson Bulletin,* 62(4): 157-174. The mating habits and territorial behavior of the Cowbird, *Molothrus ater* (Boddaert), were studied during the breeding seasons of 1944, 1945, and 1946 at Nashville, Tennessee. Most of the observations were of 29 color-banded individuals (18 males and 11 females) which were attracted to a feeding area at the author's home. The author's observations indicate that the

Cowbird is monogamous rather than polygamous or promiscuous. During 1944 one male proved to be dominant over all other males and one female was likewise dominant over all other females on the feeding area and in the immediate vicinity. These two birds showed behavior indicating they were a pair including the fact that they were observed to copulate three times in the vicinity of the feeding area. No other birds exhibited such behavior on the study area. No evidence of true territorial behavior was found. The author suggests that this area, designated as the *domain*, may be all that is left of "territory," with *intimidation bows* and *guarding of mates* all that is left of mate protection and isolation in this social species whose breeding has become parasitic.—L. R. Mewaldt.

26. Breeding Behavior of the Goldfinch. Allen W. Stokes. 1950. *The Wilson Bulletin*, 62(3): 107-127. During the summers of 1944, 1946, and 1947 approximately 600 hours were spent observing the breeding behavior of the American Goldfinch, *Spinus tristis* (Linnaeus), on 24 acres of park and marsh-land in Madison, Wisconsin. Of 230 nests, 68 percent were placed in elderberry, *Sambuscus canadensis* Linnaeus, the most abundant shrub. The study placed emphasis upon pair formation, establishment of territory, and breeding success. Pair formation took place in May or earlier while the birds were still in flocks even though nesting did not occur until July. Territories in the most densely populated part of the study area averaged about 95 feet in diameter and did not necessarily include food, water, or nest material. Both sexes defended the nest territory against other goldfinches, especially during the early part of the nesting cycle. During the three years, 239 nests containing 696 eggs resulted in a fledging success of 49 percent. Approximately 15 percent started a second brood between 5 August and 1 September. The males first began to show post-nuptial molt during the first week in September.—L. R. Mewaldt.

ECOLOGY

(See also Numbers 3, 10, 13, 20, 21, 22, 24, 26, 30, 33, 34, 35, 36, 37, 39, 45, and 46.)

27. The Avifauna of the Mesophytic Oak—Hornbeam Forest. (Die Vogelwelt des feuchten Eichen-Hainbuchen-Waldes.) Otto Niebuhr. 1948. *Ornithologische Abhandlungen*, 1. 28 pp. The author has studied the breeding-bird populations, primarily by means of censuses of singing males, in seven plots (2.00-8.35 hectares) in Hanover. The habitats are classified as follows: A_1, 200-year-old oak forest with underbrush near village; A_2, 200-year-old oak forest with underbrush; B_1, oak forest with trunks 50-65 centimeters in diameter and underbrush 2-4 meters high; B_2, same with underbrush up to 2 meters; B_3, same with underbrush having been removed the previous winter; C_1, oak forest with trunks 30-40 centimeters in diameter (60-70 years) with underbrush 1.5-2.0 meters high; C_2, same without underbrush; D_1, young pole wood (planted), oak or oak-alder with largest trunks 20 centimeters in diameter, trees 6-7 meters high; E, natural replacement or nursery. Thirty-eight breeding species were involved. The numbers of species according to habitat were as follows: A_1 13.64; A_2 7.24; B_1 3.08; B_3 2.77; C 2.45; D 1.48; E 4.10. Densities per hectare were: A_1 23.86; A_2 11.38; B_1 9.26; B_2 5.90; B_3 3.60; C 3.15; D 1.95; E 7.80. In general the utilization of forests by man prevents maximal densities of birds. "The avifauna attains its optimal density in forests of the most natural type. In a primitive mesophytic oak-hornbeam forest it may attain a density of 900-1,000 pairs per square kilometer." (p. 27.) There are many interesting tabulations of data.—D. S. Farner.

28. Effects on Wildlife of DDT Used for Control of Dutch Elm Disease. Allen H. Benton. 1951. *Journal of Wildlife Management*, 15(1): 20-27. To determine the effects of DDT spraying on bird life at Princeton, New Jersey, a sprayed study area within the city was compared with an unsprayed check area in the rural outskirts of the town. Following spraying 26 birds were found dead or dying, indicating a negligible effect on the total population. On a 20-acre census plot approximately one bird per two acres was found dead, including six nestlings, four immature birds, and one adult. Information from residents interested in birds indicated a decline in population over the three-year period, 1947-

1949, but the decrease probably resulted from reductions in numbers of insects and were independent of direct mortality caused by DDT spraying. Among the birds common to both plots, an increase of 6 percent occurred on the unsprayed area and a decrease of 22 percent occurred on the sprayed area immediately following spraying. Those that decreased on the study area were Song Sparrow, Catbird, House Wren, Cardinal, and Crested Flycatcher. Canopy feeders such as orioles, warblers, chickadees, nuthatches, pewees, and vireos, were notably absent on the treated plot. Previous spraying may have eliminated or discouraged these species from using the area. Throughout the post-spraying period the numbers of Robins and Wood Thrushes on the study area remained high and none of these birds were found dead. They outnumbered all other species, except grackles, and fed constantly under sprayed elms. In the period during or immediately following spraying six nests containing 18 young were under observation. Only eight (44 percent) were brought to a successful fledging. Of nine nests and 21 young observed in the check area, 15 (71 percent) fledged. It is recommended that spraying be completed by April 15 to prevent direct mortality.—Helmut K. Buechner.

