RECENT LITERATURE

BANDING

(See also Numbers 4 and 30.)

1. The Fourth Preliminary List of Recoveries of Birds Banded in Greenland. (Fjerde foreløbige liste over genfundne grønlandske ringfugle.) Finn Salomonsen. 1950. *Dansk Ornithologisk Forenings Tidsskrift,* 44(3): 168-170. This list contains 23 recoveries, 15 of which are of White-fronted Geese, *Anser albifrons flavirostris* Dalgety and Scott. With two exceptions these recoveries are from Ireland. There are two recoveries of Greenland Kittiwakes, *Rissa tridactyla tridactyla* (Linnaeus), from Newfoundland and similar single records for the Fulmar, *Fulmarus glacialis glacialis* (Linnaeus), and Brünnich's Murre, *Uria lomvia lomvia* (Linnaeus). A Snow Bunting, *Plectrophenax nivalis nivalis* (Linnaeus), banded 2 July 1948 at Sarqaqdalen, Nugssuaq halvø, Jakobshavn distr, was recovered at Hopedale, Labrador, May 1949.—D. S. Farner.

2. Results of Marking Game Animals during 1947-1949 in Finland. (Tuloksia riistaeläinten merkitsemisestä Suomessa vv. 1947-49.) Jukka Koskimies. 1950. *Suomen Riista,* 5: 134-143. Since the summer of 1947, 861 galliform birds and 585 waterfowl have been marked with wing tags of the Finnish Foundation for Game Preservation. There have been thirty recoveries. This experiment with wing tags, projected through several years, will be of considerable interest particularly in respect to waterfowl since the tags can be used at an earlier age than leg bands.—D. S. Farner.

MIGRATION

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

3. The Moult Migration of the Sheld-Duck. Robert A. H. Coombes. 1950. *The Ibis,* 92(3): 405-418. The British population of *Tadorna tadorna* (Linnaeus) displays a distinctive single concentrated annual migration. This migration begins shortly after midsummer and lasts about four weeks. The exodus consists of both breeding and non-breeding birds; the young of the year are thus deserted and then accumulate in large flocks. The flight direction of the migration from Morecambe Bay on the northwest coast of England is SSE. The migration is in definite routes overland despite the fact that the species is essentially marine. Observations in July 1949 indicated that there were extensive departures each evening with good visibility; sometimes small groups leave on evenings with fair visibility; none depart when the weather is foul. This is an interesting point in view of the fact that Sheld-Ducks fly in severe weather along the coast and at sea. The return is a gradual drift occupying a period of at least six months. Peak periods of return occur in autumn, late winter, and early spring with considerable variations from year to year. This is a most interesting type of migratory pattern. —D. S. Farner.

4. The Migration of the White Stork in Africa and Asia as Indicated by Banding Recoveries up to 1949. (Vom Zug des Weiss-Storchs in Afrika und Asien nach den Ringfunden bis 1949.) E. Schüz and R. Böhringer. 1950. *Die Vogelwarte,* 15(3): 160-187. The authors have carefully analyzed the Asiatic and African recovery data on *Ciconia ciconia* (Linnaeus). The map (p. 172) summarizing the records is based on 1197 recoveries. Particular attention is given (pp. 162-174) to the 361 recoveries of German-banded Storks in Asia and Africa since 1937. Records prior to this were discussed by W. Libbert, H. Ringleben, and E. Schüz (*Vogelzug,* 1937, pp. 193-208). The relatively large number of recoveries in the Nile Delta are mostly non-migratory, the migratory route passing to the southeast. Normal wintering may occur as far north as Anglo-Egyptian Sudan, especially however in Kenya and Uganda. Additional records have failed to fill in the hiatus along the Nile between 4° and 10°N; the reason for the failure

to obtain records from this area is still obscure. The authors note only a single record from Southwest Africa. There is a very narrow migratory route (400-500 kilometers) between northern Uganda and eastern Cape Province. Considerable discussion is given to the records of German Storks recovered in north Africa; most of these records are from non-migratory periods; apparently the Gibraltar route is not used by German Storks. Considerable attention is given to interpretation of recoveries in terms of human population densities. There is also a discussion of the relation of migration to rainfall. Young Storks may reach the Nile as early as the end of August and Cape Colony and Natal by November.—D. S. Farner.

5. Migration and Nesting of Nighthawks in Northern Idaho. Henry Judson Rust. 1947. *The Condor*, 49(5): 177-188. This summary of spring and fall migration and of nesting data on the Pacific Nighthawk, *Chordeiles minor hesperis* Grinnell, covers a period of 36 years, from 1911 to 1947, in the immediate vicinity of Coeur d'Alene, Idaho. First spring arrivals were recorded from 29 May to 18 June, with 67 percent from 4 June to 10 June. Females apparently arrive from one or two days to a week in advance of the males. The author's observations indicate that most of the local Nighthawks leave the Coeur d'Alene area in two mass migratory flights, one usually in the second half of August and the other usually in the first half of September. A total of 53 such flights were recorded during the 36 years. Records for the last appearance of Nighthawks in the fall range from 10 September to 9 October, with 75 percent of the dates of last appearances occurring between 14 and 29 September. Most nesting sites were found in open areas, at least one-half acre in extent, on otherwise timbered hills. Egg laying extended from mid-June to mid-July. Twenty-four sets of two eggs each and three sets of one egg each were recorded. Incubation, probably entirely by the female, was found to last usually 18 days. The eyes of the newly hatched young are open and when "considerably disturbed, the young will move about quite rapidly. When three or four days old they raise their small wings and run over the ground almost as fast as the female." (p. 181.) The young were found to fly short distances at the age of 18 days and fly well at an age of 25 to 30 days.—L. R. Mewaldt.

6. The Migratory Movements of the Southern Race of the Violet-backed Starling. C. W. Mackworth-Praed and C. H. B. Grant. 1950. *The Ibis*, 92(3): 402-404. *Cinnyricinclus leucogaster verrauxi* (Bocage) is "a breeding migrant to central and southern Angola, Damaraland, Bechuanaland, south-eastern Belgian Congo, north-eastern Northern Rhodesia, Nyasaland, Mafia and Zanzibar Islands, Portuguese East Africa, Southern Rhodesia, the Transvaal, Pondoland, eastern Cape Province and Natal from about August to April or May, southernmost areas October to March or May; . . . a partial resident in north-western Northern Rhodesia; . . . a resident in Kenya Colony and Tanganyika Territory, and . . . visits the Sudan, Abyssinia, Uganda [possibly breeds], the Portuguese Congo and northern Angola in the non-breeding season." (p. 404.)—D. S. Farner.

7. Systematics and Migrations of the Pearl-breasted Swallow. C. W. Benson. 1949. *The Ostrich*, 20(3): 137-143. The author recognizes two races of this species. *Hirundo dimidiata dimidiata* Sundevall occurs in Cape Province except Transkei, Damaraland, Transvaal, Southern Rhodesia; and apparently rarely in Orange Free State and Swaziland. Possibly at least some of the birds of this race leave Cape Province during the non-breeding season and move into the high veld of Transvaal. *Hirundo dimidiata marwitzi* Reichenow is the race of Ngamiland, eastern Northern Rhodesia, the Katanga, Nyasaland, and south-western Tanganyika Territory.—D. S. Farner.

PHYSIOLOGY

(See also Numbers 13, 16, 23, 24, and 39.)

8. Hormones and Behavior with Special Reference to Birds and the Mechanism of Hormone Action. N. E. Collias. 1950. A Symposium on

Steroid Hormones: 277-329. University of Wisconsin Press, Madison, Wisconsin. A useful review paper with a bibliography of 207 titles. The emphasis is on experimental studies on the injection of hormones in both birds and mammals. "Among birds the timing of the reproductive sequences is controlled by a complex interplay of social and endocrine factors with each other as well as with the physical environment. The parental phase of the reproductive cycle is considerably dependent upon and preconditioned by the sexual phase."—M. M. Nice.

9. Further Observations on the Hibernation of the Poor-will. Edmund C. Jaeger. 1949. *The Condor*, 51(3): 105-109. The author found a Poor-will, *Phalaenoptilus nuttallii* (Audubon), in a state of "profound torpidity" during the winter of 1946-47 in a sheltered rock nitch in the Chuckawalla Mountains of the Colorado Desert, California. On 26 November 1947 a Poor-will, presumably the same individual, was found in the same location and in the same condition. Five rectal temperature records from 30 December 1947, to 14 February 1948, showed readings varying from 18.0° to 19.8° C., in spite of fluctuating air temperatures. Low metabolic activity was indicated by the inability of the author to detect heart beat or breathing and by the very gradual loss in weight. The Poor-will weighed 45.6 grams on 4 January 1948, and 44.6 grams on 14 February 1948. On 22 February 1948, the bird was found to have resumed normal activity and flew from the author's hand. Banded on 5 January 1948, this bird was found to have returned to the same spot and to be in the same condition as during previous winters on 24 November 1948. Although still there on 5 December 1948, the Poor-will had disappeared by 19 December 1948.—L. R. Mewaldt.

10. The Annual Stimulus for Migration. Donald S. Farner. 1950. *The Condor*, 52(3): 104-122. This critical review of 125 cited papers, monographs, and books provides a much needed inventory of our knowledge concerning those factors which may be responsible for the annual stimulus for migration of birds. Of especial value is its consideration of significant findings which have resulted from investigations in Europe. The author suggests in a "working hypothesis" that migration may be, and most probably is, a phenomenon of multiple origin among birds. He proposes that "periodically, twice annually in most species, the migratory bird comes into a distinct metabolic condition, probably as a phase of a fundamental metabolic cycle, which places the bird in a 'disposition to migrate' *(Zugdisposition)*. This disposition to migrate may be reflected in the deposition of fat characteristic of the beginning of migration of some species and is doubtless associated with changes in energy utilization. . . . The fundamental cycle which periodically places the bird in the disposition to migrate is probably the result of a cyclic function of the anterior lobe of the pituitary. This cycle could be the result of periodic change in stimulation by periodic external physical factors, changing photoperiodism for example; or this arrangement could be modified by refactory periods following the period of stimulation; or the cycle could result from more strictly internally fixed rhythms of the pituitary alone or resulting from the interaction of the pituitary and other glands. . . . During the period of disposition to migrate, and only during this period, external stimuli may be effective or necessary in stimulating the actual initiation of migration." (pp. 116-7.) This review should be carefully examined by all investigators interested in the phenomenon of animal migration.—L. R. Mewaldt.

11. Bird Weights from Surinam. Fr. Haverschmidt. 1948. *The Wilson Bulletin*, 60(4): 230-239. In this useful paper are recorded the weights in grams of approximately 545 birds of 216 species in 45 families collected in Surinam. Weights were taken 2-12 hours after collection. The listing includes birds with weights between 11 and 1,000 grams, and shows the month of collection, and in most cases the sex for each specimen. The author compares the Guianan race of the worldwide Barn Owl, *Tyto alba hellmayri* Griscom and Greenway, which weighs 446-558 grams with *Tyto alba guttata* (C. L. Brehm) of Europe, which weighs but 220-355 grams.—L. R. Mewaldt.

12. Weight Variations in Wintering White-throated Sparrows in Relation to Temperature and Migration. Eugene P. Odum. 1949. *The Wilson*

Bulletin, 61(1): 3-14. During the winters of 1946-47 and 1947-48, a total of 247 weights of wintering White-throated Sparrows, *Zonotrichia albicollis* (Gmelin), including 131 from banded birds and 116 from freshly collected birds, were obtained at Athens, Georgia. The author shows evidence to indicate that low temperature is probably the principal factor responsible for the winter increase in weights. Four male weights averaged 26.0 grams after arrival at Athens during the last half of October; weights gradually increased to a winter maximum which averaged 29.8 grams (13 weights) during the first half of February; dropped to a spring low of 28.2 grams (13 weights) in March when the pre-nuptial molt occurred; and reached a season's high, averaging 30.8 grams (26 weights) during the last half of April, immediately prior to migration from the wintering area. The females showed similar weight changes except that the pre-migratory weight pattern in late April and early May was obscure, some individuals showing increases, but others showing apparent decreases. Males tended to leave the Athens area as much as two weeks ahead of females.—L. R. Mewaldt.

LIFE HISTORY
(See also Numbers 5, 26, and 27)

13. The Breeding Seasons of African Birds—1. Land Birds. R. E. Moreau. 1950. *The Ibis*, 92(2): 223-267. This important paper records for the first time a large mass of data on the breeding seasons of African birds. It will long be an important source of information for many types of studies requiring accurate data of this type. The breeding season is defined as the months in which eggs are laid. The continent is divided into evergreen, semi-arid and intermediate (deciduous) types of country, all of which occur in all latitudes south of the Sahara. Ascertainment of the breeding season for a given locality was derived from an "annual curve of breeding activity" from the number of species recorded as breeding in each month. "A definite peak in the curve of breeding activity is evident everywhere except in certain areas within about four degrees of the Equator. . . . In one part of this inner tropical belt there may be no distinct breeding season for most groups of birds (Congo), but in East Africa a double breeding season is the rule, with peaks coinciding with the two rainy seasons." (p. 266.) In the evergreen forest as close to the Equator as 5°S the single breeding season is as restricted as in other types of country. "In the intermediate type of country characterized by 4-6 months drought each year the timing of the peak breeding season varies from the end of the rains, at Cape Town, to the start of the rains in Natal and several weeks before the rains in areas 23°-10°S." (p. 267.) This is explained by the fact that at Cape Town the rains come in the cold season so that the vegetation and insects are slow to increase. From Natal northward the breeding season is less concentrated primarily because of the divergent requirements of certain ecologic groups such as aquatic species, terrestrial species, predators and scavengers, and grass birds. Raptors and scavengers are always the earliest breeders whereas aquatic species tend to breed at the end of the rainy season or after it. Only in some communities and certain categories of birds it is possible to demonstrate a correlation between the breeding season and the abundance of food and availability of safest nesting conditions. The author feels that the cyclic nature of breeding can be explained only through regulation of an internal rhythm by external factors. Day-length, rainfall, humidity, temperature, and visual stimuli are each, in certain cases, possible external factors. "Each may be effective on some species in some areas, but no one generally." (p. 267.)—D. S. Farner.