29. Effects of Five-Year DDT Application on Breeding Bird Population. Chandler S. Robbins, Paul F. Springer, and Clark G. Webster. 1951. *Journal of Wildlife Management*, 15(2): 213-216. A 117-acre tract of bottomland forest on the Patuxent Research Refuge at Laurel, Maryland, received aerial applications of DDT in oil at the rate of two pounds per acre each spring from 1945 through 1949. Birds were counted on a 31-acre plot at the center of the treated area and on a 32-acre, unsprayed check area. The three commonest breeding species, Red-eyed Vireo, *Vireo olivaceus* (Linnaeus); Parula Warbler, *Parula americana* (Linnaeus); and American Redstart, *Setophaga ruticilla* (Linnaeus), showed decreases of 44, 40, and 28 percent, respectively, over the four-year period. All three are insectivorous, tree-top feeders. Of the total decrease, 72 percent was attributed to these three birds; no significant decrease was observed for other species. The treated area showed a decline of 26 percent over the entire period, compared to an increase of 1.6 percent in the control area.—Helmut K. Buechner.

CENSUSES AND POPULATIONS

(See Numbers 17, 28, 29, 36, and 37.)

30. Some Counts of Bird Populations in Coniferous Forests near the Limit of Trees. Leonard W. Wing. 1950. *The Canadian Field-Naturalist*, 64(2): 87-88. Censuses made in June and July, 1948, along Teslin River, near Johnson's Crossing, Yukon Territory, indicated in terms of numbers of bird individuals per hundred acres, a variation between 1.3 and 13.0, average 5.2 for lodgepole pine habitat (9 samples); and between 3.4 and 9.3, average 5.6, for spruce habitat (3 samples).—W. Earl Godfrey.

31. Confidence Limits for the Petersen or Lincoln Index Used in Animal Population Studies. Lowell Adams. 1951. *Journal of Wildlife Management*, 15(1): 13-19. Presented in this paper are the Clopper and Pearson graphs showing confidence limits at the 95 percent and 99 percent levels for the relationship between total population and sample ratio (marked to unmarked animals). These graphs should be extremely useful for rapid determination of the range within which a population determined by the Lincoln index may lie. It is shown that confidence limits obtained by the graphic method compared closely with those obtained by mathematical computations, but that for small samples and samples that approach ratios of 0.0 and 1.0 (extremes) the graphs are more accurate. For large samples the graphs provide limits that are too broad. Since the graphs are difficult to read for small ratios (less than 0.05), graphs of the confidence limits for the Poisson distribution are provided for more accurate reading. It is suggested that the graphs may be used for sex ratios, age ratios, size ratios, hunter and fisherman success ratios, and many other types of ratio data. The paper provides a working tool for the determination of limits for population indexes.—Helmut K. Buechner.

CONSERVATION
(See Numbers 17, 28, 29, 36, and 37.)

SYSTEMATICS
(See also Numbers 34 and 35.)

32. A Classification of Recent Birds. Ernst Mayr and Dean Amadon. 1951. *American Museum Novitates,* 1496. 42 pp. Using as a basis the well-estab'ished sequence of Wetmore, which is used also in the Peters Check-list, the authors have incorporated such changes which, in their opinion, are clearly indicated by recent evidence. The older ordinal names of Stresemann are used. The bulk of the paper consists of discussions, by systematic groups, of problems on which recent evidence has shed additional light. This is followed by the revised "Systematic List" (pp. 32-38), annotated with numbers referring to the discussions of the preceding pages. Among the interesting changes are the elevation of the flamingoes to ordinal status, the placement of the Cuculi (Cuculiformes) near the galliform birds primarily because of the similarity of the turacos and galliform birds, reduction of several shore-bird families to subfamilies, and rather extensive revision of the families of passerine birds and their sequence including the placement of the crows and "Australian crow-like" families at the end of the list. Numerous interesting comments are made on controversial relationships which are not changed in the list. It should be emphasized that this is a paper which can be studied with great profit and interest by many ornithologists other than those primarily interested in taxonomy and systematics. The previous number of species compiled by Mayr is revised downward from 8616 to 8590.—D. S. Farner.

EVOLUTION
(See Numbers 32, 34, and 40.)

BOOKS AND MONOGRAPHS

33. Sexual Behavior in Penguins. L. E. Richdale. 1951. University of Kansas Press, Lawrence, Kansas. xiii + 316 pp., 22 photographs. $5. This book summarizes, in part, one of the most remarkable series of investigations in the history of ornithology. For more than ten years Mr. Richdale has studied closely a colony of Yellow-eyed Penguins, *Megadyptes antipodes* (Hombron and Jacquinot), on the Otago Peninsula, New Zealand. By means of foot-marking and banding it has been possible for him to know *individually* a very substantial portion of the individuals in the colony. His voluminous and painstakingly detailed notes have allowed the development of an understanding of the behavior of these birds to a degree scarcely realized for any other species. This treatise is confined to those aspects of behavior observed ashore which involve birds of the same or opposite sexes and which may be "aggressive" or of a "love-habit nature." To attempt to summarize in any way the enormous quantity of information in this attractive book is patently impossible. Few books in the field of ornithology contain as much *new* information and as many *new* ideas. The author has refreshingly avoided anthropomorphic interpretations and conclusions although the terms employed, *e. g.* "divorce," "unemployed," etc., may have connotations in this respect unless the reader makes careful note that the author's definitions carefully divorce any connotations of anthropomorphism. There are chapters dealing successively with the scope of the study, an analysis of types of behavior, pair formation, sex differences, sexual behavior in winter, pre-egg stage, unemployed birds, incubation, chick stage, and molt. Several appendices give some of the detailed data. There are indices to subjects, authors, and bands. The photographs are excellent and form an integral part of the presentation. The text is replete with comparisons with other species; particularly important are the comparisons with other oceanic birds such as petrels, prions, and albatrosses which the author knows well from his other investigations. Perhaps the only shortcoming might be the failure to draw extensive comparative information from continental Europe; this is to be explained primarily by the inaccessability of certain journals to the author.

One of the most interesting masses of information is that on the duration of the pair. The author records 40 individuals whose status was known for seven to ten years. If the two members of a pair return to the colony there is a strong probability that they will remain mated. The probability of "divorce" is about 18 percent. The chapter on unemployed birds is also of great interest in that it may have implications in the studies of population dynamics in many species. The author recognizes no less than twelve classes of unemployed birds not including juveniles. The observations on their behavior are particularly interesting. These are only two isolated examples from the great wealth of information contained in this book. No ornithologist interested in any aspect of behavior can afford not to study it with the greatest of care. The University of Kansas Press is to be congratulated both for recognizing the value of publishing the manuscript and for an excellent job in the production of the book.—D. S. Farner.

34. The Hawaiian Honeycreepers. Dean Amadon. 1950. *Bulletin American Museum Natural History*, 95(4): 151-262. This interesting family of birds first came to scientific notice as a result of reports by Captain Cook in 1778. There are or have been 39 distinct forms, all restricted to the Hawaiian Islands. They are here regarded as requiring only 22 species and nine genera, although earlier accounts divide the group into about twice as many genera. In contrast there were in Hawaii only six other genera, forming only seven other species of native passerine birds. An excellent brief account is given of the geology, geography and ecology of the Hawaiian archipelago.

The family Drepaniidae shows relationship rather to American than to Asiatic birds, although the plant life of Hawaii is quite the opposite. Among the closest other families are the Parulidae (wood-warblers) and the related Coerebidae (South American Honeycreepers). These are passerine birds with only nine primaries, the tenth being vestigeal. The Drepaniidae usually have a tubular tongue. The nostrils are more or less covered by dorsal and ventral opercula, the bill lacks serrations or notches, palato-maxillary bones are absent and both skin and plumage possess a distinctive musky odor which persists in specimens even for decades. The first species treated is typical. It is the Amakihi, *Loxops virens* (Gmelin). This is a little bird which looks and acts like a wood-warbler of the orange-crowned type, and is still fairly common in the native forests, even near Honolulu. Another interesting species, still common, is the Apapane, *Himatione sanguinea* (Gmelin). This little, warbler-like beauty has black wings and tail, white undertail, but all the rest vivid crimson. The type genus, *Drepanis*, was represented by the "Mamo," an oriole-like bird with golden yellow rump, flanks, and bend of wing,—wing coverts whitish, but all the rest glossy black. Most of the species of Drepaniidae have long been extinct, and are represented by few or no specimens. What specimens do exist are commonly in bad condition, partly due to their original collection under rain-forest conditions, and occasionally due also to poor preservation. Many of the best are in the American Museum in New York. Tables of measurements of very numerous specimens are given. It has been suggested that species of such extremely isolated distribution should show very little genetic variability, but this was not found to be true for the Drepaniidae. The sexes are usually alike or very similar, but the adults differ strikingly from the immature. There is a complete post-breeding molt, often in August. The red color *(Himatione)* is considered to be the primitive one, that of the ancestors who first colonized the islands. Considerable diversifications of color, shape of body, and bill, have evolved since the first immigration. The nectar-feeding habit is clearly primitive for the Drepaniidae, with their tubular tongues. A principal food plant is *Metrosideros collina* (Myrtaceae), the "Ohia," which is the dominant tree in most of the native Hawaiian forests. It has abundant, nectar-rich red flowers during most of the year.

The songs or notes of the Drepaniidae are not as useful for their field identification as is true of the songs of many mainland birds. This may reflect their comparatively recent common ancestry. Each species may give a trill or sustained song, also a plaintive whistle, and also a variety of squeaks. Their nests and eggs also indicate common ancestry; they are commonplace open nests of the wood-warbler type, with spotted cream-white eggs. The nests, as noted by Howard Cogswell, are built of rootlets, moss, and similar material, in twigs of trees or bushes, at greatly varying elevations.

A section treats of parasites, diseases, and extinction. The discovery of avian malaria in Hawaii by J. E. Alicata is noteworthy. Shooting has been blamed, and the age-old custom of obtaining bird feathers for the royal garments of the ancient Hawaiians, but these are probably not responsible for the rapid extinction of Drepaniidae which occurred about 1850. Destruction of forest is very significant, and particularly imported diseases, as possible causes of the many extinctions. There is also a section on comparative anatomy, including skeletons; another is devoted to a discussion of the probable phylogeny. Speciation receives another section. As might be expected, the stronger flyers reach all the main Hawaiian Islands and all may be of the same subspecies, whereas the weaker flyers reflect their limitation by distinctive subspecies on the several islands. As is true throughout the Pacific, the larger the island, the greater the variety of bird life. Yet another section is devoted to evolution. An appendix gives data concerning native land and fresh-water birds, other than Drepaniidae, of the Hawaiian Islands, and a bibliography. The plates show clear photographs of museum specimens. This is an excellent monograph.—M. W. de Laubenfels.