14. The Breeding Seasons of African Birds—2. Sea Birds. R. E. Moreau. 1950. *The Ibis*, 92(3): 419-433. The author has assembled the available, mostly unpublished data on the breeding of marine birds in African waters, 36°N.—36°S. Poorly defined breeding season for a given species at a given locality is unusual. North of the Equator most of the marine birds breed in spring or summer. The situation is much more variable south of the Equator. In the vicinity of the Cape of Good Hope there is considerable mid-winter breeding, mainly in localities affected by the warm Agulhas current. On the east coast

most of the breeding occurs in June-August from the Gulf of Suez to the mouth of the Zambesi.—D. S. Farner.

15. The Breeding Seasons of Birds in Indonesia. K. H. Voous. 1950. *The Ibis*, 92(2): 279-287. This is a compilation and analysis of published material on the breeding seasons of Indonesian birds. In all localities analyzed (3°30'N.—7°15'S.) in Sumatra, Borneo, and Java, there are distinct breeding seasons. Few species breed throughout the year. In those regions where a dry period is less pronounced, the period of breeding activity is less sharply defined. In general the breeding season begins at the close of the rainy season and reaches a peak before the driest month regardless of the time of the year at which the rainy season occurs. This holds true in evergreen habitats as well as others. The species which breed throughout the year are inhabitants of cultivated areas.—D. S. Farner.

16. The Breeding Seasons of European Birds. David Lack. 1950. *The Ibis*, 92(2): 288-316. This important paper consists of a compilation of data on breeding dates, a careful analysis of these data, and suggestions concerning the mechanisms of evolution and annual stimulation of breeding cycles. In general breeding periods are correlated with abundance of food; the author considers this factor to have been paramount, by natural selection, in the evolution of reproductive cycles. Although abundance of food is doubtless the major factor in the evolution of breeding cycles there may be modifying factors concerned with the survival of the parents, of the nest and eggs, and of the juvenile birds in the period soon after departure from the nest. More puzzling are the factors that serve as "anticipatory" stimuli since the gonads must recrudesce in advance of the appearance of the maximum abundance of food. Day-length appears to be the major factor but there are several probable modifying factors including temperature.—D. S. Farner.

17. Breeding Seasons in the Galapagos. David Lack. 1950. *The Ibis*, 92(2): 268-278. Although captive Geospizinae are capable of breeding throughout the year, these endemic finches and other passerine species breed only during the rainy season (January to April) when food for these species is most abundant. However, the dove, *Nesopelia galapagoensis* (Gould), breeds from March through June. The two raptors, *Buteo galapagoensis* Gould, and *Asio flammeus* (Pontoppidan), rear young during the cool dry season after the rains; this pattern is similar to that of the large raptors of Africa. Many of the marine species breed throughout most of the year; however, five of the six procellariiform species breed during the cool dry season when the Humboldt current, with its abundant plankton, is strongest. The duck, *Anas galapagoensis* (Ridgway), and the herons apparently have double breeding seasons (January-April and August-September). Unlike the temperate and arctic regions, the tropics are not subjected to marked changes in day-length. Consequently other factors are of importance in controlling the abundance of food and in establishing the reproductive periods of birds. —D. S. Farner.

18. A Nesting of the Carolina Wren. Margaret M. Nice and Ruth H. Thomas. 1948. *The Wilson Bulletin*, 60(3): 139-158. Approximately 250 dawn, daylight, and dusk hours were spent making observations of a nesting pair of Carolina Wrens, *Thryothorus ludovicianus* (Latham), from the arrival of the female on 19 April 1946, until the young left the nest on 26 May. Both birds participated in nest construction starting on 20 April. Although most of the nest was completed on 21 April, the female continued to add to the lining until 6 May, the eighth day of incubation. Starting 25 April, five eggs were laid in five days. The female left the nest five to eight minutes after sunrise, returned in 23 to 26 minutes, and stayed on the nest for the next 30 to 64 minutes to lay. Ninety-two hours of observation during the 14-day incubation period revealed that the female did all the incubating, averaging 86 minutes per attentive period and 31 minutes per inattentive period. The color-banded male fed the female on the nest 93 times during 92 hours of observation during incubation. The young hatched on 12 May. Observation for 77.8 hours during the nestling period showed the adults

together fed the young an average of 5.1 times per hour the first week and 12.8 times per hour the second week. The male did most of the feeding the first week when the female spent much time brooding the young, but the second week the female did most of the feeding. Early morning and late evening activities of both adults were closely correlated with the times of sunrise and sunset throughout the nesting period. This excellent study of a single nest contains much useful information.—L. R. Mewaldt.

19. The Breeding Biology of the Great and Blue Titmice. John Gibb. 1950. *The Ibis,* 92(4): 507-539. Another important paper from the Edward Grey Institute at Oxford. The combined population of *Parus major* Linnaeus and *Parus caeruleus* Linnaeus in the mixed deciduous forest in which 200 nest boxes were placed rose from about 43 pairs in 1947 to about 100 pairs in 1948 and 135 in 1949. A vast amount of detailed information is presented in the 21 tables—weights of eggs, weights of clutches (an average first clutch weighing about the same as adult bird), clutch size (7-15 in the Great Tit, 7-19 in the Blue Tit in the first brood, 6-11 in the second brood with Great Tits), egg temperatures during incubation, incubation period (13.9 days with the Great Tit, 14.2 with the Blue Tit), hatching period, nestling weights of first and second broods and of large and small broods, feeding frequency, nestling period (18.9 days for the Great Tit, 19.7 for the Blue Tit), breeding success, etc. Feeding frequency was recorded mechanically for 13 broods of Great Tits in 1948 from the age of 2.5 days to fledging, and on 11 broods in 1949 from hatching to fledging. In 1948 mean daily visits to large first broods averaging 13 young were 535, to "small" first broods averaging 9.7 young were 450, and to second broods averaging 6.8 young were 380. In 1949 mean daily visits to large first broods averaging 11.2 young were 450, to "small" first broods averaging 8.5 young were 400. Visits per nestling in 1948 averaged 42, 50 and 58 per day respectively for the three categories; in 1949, 39 and 48. Feeding frequency increased in 1948 to a peak on the 8th day, in 1949 to a peak on the 11th day. Nesting success was high, about 90 percent for each species if losses from man are excluded. With these included, 1225 eggs in 112 nestings of Great Tits (Table 3) resulted in 984 fledged young (Table 21) or 80.3 percent.

The females at two nests deserted when caught and banded while the young were hatching; the male reared six of the 12 nestlings of one nest, the other male 11 of the 12. The male of a third nest disappeared before the young hatched; the female raised four of the ten. "Feather development was independent of body-weight, and is therefore a reliable indicator of age." Nestlings first show fear at about 10 or 12 days. Second broods, however, were undernourished due to less abundant food and bad weather; they "failed to develop the normal jumpiness so characteristic of first broods. . . . This deficiency in nervous reaction would presumably make them an easier prey after leaving the nest." (p. 536.) Interesting notes are given on pre-nesting behavior. The male flies to and around the hole, then perches inside and pecks at the rim. "The white spot on the nape is conspicuous in this display when the male perches outside, looking into the hole; but much more startling are the black and white facial markings flashing at the hole when the male perches and pecks from within." (p. 541.) The spring temperatures differed markedly in the three years and nesting started much earlier in 1948 than in the other years; in 1948 there were five genuine second broods, in 1947 one, in 1949 none. "Laying was so timed that the period with the maximum number of nests with young coincided very closely with the period of greatest abundance of the moth larvae, *Cheimatobia brumata* and *Hibernia defoliaria,* upon which the nestlings are largely fed." (p. 512.) It is a pity that the author did not work out in detail temperature thresholds for the start of building and start of laying. A very fine study.—M. M. Nice.

20. Nest-building by the Red-backed Shrike. (Der Nestbau beim Neuntöter (*Lanius collurio L.*). Gustav Kramer. 1950. *Ornithologische Berichte,* 3(1): 1-14. Three pairs of hand-raised shrikes nested in large outdoor cages. The male took the initiative in nest-building by calling his mate to likely spots. Both birds built the nest, the male doing most of the bringing of materials, the female most of the arranging. A careful description with photographs and sketches

is given of the technique of working in the material and shaping the cavity by pressing down the breast and stamping and scratching alternately with the legs, while the rim is flattened through pressure from fanned wings and tail held horizontally. This was done by both male and female. Young shrikes showed these movements when a few weeks to a few months old. Similar nest-molding behavior was seen in my young male Song Sparrows, *Melospiza melodia* (Wilson) and my adult male Meadowlark, *Sturnella magna* (Linnaeus).—M. M. Nice.

BEHAVIOR

(See also Numbers 8, 9, 10, 13, 16, 17, 18, 19, 20, and 39.)

21. Some Variations in Grouping and Dominance Patterns among Birds and Mammals. N. E. Collias. 1950. *Zoologica,* 35, part 2: 97-119. Interesting observations on groups of birds and mammals kept in large enclosures at the New York Zoological Park. A colony of 14 penguins, mainly Black-footed Penguins, *Spheniscus demersus* (Linnaeus), were observed for territorial and dominance relationships; they appeared to be organized chiefly on the basis of individual pair territories. "However, a dominance hierarchy existed on neutral ground . . . and successful breeding was associated with high social rank." A flock of 15 geese of six species showed a dominance hierarchy. One pair of Barnacle Geese, *Branta leucopsis* (Bechstein) nested and the male defended territory vigorously, but tolerated one other Barnacle Goose, Bg. After the eggs hatched only one gosling survived and this was defended by both parents, again with the exception of Bg, that often bit the gosling. A fourth Barnacle Goose, Pf, became dominant over the pair and drove them from the gosling, which soon perished, probably due to attack from Bg. The author found that "Tendency to aggregate was associated with degree of difference in coloration and pattern of plumage and also with the tendency for various individuals of the same or related species to engage in the same type of activity at the same time, in all groups studied."—M. M. Nice.

22. An Experimental Analysis of Interspecific Recognition. P. T. H. Hartley. 1950. *Symposia of the Society for Experimental Biology.* No. IV, *Animal Behaviour:* 313-336. An important series of over 300 carefully planned and well controlled experiments with model owls and other objects in the field. The "mobbing" reaction was the criterion of recognition. "Many species of passerine birds were found to recognize owls by the same combination of visual characters. It was established, that an object, to have strong 'owl-valence' must, within a considerable range of size, be: (1) Owl-like in outlines—big headed, short necked and short tailed. (2) Solid in contours. (3) Coloured in browns and/or greys, or in tone contrasts of these colours. (4) Patterned in a system of spots, streaks or bars." (p. 335.) A model was painted bright green all over except for two black spots for eyes; ". . . its strange appearance was inadequate to provoke any but the briefest demonstrations of hostility." (p. 321.) All British Owls but the Barn Owl, *Tyto alba* (Scopoli), release mobbing. "Barn Owls are, in fact, the 'correct' shape, but the 'incorrect' colour." (p. 332.) As to size, the ". . . lower limit appears to be in the neighbourhood of half the linear dimensions of the smallest owl likely to be encountered." (p. 326.) Strangely enough, the dummy was equally effective whether upright, hanging upside down or projecting out at an angle. Theoretical implications are discussed and further problems suggested in the field of enemy recognition.—M. M. Nice.

23. The Comparative Method in Studying Innate Behaviour Patterns. Konrad Z. Lorenz. 1950. *Symposia of the Society for Experimental Biology, No. IV, Animal Behaviour:* 221-268. The errors of both the vitalistic and mechanistic schools of behavior study are pointed out and both schools are severely criticized because of their "insufficient knowledge of facts." (p. 232.) "They have one and all formed a hypothesis *first* and proceeded to look for examples *afterwards.*" (p. 233.) Methods peculiar to comparative ethology are described under eight headings. In (1) *Observational basis of induction*, we are told,

"The development of any inductive natural science proceeds through three indispensable stages: the purely observational recording and describing of fact, the orderly arrangement of these facts in a system, and finally the quest for the natural laws prevailing in the system." (p. 234.) (2) treats of *The keeping of animals as a scientific method.* In (3) *'Comparative anatomy' of behaviour* we read: "A social releaser is a device—either a property of colour and/or shape, or a special sequence of movements, or, for that matter, of sounds, or a scent—specially differentiated to the function of eliciting a response in a fellow-member of the species. To every releaser, as an organ for sending out sign stimuli, there corresponds a perceptual correlate, an 'organ' to receive sign stimuli and to actuate the answering reaction. This we call an innate releasing mechanism (auslösende Schema). The function of social releasers and of answering innate releasing mechanisms is very much like that of a human signal code, or of that of human word language." (p. 242.)

The other headings are (4) *Approach to physiology,* (5) *The method of dual quantification,* (6) *Analysis of taxis and kinesis constituents of 'instinct,'* (7) *The hierarchy of moods,* (8) *The psychological aspect of comparative ethology.* Examples are given from studies of fish, insects and birds. The paramount importance of comparative ethology is stressed: "It is high time that the collective human intellect got some control on the necessary outlets for certain endogenously generated drives, for instance 'aggression,' and some knowledge of human innate releasing mechanisms, especially those activating aggression. Hitherto it is only demagogues who seem to have a certain working knowledge of these matters and who, by devising surprisingly simple 'dummies,' are able to elicit fighting responses in human beings with about the same predictability as Tinbergen does in stickelbacks."—M. M. Nice.