35. The Birds of Greenland. Part II. Finn Salomonsen, with plates (water color) by Gitz-Johansen. 1951. Einar Munksgaard, Copenhagen, Denmark. pp. 159-347. $9. Volume II of this important set maintains the quality and general organization initiated in Volume I. (See *Bird-Banding*, 22(1): 42, 1951.) Included in this volume are the Charadriiformes and the Galliformes. Three races of the Rock Ptarmigan, *Lagopus mutus* (Montin), are recognized: *rupestris* (Gmelin) of southeastern Greenland which is identical with the birds of Labrador and southern Baffin Island; *saturatus* Salomonsen of northwestern Greenland; and *captus* Peters of northern Greenland. This separation is based on the series of 350 skins in the collection of the Zoological Museum of Copenhagen and is substantially different from that now accepted in the A. O. U. Check-list and supplements. There is a very interesting description and discussion of the population cycles in this species; the most significant maxima have occurred in 1890-1, 1929-30, and 1948-9. The author cites Braestrup's suggestion that these fluctuations are the result of climatically induced changes in the soil which affect the mineral content of plants. There are local winter movements from the inland to the coastal districts. Rock Ptarmigan have been introduced into the Faeroe Islands where, despite the mild winter climate, they continue to become pure white during the winter. Contrary to the A. O. U. Check-list, the author states that there are no authentic breeding records for the European Golden Plover, *Pluvialis apricaria altifrons* (Brehm), although the number of records for this species has increased markedly with the recent amelioration in climate. Contrary also to the A. O. U. Check-list, and to Peters' Check-list, the subspecific status of the Iceland Whimbrel, *Numenius phaeopus islandicus* Brehm, is maintained. Also the author refers the Knots of Greenland to the Old World race, *Calidris canutus canutus* (Linnaeus), rather than to the American subspecies. The breeding status of Baird's Sandpiper, *Calidris bairdii* (Coues), is to be regarded as definite on the basis of several authentic records. The American race of the Long-tailed Skua, *Stercorarius longicaudus pallescens* Løppenthin, is accepted and the Greenland population assigned to it. The author places the high arctic Thayer's Gull, *thayeri* Brooks, as a race of *Larus glaucoides* Meyer (= *leucopterus* Vieillot), the Iceland Gull, rather than as a race of the Herring Gull, *Larus argentatus* Pontoppidan. In general this volume contains an immense quantity of previously uncompiled information on the biology and distribution of arctic birds. The reviewer has never read a regional ornithology with greater interest. It is unfortunate that the double-column English-Danish text and the plates have forced the cost so high for this is a treatise which should be widely useful to American ornithologists.—D. S. Farner.

36. Survey of Contemporary Knowledge of Biogeochemistry. 3. The Biogeochemistry of Vertebrate Excretion. George Evelyn Hutchinson. 1950. *Bulletin of the American Museum of Natural History*, 96: pp. i-xviii, 1-554, text figures 1-103, plates 1-16, tables 1-56. $10.00. This prodigious monograph, contributed by one of America's most versatile and able scientists, is a synthetic summary and a critical analysis of this highly interesting field with indications, wherever pertinent, of researches yet to be done. The available information is surprisingly extensive but sadly scattered in the literature and of tremendously

variable quality, thus emphasizing the importance of this critical synthesis. The deposition of guano, from a biological aspect, requires large colonies of animals which feed over a wide trophophoric field and which tend to deposit excreta in a restricted area. High-nitrogen guanos result from uricotelic nitrogen metabolism; ureotelic metabolism results in nitrogen-poor guano because of the relatively rapid decomposition of urea. Obviously then birds must be principal producers of nitrogen-rich guanos; certain species of pelicans, boobies, and cormorants are primary producers; secondary producers include certain colonial species of penguins, albatrosses, and possibly diving petrels and terns. Mammalian nitrogen-poor guanos, much less extensive in quantity than avian guanos, are deposited by seals and bats. From the geophysical aspect, deposition of avian guano requires ideally flat, dry islands surrounded by biologically productive waters. There is a very extensive discourse (pp. 9-120) of the "modern" and "ancient" guanos of the coasts of Peru and Chile with detailed attention to climatography, oceanography, guano birds and their biology, description of the islands in general and individually, chronology, and chemistry. Similar treatments, whenever possible, are applied to the depositions of the Gulf of Lower California, southwest African Coast, Pacific atolls, Australasian islands, islands of the South China sea, islands in the western Indian Ocean, and the Atlantic islands. There is a very interesting discussion (pp. 360-381) on the general aspects of avian-guano deposition. It is of interest to note that the estimated annual deposition for South America, South Africa, and Lower California is 185,000 metric tons; this mass probably contains 8800 metric tons of phosphorus. There is also an extensive treatment (pp. 381-461) of cave guanos, produced primarily by bats, which although quantitatively less extensive than avian guanos, are nevertheless of great biological interest. The discussion of the comparative geochemistry of guanos (pp. 462-480) is extremely interesting. Although with time all guanos evolve towards depositions of insoluble calcium phosphate, the intermediate stages and processes are very complex. Of importance is the summary (pp. 481-482) of 18 previously unrecognized conclusions. For example, it is concluded herein that the oceanic birds of the world deposit on land 10,000-100,000 tons of phosphorus per year; loss of phosphorus to the ocean, however, is in the order of 10,000,000 tons per year. It is suggested that beginning of guano deposition on the Peruvian islands was about 1000 B. C. The seven-year cycle in guano deposition on the Peruvian islands is doubtless associated with the inshore movement of warmer waters and decreased productivity. There are 36 pages of references (more than 400 citations) and an index of 31 pages. This monograph is a thoroughly excellent presentation of a field common to biology and geology. It should be of extensive interest to ornithologists.—D. S. Farner.

37. Ontario Birds. L. L. Snyder. With 146 drawings by T. M. Shortt. 1950. Clarke, Irwin and Co., Ltd., Toronto. x + 248 pp. $4.50. Included in this volume are sections on: what is a bird?, distribution, migration, classification (351 Ontario species are listed with subspecies not mentioned), natural history of the commoner species and briefer mention of the rarer, extinct and extirpated ones, a spring calendar for 11 localities with average first arrival dates for 50 migrants, and an index of common and scientific names. End papers are maps. Museum people who have answered the usual variety of questions asked them about birds will appreciate that this volume supplies most of the answers for Ontario. It is written simply and directly, at about high school level. The introductory sections provide up-to-date accurate general information. Rather surprisingly, there is mention of extralimital species throughout in the discussions of bird families. Descriptions of voice and habitat are particularly well done and comments on habits are very good—especially in cases where actions commonly observed but seldom described are mentioned. For instance, it is mentioned that the Belted Kingfisher has the habit of raising its head and tail simultaneously. The illustrations are uniformly good and reveal a fresh viewpoint at times. A gull feathered and one unfeathered both are depicted in flight position (p. 10), the Sora is drawn in flight (p. 95) and the Yellow-shafted Flicker is shown feeding on the ground (p. 139). The Horned Owl (p. 125) is full of life, one of the best owl drawings this reviewer ever has seen. This well-printed book will prove useful to beginners and those with more advanced interests.—Ralph S. Palmer.

38. Practice of Wildlife Conservation. Leonard W. Wing. 1951. John Wiley and Sons, Inc., New York. viii + 412 pp. $5.50. This book will find its place among several others in elementary wildlife training at levels within the first two years of college. It covers in rapid style a wide range of facts and principles related to wildlife conservation and management, including biological concepts of special interest in studying and managing wild animals, census methods, field techniques, management of farm and forest game, natural history of game animals, fur-bearer management, waterfowl management, stream and lake improvement for fish, rare and threatened species, State and Federal powers and controls, and administration and regulation. Obviously, to cover such a broad range of material, much of it must necessarily be extremely limited and sketchy. Until one discovers that the author considers wildlife management as a branch of conservation, the title may seem somewhat misleading in that the book is directed primarily toward management rather than conservation. Many people will object to this definition since conservation in the more orthodox sense considers the wise use and preservation of resources or our effort to understand and perpetuate the capacity of the land for self-renewal, whereas management is mostly concerned with production and regulation of use. Conservation is a philosophy and way of life as well as sometning to practice; management simply envolves technology, control, and administration. The author emphasizes that he has taken particular care to avoid the use of ecological, biological or management "jargon," yet he refers to the "essence of climax ecology" in depicting wilderness areas. This perhaps sounds profound to the unintormed, but means little to those who recognize the weaknesses of such ill-defined terms as "climax" and the American concept of "ecology." Such terms as allopatric, sympatric, neotropical, icterids, mitotic, and *ferae naturae* are scientific jargon to most freshmen and sophomores. The author offers a biological basis for management, yet his discussions of biological principles related to wildlife are incomplete, superficial, and often irrelevant. Many important concepts are omitted, including the Leibig law of the minimum and the Taylor restatement, the distinction between home range and territory, and population-mortality rates. The writing is extremely choppy, lacks continuity of thought, and is frequently confusing. Since the book is not documented, one cannot check the authenticity of facts and ideas, nor discover what was contributed by the author and what by others. It is difficult to determine what is objective and what subjective, and one must have unlimited faith in the author's interpretation. The book is rife with hazardous guesses. On page 47 it is stated that the explanations of how fish find their way during migration probably differ little from those for birds. Dogmatism and Aristotelian thinking characterize the book throughout. The oversimplifications distort reality and provide a superficiality that scientists abhor. For example: "Quantitative lack of food means starvation, emigration, or wandering; qualitative lack means physical weakness, loss of vigor, low reproduction, slow decline, and perhaps slow death." Why make such categorical statements when quality and quantity of food blend imperceptibly in many of their effects on the animal body? The semantic approach so much needed in modern education and scientific thinking is almost completely lacking. *A priori* reasoning dominates the text, and students trained through this medium will have little understanding of the scientific method and will develop harmful philosophies and improper interpretations of field data. Under censusing there is no mention of the suggested improvement of the King method that appeared in 1949. Such severely criticized methods as the road count for pheasants are offered as reliable techniques. No mention is made of the inaccuracies, limitations, or abuses of the drive census for pheasants or counting big game and waterfowl from airplanes. It is misleading to imply that all is well with wildlife censusing. One would like to see documentary proof that the age and sex classes of tigers can be determined by track counts at water holes. The implication that stomach-sample analyses are highly accurate for herbivorous big game is detrimental. The reconnaissance and square-foot-density methods for big-game range surveys are outmoded and inadequate, yet they appear in the book as commonly used techniques. No mention is made of new concepts in range trend and condition classes developed by Humphrey, Dyksterhuis, *et al.* which offer far-reaching possibilities of basing range management upon plant-animal succession. Much emphasis is placed on food patches, feeding stations, and provision of brush piles for shelter, although these practices have met with

failure throughout much of the country. Flushing bars are advocated despite the fact that they are practically useless on fast modern farm equipment. In discussing environmental improvement for Valley Quail it is stated that the destruction of noncommercial timber need cause little concern. Does this include some of the critical watersheds in California? Blue grouse are assumed to be cyclic, although cyclic behavior has never been demonstrated adequately for populations of this species. The author is willing to consider the reindeer and the caribou as the same species (p. 222); but insists on three species of snowshoe rabbits (p. 168), despite the fact that recent literature considers them to be conspecific. It is repeatedly stated that predators are unimportant in their influence on wild-animal populations, yet insufficient evidence is provided to support this contention. The text is not well written and is somewhat poorly edited; the grammar is notably weak and frequently colloquial; there are many annoying mannerisms such as the almost complete inconsistency in hyphenating, using parentheses to inject loose afterthoughts, the inclusion of unrelated facts and ideas within the same paragraph or even within the same sentence, and the inconsistency of using an "s" to denote the plural of bobwhite and similar words. About 320 different references are suggested for supplementary reading. Approximately 92 repetitions are made at the ends of chapters, and some references are repeated 5 to 10 times. References of major importance have been omitted, while some exceptionally weak references have been included. There is no mention of classical foreign literature, leaving the impression that little is accomplished in countries other than the United States. For years educators in wildlife have been looking for a text promoting new and fundamental approaches, facts, principles, and concepts. The present book is only a superficial recapitulation of old ideas.—Helmut K. Buechner.