24. The Learning Ability of Birds. Part I. W. H. Thorpe. 1951. *The Ibis,* 92(1): 1-52. An important, comprehensive paper, presenting a clear and illuminating review of a large subject. The work of Craig, Heinroth, Lorenz and Tinbergen forms the basis of the modern approach to animal behavior. In Part I ten pages are devoted to "The Nature of Inborn Behavior"—reflexes, kinesis, taxis and instinctive behavior. Four kinds of learning are discussed. (1) Habituation "is a simple *learning not to respond to stimuli which tend to be without significance in the life of the organism.*" (p. 10.) Habituation probably does not take place in cases involving an inborn pattern of a predatory enemy. (2) Conditioning; "It is not always realized . . . how artificial and isolated the classical conditioned reflex is and how completely passive and otherwise unresponsive the animal must be before it can be demonstrated." (p. 14.) For (3) Trial-and-error learning, there must be motivation, e.g. the drive of the pecking instinct, governed by 'initial curiosity' about the external world." (p. 18.) Experiments with puzzle-boxes and mazes are reviewed and the learning function of play discussed. Under (4) Insight learning, there are discussed "latent learning and exploration," "territorial learning as latent learning," "tool-using," and "number concept" where the experiments of Otto Koehler and others are reviewed. "Two pre-linguistic faculties—simultaneous and successive unnamed number sense—have been demonstrated in some species of birds." (p. 47.) Experiments on human beings with similar tests showed that their "limit of achievement is of the same order as that shown by birds." (p. 48.) A paper that will well repay careful study.—M. M. Nice.

25. Reactions of Some Passerine Birds to a Stuffed Cuckoo. II. A Detailed Study of the Willow-Warbler. G. Edwards, E. Hosking and S. Smith. 1950. *British Birds,* 43(5): 144-150. Interesting, well-planned experiments with dummies of *Cuculus canorus* (Linnaeus) at 14 nests of *Phylloscopus trochilus* (Linnaeus). During nest building the warblers reacted to the mount with chittering and wing-flickering. After the eggs were laid, the birds attacked at once, while with young in the nest, "reaction is immediate, violent and sustained." Experiments with a wooden body shaped like a Cuckoo's resulted in little reaction; adding wings and tail brought the fear note, while the addition of the head, or even the head alone, resulted in violent attack. In the presence of mounted Sparrow-Hawks, *Accipiter nisus* (Linnaeus), the warblers showed strong fear, but they

"chittered" and attacked a Red-footed Falcon, *Falco vespertinus* Linnaeus. This reaction "is of great interest, since although the hooked beak of the *raptor* was there, the general colouration and shape of head of this stuffed bird approximated to those of the Cuckoo. It is fairly certain from these experiments that Willow-Warblers have a visual concept of 'cuckoo' associated with a head which is blue-grey in colour, and that they have a specific reaction to this concept which is aggressive in character, and typified by a specific, chittering 'chee-chee' note, accompanied by wing-flicking and by actual physical attack on the head."—M. M. Nice.

26. Observations on the Breeding Behavior of the Ring-necked Pheasant. Richard D. Taber. 1949. *The Condor*, 51(4): 153-175. The breeding behavior of the Ring-necked Pheasant, *Phasianus colchicus* Linnaeus, was studied during the springs of 1946 and 1947 on a 349-acre marsh at Fitchburg, Dane County, Wisconsin. Color bands and other markings were employed to distinguish individual birds. First courtship was observed in February and first copulation in mid-April. Antagonistic behavior between cocks extended from February through June, showing progressive changes in character. Between hens, antagonistic behavior occurred largely in late April and May. Cocks crowed most commonly before sunrise, especially early in the season. Crowing started in February and was at a very low level in mid-July. Non-territorial cocks were not observed to crow. Male territories in the study area, varying from 12 to 13 acres each in April and May to about six acres in mid-June, seemed to reflect the high population density of the study area.—L. R. Mewaldt.

27. Studies on the Companion Relationships of the Young Common Curlew. (Untersuchungen über die Kumpanverhältnisse des jungen Brachvogels (*Numenius arquata* L.).) Alfred Seitz. 1950. *Zeitschrift für Tierpsychologie*, 7(3): 402-417. When Heinroth raised a brood of Common Curlews from the egg he found that, in contrast to the goslings of the Grey Goose, *Anser anser* (Linnaeus), which became imprinted on man, the Curlew chicks were exceedingly shy, crouching and fleeing from their caretakers. Lorenz interpreted this as meaning that Curlews must have a rather definite innate releasing mechanism of the parent. Dr. Seitz suggests that the chicks might have reacted to the Heinroths as to a "ground-enemy." He took the precaution to raise his two Curlew chicks, hatched in an incubator, so that at first one could see only his head, the other only the upper part of his body. Both chicks called continually in the author's absence and "greeted" him on his return, at the same time becoming quiet. Neither followed him when later he let them out on the floor. On the fifth day he showed them mounted plovers and curlews, but the chicks remained indifferent. On the 9th day he brought the chicks together for the first time; they "greeted" each other, then one pecked the other, so they were separated for three weeks. After that they showed no special bond to each other and they also lost their bond to Dr. Seitz. A two-day-old Curlew caught in the wild remained very shy. At three weeks he paid no attention to a grown Curlew. The author suggests that the young respond to acoustic signals—the parents' call for brooding and warning of danger. Little is known of the family life of this species, or, indeed, of that of most Limicolae.—M. M. Nice.

28. On the Stimulus Situation Releasing the Begging Response in the Newly Hatched Herring Gull (*Larus argentatus argentatus* Pont.). N. Tinbergen and A. C. Perdeck. 1950. *Behaviour*, 3(1): 1-39. A remarkable series of experiments with various dummies carried out during four seasons and involving over 1600 responses from newly hatched chicks. It was concluded that the parent releases the chick's begging response by movement and by six characters of the bill: a very definite shape, "lowness," "nearness," downward pointing position, a red patch at the tip, and food protruding from the bill. "It seems that all these 'sign stimuli' have a releasing and at the same time a directing influence." "It is not easy to decide which of the characters of the adult Herring Gull found to have releasing value are true releasers in the sense of characters evolved as adaptations to a communicative function. As far as we can see, only the mew call

[the food call of the parents to the young] and the red patch can claim this title, because so far as we know the releasing function is their only, or at least their main function."—M. M. Nice.

ECOLOGY

(See Numbers 9, 13, 14, 15, 16, 17, 29, 31, 35, 36, and 39.)

POPULATION DYNAMICS

(See also Numbers 31 and 36.)

29. Population Cycles in Birds and Small Mammals. (Zyklische Massenvermehrungen bei Vögeln und Kleinsäugern.) J. Franz. 1950. *Die Vogelwarte,* 15(3): 141-155. This interesting paper is a review of the recent literature in the puzzling field of population cycles. The terse condensed nature of this treatise makes impractical the preparation of a review in fewer words than the original. Among the aspects of the problem considered is that of the length of cycles. The 3 1/3-year cycle of Siivonen with the depression of two successive maxima can become a classical ten-year cycle. Possible etiologic factors are classified as cosmo-climatic or biologic. The sunspot, rainfall, nutritional-deficiency (Baas-huus-Jessen Braestrup), and meteorologic-cycle hypotheses are included in the former. In the latter are included hypotheses involving cyclic changes in food and cover, microbial infections, and intra-specific strife. This interesting review must be read in its entirety to be properly appreciated.—D. S. Farner.

30. Age Groups and Longevity in the American Robin: Comments, Further Discussion, and Certain Revisions. Donald S. Farner. 1949. *The Wilson Bulletin,* 61(2): 68-81. The problems involved in real and theoretical determinations of longevity among passerine birds, where results from banding can be employed, are discussed. It is suggested that the first January 1 in the life of the bird be employed as the initial date for these determinations. The high and unstable mortality during the calendar year of birth makes the true total longevity from hatching difficult to estimate from banding data available. Useful equations presented, some of which are derived by the author, include those for calculation of: annual mortality rate; monthly survival rate; population size at a given time after the initial date; mean period lived after the initial date by birds dying during that year; and mean longevity beyond the initial date. It is probable that mortality is not uniform throughout the year even after the first January 1, but how reliably recovery records reflect the actual mortality pattern, is difficult to test. Actual records from 597 American Robins (*Turdus migratorius,* Linnaeus), of known age recovered dead would indicate a mean period lived of 0.34 of a year after January 1 of their year of death. Using a 52 percent annual mortality rate, and assuming a uniform monthly mortality rate, the mean period lived after January 1 of the year in which death occurred, would be 0.44 of a year. The mean natural longevity of the American Robin after its first January 1 is determined to be 1.3 years. The author's realistic approach should prove useful to students of the dynamics of natural avian populations.—L. R. Mewaldt.

AVIFAUNAL DYNAMICS AND ZOOGEOGRAPHY

(See also Numbers 36, 37, and 38.)

31. Secular Rhythm in the Distributional Dynamics of some European Birds and Mammals and its Relation to Winter Conditions. (Zur säkularen Rhythmik der Arealveränderungen europäischer Vögel und Säugetiere, mit beseonderer Berücksichtigung der Überwinterungsverhältnisse als Kausalfaktor.) Olavi Kalela. 1950. *Ornis Fennica,* 27(1/2): 1-30. The author has considered changes in range of certain species in respect to the amelioration in winter climate in northern Europe which has been occurring, with some regressions, since a series

of most severe winters just following 1800. During the 16th century the permanently resident Crested Lark, *Galerida cristata* (Linnaeus), enjoyed its present northerly distribution. During the 17th and 18th centuries, however, its northward limit retreated far to the south presumably because of the severe winters during this period. The recent expansions in southern and central Fenno-Scandinavia of the Blue Tit, *Parus caeruleus* Linnaeus; Tawny Owl, *Strix aluco* Linnaeus; and the Partridge, *Perdix perdix* (Linnaeus), as well as the recent expansions in northern Fenno-Scandinavia of the English Sparrow, *Passer domesticus* (Linnaeus); Crested Tit, *Parus cristatus* Linnaeus; Willow Tit, *Parus atricapillus* Linnaeus; and the Great Tit, *Parus major* Linnaeus, are doubtless due to the same changes in winter climate. Most of these species are subjected to marked decreases in population in severe winters. The improvement of winter conditions has apparently affected certain species which are partially migratory, although the circumstances are somewhat more intricate. Included in this group is the Wood Pigeon, *Columba palumbus* Linnaeus; European Blackbird, *Turdus merula* Linnaeus; Mistle Thrush, *Turdus viscivorus* Linnaeus; Gray Wagtail, *Motacilla cinerea* Tunstall; and the Tufted Duck, *Aythya fuligula* (Linnaeus). The author's conclusions apparently fit the facts quite well. Similar investigations in this country would be very interesting.—D. S. Farner.

32. Distributional History of Eurasian Bullfinches, Genus Pyrrhula. K. H. Voous. 1949. *The Condor*, 51(2): 52-81. The bullfinches of the genus *Pyrrhula* (Linnaeus) of the Oriental and Palearctic regions are thought to have had their center of origin and dispersal in southeast Asia (Chinese-Burmese region.) Bullfinches probably reached Europe from Manchuria by way of Siberia in at least two principal waves. The last glaciation of Europe may well have left residual populations in southeast and southwest Europe and the British Isles. The most recent wave probably penetrated into Scandinavia from the Siberian taiga not before about 6000 B. C. when the habitat first became suitable. Further differentiation into subspecies, clines, and ecologic races is possible in the case of at least the better known species. Many comparisons are made with the pied woodpeckers *(Dendrocopos)*, which the author treated monographically earlier and with which he has found many similarities in distributional history.—L. R. Mewaldt.

33. Origin of the Bird Fauna of the West Indies. James Bond. 1948. *The Wilson Bulletin*, 60(4): 207-229. Of 175 indigenous recent genera representing 58 families in the West Indies, no less than 50 genera, in 21 families, are endemic. The West Indies must be considered oceanic islands so far as their avifauna is concerned. Most birds of the Greater Antilles are thought to have crossed the ocean from Central and especially tropical North America at times when the water gaps were smaller than today. Hurricanes are said to have been an important factor in the dispersal of birds to and among the islands. Two families with numerous genera endemic to the West Indies, the Trochilidae (hummingbirds) and the Thraupidae (tanagers), may have had South American origin. A White-winged Crossbill, *Loxia leucoptera megaplaga* Riley, which inhabits pine forests above 4000 feet in the mountains of Hispaniola, probably crossed the water gaps from North America during the Ice Age. The birds on the Bahama Islands were almost entirely derived from Cuba and Florida, whereas many of the birds of the Lesser Antilles were invaders from northeastern South America.—L. R. Mewaldt.

SYSTEMATICS

(See Numbers 7, 32, 33, and 37.)

EVOLUTION

(See Numbers 16, 32, 33, and 37.)

BOOKS AND MONOGRAPHS

34. Studies on Bird Migration. Gustaf Rudebeck. 1950. Supplementum I, *Vår Fågelvärld.* Berlingska Boktryskeriet, Lund, Sweden. 148 pp. This monograph is primarily the result of the author's very extensive field investigations in southern Sweden, particularly in fall at Falsterbo. The extensive and interesting data from Falsterbo for the autumns of 1942, 1943, and 1944 are presented in detailed tables (pp. 90-146). Considerable attention is given (chapters II, III, and IV) to meteorologic factors as they affect migratory movements of birds of prey. In soaring species the upward spiral ends in a long glide in the normal direction of migration (*Normalzugrichtung* of Geyr von Schweppenburg). Actual direction may be modified to S-SSW by W-N winds or towards W by S-E winds. However the degree of deviation does not exceed a definite limit. N-E winds exert little effect on direction of migration; flight is much higher and the influence of "guiding lines" (*Leitlinien* of German authors) is diminished. Winds from S-W exert little influence on direction; average speed is lower and "guiding lines" are markedly operative; if winds are strong and without thermal currents few birds migrate. Because wind direction and velocity may affect flight elevation and actual migratory route, annual fluctuations at a given point during migration cannot be interpreted as necessarily representing fluctuations in population or migration. There is some indication in buzzards that a day of good conditions for migration produces a physiologic momentum which results in migratory behavior the following day even under very unfavorable conditions. There is an interesting discussion of the differential sensitivity to changing meteorologic conditions.

Chapter VII (pp. 49-54), *The Migration Concept,* contains a number of interesting suggestions concerning basic concepts. The author presents data which support his suggestion that true distinctions cannot be made among the so-called migratory, irruptive, and resident species. With ideal meteorologic conditions at the right season, certain so-called resident species (observations cited for the Magpie, *Pica pica* (Linnaeus); and the Nuthatch, *Sitta europaea* Linnaeus) may develop rudimentary migratory behavior. Chapter VIII (pp. 55-68), *Some General View-points on the Migration of Palaearctic Birds,* presents some generalizations concerning the migration of non-marine palaearctic birds. For this group there are marked clines from SW to NE in percentages of migratory individuals (smallest in SW) and length of migratory routes (shortest in SW). The species whose routes converge in *southwestern Europe* mostly winter there, have shorter routes, and have relatively less developed migratory instinct, whereas those whose routes converge in the *Balkan Peninsula and Asia Minor* continue southward to a more distant wintering area, have consequently longer routes, and appear to have better developed migratory instinct. Chapter IX (pp. 69-83) contains details on the migration of 16 species as observed in fall at Falsterbo. Despite a number of ambiguous sentences and some typographical errors, American ornithologists will be pleased with the publication of this important monograph in English.—D. S. Farner.