39. The Ecology of Animals. "Third Edition." Charles Elton. 1950. Methuen and Co., Ltd., London, and John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, New York. 97 pp. $1.25. It is a pleasure to note the availability of this succinct classical statement of the important principles of animal ecology. It should be observed that the designation of "third edition" does not in reality indicate a different edition in the ordinary sense of the word. Actually there are few, if any, modifications from the original edition published in 1933; the bibliography contains no references more recent than 1933. Despite this, Elton's "Animal Ecology" stands as the best brief description of the scope and principles of animal ecology and, as such, should be an indispensable part of the library of every ornithologist.—D. S. Farner.

40. Mendelism and Evolution. "5th edition." E. B. Ford. 1949. John Wiley and Sons, Inc., New York, and Methuen and Co., Ltd., London. xii + 122 pp. $1.25. The principal interest of this book to ornithologists probably lies in its general exposition of the relation of mendelism to evolution, especially to the origin of species. Since the treatment is non-mathematical, the book should be of particular interest to those not ordinarily employing mathematical procedures in their work. The first chapter is a review of the basic principles of inheritance: the particulate theory, physical basis of inheritance, segregation, independent assortment, linkage and crossing over, sex linkage and mutation. Chapter two is concerned with heredity and environment and divides the subject into two simple but important components, external and internal environment. By internal environment the author means "the total effect of the genetic constitution." Chapter three, the bearing of experimental genetics on evolution, consists largely in a discussion of the phenotypic effects of mutation, *i.e.*, the origin, evolution and behavior of dominance under different conditions of external environment and general genetic constitution. A comparison is made between behavior of genotypes subjected to natural selection and those subjected to artificial selection in domestic forms. The fourth chapter is introduced by a review of the experimental evidence on nuclear *versus* non-nuclear inheritance and blending *versus* particulate inheritance. The principles of mendelian theory are then applied to evolutionary problems in nature, the discussion centering largely around mendelism and selection. The last chapter deals with evolution in wild populations and covers a wide range of examples of studies on natural and semi-natural populations (if such an expression may be used); these will be of concern

to anyone interested in evolution in wild populations. The material covered in this book is compactly and concisely presented and constitutes an excellent résumé on mendelism and evolution, so far as it purports to go. Subsequent editions would be improved if, in the same concise style, the following items were incorporated into the discussion: the Hardy-Weinberg law, effects of migration, mating system, population size and drift; cytoplasmic and bacterial genetics, especially as they relate to evolutionary theory; certain aspects of biochemical and biometrical genetics; and finally the more recent work on the genetics of both natural and experimental populations.—Ray Moree.

41. A List of Swedish Birds. (2nd edition.) (Förteckning över Sveriges Fåglar.) Original edition prepared for the *Sveriges Ornithologiska Förening* under the direction of Ulf Bergström, Carl Edelstam, and Gustav Rudebeck; 2nd edition prepared by Kai Curry-Lindahl and Carl Edelstam. 1951. Bokförlaget Svensk Natur, Stockholm. 103 pp. 7:50 Kroner. The second edition of this very usable list differs from the first only in the addition of information from the literature for 1948-1950, a few corrections, and the addition of a useful "Note to Foreign Readers" (pp. 15-18) which, among other things, lists and explains the abbreviations used in the text. The number of "full species" admitted to the list is 330; 245 have bred at some time in Sweden and 230 are regular breeding birds at the present time. Like its predecessor this little book contains an amazing quantity of useful information.—D. S. Farner.

42. Letters on the Ornithology of Buenos Ayres by W. H. Hudson. Edited by David R. Dewar, with a foreword by Herbert F. West. 1951. Cornell University Press, 124 Roberts Place, Ithaca, New York. xv + 93 pp. $2.75. Mr. Dewar, Professor West and the Cornell University Press have performed an important service to the history of biology in making available the first published writings of W. H. Hudson. These letters were written to Dr. P. L. Sclater of the Zoological Society of London during 1869 and 1870 and were published in the *Proceedings* in 1870 and 1871 as "Letters on the Ornithology of Buenos Ayres." Seven of these letters are still in existence in the library of the Zoological Society of London; they differ from the cut and edited versions which appeared in the *Proceedings*. In the present collection these appear as Hudson wrote them. The other five, for which the manuscripts appear no longer to be in existence, are printed as published in the *Proceedings*. These letters were all written before Hudson's expedition to Patagonia. They disprove the oft-repeated statement that Hudson left Argentina for England in 1868 or 1869. Because of the intrinsic value of the letters as well as their historic value, this very attractive volume should become a part of every ornithological library.—D. S. Farner.

43. The Birds of Wisconsin. L. Kumlien and N. Hollister, with revisions by A. W. Schorger. 1951. The Wisconsin Society for Ornithology, Inc., Supply Department, 4333 Hillcrest Drive, Madison 5, Wisconsin. vi + 122 pp. $2 pliable cover, $2.75 Buckram. Originally "The Birds of Wisconsin" was published by Board of Trustees of the Milwaukee Public Museum and the Wisconsin Natural History Society in 1903 in the *Bulletin* of the Society. Recently this treatise has been revised by Dr. Schorger and has appeared in *The Passenger Pigeon*, 1948-1951; it now is made available under a single cover. Dr. Schorger's annotations are principally in respect to changes in status since the time of Kumlien and Hollister and to additions to the Wisconsin list since that time. There are few, if any, changes in nomenclature. All annotations are conspicuously indicated to allow separation from the original text. Because of the scarcity of the *Bulletin* of 1903, the Wisconsin Society for Ornithology has performed a valuable service in the publication of this treatise.—D. S. Farner.