35. Conservation of Natural Resources. Guy-Harold Smith, Editor. 1950. John Wiley and Sons, Inc., 440 4th Ave., New York, 16. xii + 552 pp. $6.00. This book, a successor to *Our Natural Resources and Their Conservation* by A. E. Parkins and J. R. Whitaker (John Wiley and Sons, Inc., 1936 and 1939), indubitably represents the best compilation of its kind to date. The combined efforts of twenty specialists resulted in an achievement perhaps impossible for a single author. It is seemingly inevitable that some economists, geographers, and horticulturists must deviate far from the topic of conservation. Evidently the biologists are more realistic concerning the basic problems. Although all chapters contribute importantly, at least as background material, some are notably weak while others enhance the book. Some authors express too much optimism, leaving the reader unaware that the uphill fight to achieve total conservation has hardly begun. The history of the public domain holds little conservation meaning since it is not interpreted in light of anthropic influences on the land through greedy exploitation. Excellent concepts basic to a fuller understanding of wise use of natural resources are presented by Wolfanger and Rockie in the chapters on

soils. The superfluous, awkwardly written chapter on "tree crops" represents a conglomeration of widely divergent facts and ideas, mostly with little relation to conservation. By relating irrigation to population pressures and problems of food surpluses, including a discussion of the serious depletion of underground water resources, and the need for water-conservation policies, the section on irrigation could have been strengthened. Grassland resources are discussed in a concrete, effective fashion. On page 134 the impression is given that broomsedge and three-awn are important forage species; actually, these are pests of little forage value on burned-over land in east Texas. The strict control of grazing on public land under Forest Service jurisdiction implied on page 138 is more optimistic than real, despite the fine progress that has been made in reducing grazing pressure. No mention is made of the new (1948) American Society of Range Management. Guy-Harold Smith expertly discusses modern agriculture and its relation to demography but fails to develop adequately the basic principles of carrying capacity and the consequences resulting from populations exceeding the ability of the land to support them. Much of his discussion of rural sociology has little bearing on conservation. An excellent reference for facts on forest resources is presented in two chapters by Diller, and these facts are well integrated with conservation, watershed control, and wildlife. Only about one page in the chapter on water uspply is devoted to the acute problem of declining water tables, the relation of vegetation to water supply, and the dependence of future American civilization upon immediate conservation of water above and below ground. In discussing water power, Guy-Harold Smith fails to point out the problems of reservoir siltation, relations of land use to water supply, and the conflicting interests of federal dam builders, wildlife conservationists, recreationists, and others who use the land or pay taxes. Although well presented, the facts on waterways show little relation to conservation, except in the section on the advisability of river and harbor improvements. Flood control is discussed with surprisingly inadequate reference to land-use practices and vegetation in relation to the causes and intensities of floods. Conservation philosophies so lacking in many chapters are clear in the two on minerals, undoubtedly because the exhaustion of many minerals appears eminent. The many diversified aspects of general wildlife science and management are presented by Dambach in a clear and concise manner. Under water requirements, it would have been appropriate to mention that populations of California quail may be increased by provision of artificial watering devices. On page 406 it is erroneously implied that the territorial pheasant is tolerant of crowding. "Fisheries for the Future" is another well-written chapter that should advance conservation education in the proper direction. Prophet emphasizes that hunting and fishing provide the most important recreational uses of the land, both in area utilized and in man-days of use. Private hunting and fishing lands are apparently encouraged, to the dismay of the reviewer. The nonuse of wildlife in National Parks and the resulting damage by big game is a problem not mentioned. Discussions on recreation and mental health and the deplorable untidiness of picnickers, campers, and hunters would have been appropriate. Huntington's discussion of the conservation of man reveals some startling and depressing facts concerning the decline of the quality of American people and the lack of effort to conserve and improve human material. The last two chapters on regional planning should have given more attention to the importance of sound economic practices to replace subsidies and tariffs that defeat the objectives of conservation. The typography is excellent, and facilitates rapid reading with easy comprehension. One conspicuous inconsistency is in the spelling of farm land (and similar words) as one word or two words both within and between chapters. Research is fortunately stressed in several chapters as a means toward sound conservation. It is regrettable that more emphasis was not given to philosophies, ethics, and principles of conservation. A proper ecological orientation on the part of many authors would have provided better integration of the material and a more effective end product.—Helmut K. Buechner.

36. Structure of Short-cyclic Fluctuations in Numbers of Mammals and Birds in the Northern Parts of the Northern Hemisphere. Lauri Siivonen. 1948. *Riistatieteellisiä Julkaisuja (Papers on Game-Research)*, 1. Riistantutkimuslaitos, Suomen Riistanhoito-Säätiö, P. Rautatiek, 13, Helsinki, Finland. 166 pp. The author has assembled and analyzed a large mass of data

on species of mammals and birds which display cyclic fluctuations in population. These analyses convince him that the basic short-term cycle has an average duration of 3 1/3 years. Several types are recognized, the most general being type 037 (population maxima in years ending in 0, 3, and 7); the nearest types, 036, 047, and 147 are also frequent. The other six theoretical types of the 3 1/3-year cycle appear to be infrequent. Two-year cycles are explained as primarily the result of "forked maxima." In certain series, five- and six-year cycles are regarded as the result of the failure to develop the theoretic maximum characteristic of the 3 1/3-year cycle. Differences between maxima and minima increase from south to north in many species. In the dominant 037 type, the 0- and to a lesser extent the 3-maxima are less stable than the 7-maximum. The basic 3 1/3-year cycle appears to hold for Black Grouse, *Lyrurus tetrix* (Linnaeus); Capercaillie, *Tetrao urogallus* Linnaeus; Red Grouse, *Lagopus scoticus* (Latham); Willow Grouse, *Lagopus lagopus* (Linnaeus); Ptarmigan, *Lagopus mutus* (Montin); Blue Goose, *Anser caerulescens* (Linnaeus); Brant, *Branta bernicla* (Linnaeus); Bohemian Waxwing, *Bombycilla garrulus* (Linnaeus); Partridge, *Perdix perdix* (Linnaeus). The author is of the opinion that the cycle of the Ruffed Grouse, *Bonasa umbellus* (Linnaeus), frequently interpreted as a 10-year cycle, is more properly to be regarded as a 3 1/3-year cycle. The author's approach is of necessity empirical with little attention to the basic cause of cycles. A possible clue lies in the fact that the 3 1/3-year cycle seems to occur in pines and other plants. This monograph may well prove to be an important step in the solution of one of the most perplexing problems of population dynamics.—D. S. Farner.