44. Name That Animal. Ernest C. Driver. 1950. Published by the author, Department of Zoology, Smith College, Northampton, Mass. 558 pp. In this "Guide to the Identification of the Common Land and Fresh-water Animals of the United States with special reference to the area east of the Rockies" the author has attempted the prodigious task of providing a book which a beginner in zoology can use to identify animals. The prime objective has been to provide an effective introduction to taxonomic zoology. Accepting this objective, the reviewer feels

that this book can prove itself to be very useful in instruction in field zoology and taxonomy providing that proper emphasis is made to the student that, in identifications for research and publication purposes, original treatises must be consulted and that, whenever possible, verification by an expert on the group concerned be obtained. Unfortunately space considerations did not allow the author to include the desirable complement of references to the taxonomic literature. Many of the cited references are of a more general nature; some are not particularly useful for identifications. The book reflects a substantial experience in the teaching of taxonomic zoology to elementary students and a fine sense of their difficulties; the numerous drawings and the keys are, insofar as possible, of the desirable elementary nature. The latter are adapted from a variety of sources. There are useful directions for collection, preservation, and preparation of specimens. Relative ease or difficulty in identification, numbers of species involved, abundance, and other factors have dictated the detail of the keys for the various groups. For example there are keys for the "common genera" or "principal genera" of Protozoa, water fleas, ostracods, scuds, sow bugs, etc. On the other hand the keys for the flatworms and snails are to certain genera and "representative species." For spiders the key is to the principal families; for insects, to the principal orders. There are no keys for birds although there is a synopsis of the characteristics of the orders and families. There are keys to the species of mammals and keys to the skulls of the "principal genera." There are brief chapters dealing with eggs and tracks. Obviously, both because of objective and general content, this book cannot be recommended to ornithologists as an aid in studying birds. It could be very useful as an *introduction* to the many animals with which the ornithologist must become familiar to be an intelligent student of avian ecology providing that it is understood that definitive identifications must involve the use of the more technical original treatises and confirmation, whenever possible, by an expert on the group concerned.—D. S. Farner.

45. The Effect of the Lesser Vegetation of Certain Adirondack Forest Types with Particular Reference to Deer and Grouse. F. B. Barick. 1950. *Roosevelt Wildlife Bulletin*, 9(1): 1-146. On a 4,062-acre block of land, 10 transitions ("edges") of vegetation, involving 10 forest types, were investigated to determine the floristic characteristics, width, and value to Ruffed Grouse, *Bonasa umbellus* (Linnaeus), and Whitetail Deer, *Odocoileus virginianus* (Boddaert). The data are presented in both graphical and tabular forms. The variety of flora was greater in transition areas, but there was little difference among the 10 transitions in the number of species of plants present. Real differences, varying between 7,000 and 47,000 square feet per acre, occurred in the relative amounts of herbs, shrubs, and arborescent reproduction, as determined by crown coverage. Some edges furnished abundant amounts of certain wildlife requirements, yet were seriously lacking in others, either seasonally or throughout the year. Tabulations of 763 observations of grouse and 808 observations of deer over a 6-year period revealed: (1) Transition vegetation was not uniformly preferred over the interior of communities; (2) in several cases the interior was preferred over the transition; (3) preferences for edges and centers of types varied seasonally; (4) edge preference was indicated by grouse only in the mixed-hardwood type and in the spruce-slope type; (5) grouse and deer flushed in the spruce flat and northern-hardwood types averaged closer to the center of the community than the edge, indicating a high preference for these communities; (6) edge and community preference of deer closely resembled that of grouse, although seasonal variation was greater, perhaps as a reflection of greater mobility; and (7) spruce-slope transitions attracted both grouse and deer in summer and fall, but winter and early spring distribution was closer to the center of the spruce community, probably as a response to more effective conifer cover and easier travel in the more compact snows. The concept of "edge effect," according to the data presented in this paper, has been somewhat overemphasized in wildlife management.—Helmut K. Buechner.

46. Mourning Dove Studies in North Carolina. Thomas L. Quay. 1951. North Carolina Wildlife Resources Commission, Raleigh, N. C. 1-90. A Federal Aid Project in Farm Game Management, the primary object being to study nest-

ing activities of *Zenaidura macroura* (Linnaeus) in the four major physiographic sections of the state, as well as checking relative abundance and proportions of mature and immature birds. Of the 771 nests found, 62 percent were in seven species of conifers, largely loblolly and short-leaf pine, a total of 55 species of plants being used. Nesting lasted from early March till late October, the peak coming from April to June. "September was an important nesting month with 11 percent of all the nests known to be functional then, and 20.5 percent of the adults collected still feeding young (pigeon milk in the crop)." Nesting success was calculated at about 50 percent, but if only nests known to have been successful or unsuccessful, 184 and 351 respectively (p. 34), success is only 35 percent, which is lower than other studies. Weight at hatching averaged 5-6 grams; at 10 days 61 grams. Mature plumage with captive birds was attained at an average age of 17 weeks.

Weights were taken of 471 adult males, 341 adult females and 310 juveniles. From December to March the males averaged from 138-143 grams each month, the females 126-139; in April and May the males averaged 136 grams, females 128; in August and September males 124 grams, females 116.5. Average weights of shot juveniles in August and September were 107-117 grams. In the winters of 1940-41 and 1941-42, there was a marked preponderance of males, the sex ratio being 162:100. "The September ratios of adult males to adult females were: 1939—121:100; 1940—124:100."

One all-day observation was made of a nest with eggs and two half day observations with hatching and two day young. The parents did not consistently follow the pattern of the female's leaving the nest in mid-morning and not returning until mid-afternoon. Seventeen doves were taken from the nest and raised to maturity: six pairs mated the following spring and nested, raising seven young in all. The author concludes: "In view of the importance of late fall nesting to the total population, it is recommended that there should be no open season on Mourning Doves in North Carolina before late October."—M. M. Nice.

47. Birds of Arkansas. W. J. Baerg. 1951. Agricultural Experiment Station, Univ. Arkansas Coll. Agriculture, Fayetteville, Bull. 258 (Rev.) 188 pp. A revision of the 1931 bulletin brought up to date with new records; the list has grown from 312 species and subspecies to 354. Twenty-four pages are devoted to the Introduction which treats of the economic value of birds, their longevity, song with two tables on song periods in Arkansas, migration with records for five years at Fayetteville and a helpful "Calendar" for Northwestern Arkansas, methods of attracting and studying birds. New sections are on Territory and Peck Order, while much additional information is given on other aspects of bird life. It could be wished that Sources of Information had been dealt with more fully and that more of a bibliography had been included. There is no section on physiographic features and no map.

The systematic list includes: a brief description of the bird, its range in summer and in winter and its occurrence in Arkansas, plus a short section on habits, often including a few words on song and call notes. A number of photographs of birds and nests enliven the text.

The aim of the bulletin is to interest the general public and guide the beginner. In this Dr. Baerg has succeeded admirably. He deplores the persecution of eagles and hawks. In regard to the Red-tailed Hawk he writes: "In hawk-killing campaigns this large, slow-flying hawk gets punished for depredations committed by Cooper's and sharp-shinned hawks. In displays resulting from such campaigns, one rarely sees more than one or two Cooper's, possibly one sharp-shinned, with 20 or 30 red-tails." (p. 49).

It is a pity that in such a good book as this a number of careless statements have crept in particularly in regard to incubation, its length and the share of the sexes. Curiously, we are given the correct statement on p. 11 that only females incubate in the case of flycatchers, chickadee, buntings, sparrows, most crows and jays, yet under the respective species we read of males sharing incubation in the Phoebe, Wood Pewee, Carolina Chickadee, Field, Lark and Chipping Sparrows, Towhee, and Blue Jay. Also in the Meadowlark and Red-eyed Vireo. On the other hand, the male really does incubate in the case of the Belted Kingfisher and Starling. And it was the California Gull, not Franklin's, to which the Mormons erected a statue.—M. M. Nice.

48. Audubon Water Bird Guide. Richard H. Pough. 1951. Doubleday & Co., Inc., Garden City, Long Island, New York. xxviii + 352 pp., 48 color plates, 138 black and white drawings. $3.50. This companion volume to the author's "Audubon Bird Guide" (1946) treats 258 species included in the first half of the A. O. U. "Check-List," from loons through doves. The area covered is continental North America north of Mexico and east of the semi-arid Great Plains, plus western Greenland. Since waterfowl and shorebirds tend to be cosmopolitan many species found in the western United States are included. In the text each species is listed by vernacular and scientific names, which in some cases will be unfamiliar to the reader. Through the cooperation of the A. O. U., Mr. Pough has been able to use the names tentatively selected for the forthcoming fifth edition of the "Check-List," which will give each species a vernacular as well as a scientific species name, in some cases altogether new and in other cases differing somewhat from the one previously accepted. All of these and various local names are cross-referenced in the index. Average physical dimensions, and often average weight, are listed for each spcies, and tables comparing the sizes of related species are presented at appropriate points. For each species there is a short paragraph on identification; however, the identification notes are inadequate for difficult discriminations. The main sections discuss many important phases of life history, with management notes on game birds and emphasis on conservation where applicable. There are short paragraphs on voice, nest and eggs, and geographic range. The color plates are a special feature of the guide. Don Eckelberry has done a fine job of illustrating all the significant plumages (except downy and juvenal) of all the species. In the reviewer's copy the color registry is excellent. The economic limitations of presenting 458 full-color figures in a reasonably priced book have made it necessary to crowd quite a few pictures onto each plate, and to use mainly white backgrounds. Black and white line drawings by Earl Poole illustrate 138 birds in flight. The end plates present ecological maps of North America and the Atlantic Ocean. An amazing amount of information is packed into this splendid book. In view of the species covered it will appeal less to backyard birders than the companion land-bird volume, but will be of greater interest to sportsmen and game managers. Although there are noticeable typographical errors, the number is perhaps not excessive for a first edition. Certainly every bird student who has progressed beyond the merest rudiments and whose interest is not restricted to technical treatises will wish to own a copy.—Hustace H. Poor.

Letter to the Editor

The editors of *Bird-Banding* have kindly invited us to reply to Mr. Wolfson's criticism of our paper on the cycle in the Gambel Sparrow, *Zonotrichia leucophrys gambel* (Nuttall). While we have no intention of indulging in polemics, which can throw no light on the problem, we are happy to reiterate our point-of-view which we had thought was made abundantly clear in our paper.

On two points we agree with the reviewer: first, that more original data should have been included and second, that further investigation is necessary to substantiate our tentative conclusions.

As to the first point,—our manuscript as first submitted for publication contained substantially more original data. Editorial policy, however, was ruthless in its insistence that even material we considered essential should be cut out, and no amount of persuasion on our part could change it. This we regret, needless to say, even more than does the reviewer. The daylight curves (in figures 6 and 7) are based upon calculations from figures in *The American Ephermeris* for the periods from the beginning of twilight to the end of twilight rather than from sunrise to sunset, since the former correspond more closely to the periods when the birds are active.

As to the second point,—we have emphasized again and again the necessary tentativeness of our conclusions. (Those who know our work and the point-of-view which has guided it the past eighteen years will hardly be likely to take seriously Mr. Wolfson's contention that we "state causation." Of course we do not, nor do we intend even to imply it.) Where we disagree with the reviewer is as to the nature of the test to which our hypothesis should be subjected. Mr.