37. Geographic Variation and the Species Problem in the Shore-bird Genus Limnodromus. Frank A. Pitelka. 1950. *University of California Publications in Zoology,* 50: 1-108, 10 pls, 9 text figs., 30 tables. $2.00. Uncertainty and difference of opinion have often been expressed regarding the validity of the described forms of dowitchers. Specimens from the nesting grounds are scarce; the taxonomic characters overlap; sexual dimorphism in size often masks geographical variation. The present paper embodies the results of painstaking study of about 3000 specimens of dowitchers and answers convincingly many of the problems that have existed in this genus. Pitelka's conclusions are: There are two species of American dowitchers, the Long-billed *(scolopaceus)* and the Short-billed *(griseus)*. The latter has shorter legs and bill, but longer wings; sexual difference in size is relatively less. Some Short-billed Dowitchers migrate down the Mississippi Valley, but, in general, this species migrates and winters in coastal, salt-water areas while the Long-billed usually frequents fresh water. Pitelka makes the interesting suggestion that the relatively short wings of *scolopaceus* facilitate taking flight from the deeper fresh-water ponds preferred by this species, while its relatively great sexual dimorphism in size enables this form to utilize a greater range of water depths—the implication being that the females, which are larger, forage in deeper water, on the average, than do the males. In *griseus,* which forages on extensive tidal flats where vast areas of shallow water are available, these adaptations are not present. The Long-billed Dowitcher nests on the Alaskan tundra and migrates south across the continent, more commonly in the west. The Short-billed species has three races, differing on the average in size and color. The westernmost, *caurinus,* described in this paper, nests in southern Alaska and migrates chiefly on the Pacific coast. The much-discussed form *hendersoni,* found to be perfectly valid, breeds in western Canada and migrates through the center of the continent, though not rare in the east. The eastern form, *griseus,* presumably nests in Ungava, west to James Bay, but its principal nesting areas remain to be discovered. All three forms of the Short-billed Dowitcher nest somewhat to the south of the true tundra. It is assumed that during the Pleistocene glaciation they retreated to the south, while *scolopaceus* remained in the unglaciated region near Bering Sea; thus the ecological differences between the two species arose or were enhanced. Since their ranges are complementary, it is difficult or impossible to prove that *scolopaceus* and *griseus* are species not races. Pitelka found only one specimen that seemed truly intermediate. It was from Alaska, where more field work is needed in the region where the two forms *scolopaceus* and *g. caurinus* meet. Several pages of photo-

graphs show the distinctions of the various forms of dowitchers. Field or sight identification of any of them, except of females of *scolopaceus* which are very long billed, is scarcely feasible.—Dean Amadon.

38. Distributional Check-List of the Birds of Mexico. Part I. Herbert Friedmann, Ludlow Griscom and Robert T. Moore. 1950. *Pacific Coast Avifauna,* 29. 202 pp. and 2 colored plates. Geographically North America extends southward to the borders of Guatemala and British Honduras, but, except for Baja California, it has always terminated, insofar as the A.O.U. Check-List of North American birds is concerned, at the Rio Grande and the remainder of the Mexican boundary. This standard work, in its various published editions, as well as the one now in preparation, has continued to defer the inclusion of Mexico on the ground that its rich and varied avifauna is too imperfectly known in comparison with that of the traditional Check-List area. But the very lack of an up-to-date summation of our distributional knowledge of Mexican birds has proved the greatest obstacle to the improvement of that knowledge, so essential is a check-list as a tool of progress. The publication of the present volume, the first of two parts, now at long last breaks this impasse and constitutes, therefore, an ornithological event of historic importance. It covers the birds of the non-passerine orders, through the Apodiformes, that are known from our neighboring republic. In combing the vast literature and in analyzing the three great collections on which their researches are mainly based, the authors have done a superb and scholarly job. The book gives the general range and the details of distribution in Mexico for each species and subspecies, along with primary citations and English and Spanish names. Greatly to be commended is the policy of not applying English names to subspecies. One cannot help but wonder though why Spanish names were concocted for the subspecies. The best way to avoid the spread of this highly pernicious practice, which now plagues ornithology in the United States, is never to let it begin! Although a "Hypothetical List" is scheduled to appear in Part II, the absence from the list of such birds as *Charadrius melodus* Ord and *Otus asio cineraceus* (Ridgway), to name only two, causes one to speculate now as to the basis for their omission.

In order to ascertain partially what would be the effect of the inclusion of Mexico in the scope of the A.O.U. Check-List, the following facts have been assembled: The Mexican list, in the families covered, contains 428 species and a total of 707 named forms. The corresponding part of the 1931 edition of the A.O.U. list, and its various supplements, contains 436 species and a total of 709 forms. Actually, however, in the families so far treated, Mexico contains more species than the remainder of North America, since the A.O.U. list admits 9 species solely on the basis of their occurrence in Baja California, a territory of Mexico and the one part of Mexico covered by the A.O.U. list. The two lists contain 279 species and 352 forms that are common to both lists. In the Mexican list there are 149 species or 355 forms not found in the A.O.U. list. Similarly, the A.O.U. list has 157 species and 357 forms that are not shared with the Mexican list. Three forms given species rank by the A.O.U. Committee on Nomenclature are reduced to subspecies by the authors of the Mexican list: *Plegadis falcinellus mexicanus* (Gmelin), *Anas crecca carolinensis* Gmelin, and *Endomychura hypoleuca craveri* (Salvadori). Conversely, *Branta canadensis hutchinsi* (Richardson) of the A.O.U. list is elevated to a full species in the Mexican list, and *Larus nelsoni* Henshaw, although generally regarded as a hybrid, is dignified by a place in the main list in the Mexican book, whereas the A.O.U. puts it in its hypothetical list. Continuing the analysis, we find four subspecies rejected by the Mexican list that are still endorsed by the A.O.U., and conversely, eight rejected by the A.O.U. that are accepted by the authors of the Mexican list. With regard, however, to this quantitative analysis of the two works, it is obvious that the picture will change materially when Part II of the Mexican list is finished and the entire Mexican avifauna is then compared with that of the remainder of North America. Mexico is certain to pull far ahead of the United States and Canada in the number of species and subspecies it possesses. Of possible real significance at the present moment is the fact that a casual perusal of the Mexican list reveals at least two species accredited to the geographical area encompassed by the A.O.U. Check-List,

but which are not now included in the official A.O.U. list or its supplements. They are: *Priocella antarctica* (Stephens) and *Oceanodroma tethys kelsalli* (Lowe).

The book, as is usual in the *Pacific Coast Avifauna* series is well edited and attractively printed. In short, the long-awaited appearance of this Check-List of the Birds of Mexico is a real landmark in American Ornithology. No one who claims to be an ornithologist will want, or can afford, to be without it. We can only wish the authors every speed and success in bringing to us Part II at the earliest possible date.—George H. Lowery, Jr.

39. The Cycle in the Gambel Sparrow. Barbara D. Blanchard and Mary M. Erickson. 1949. *University of California Publications in Zoology*, 47(11): 255-318, 7 plates, 9 figs. This is a study of some of the phases in the annual cycle of the male Gambel Sparrow, *Zonotrichia leucophrys gambeli* (Nuttall) and their relation to certain climatic factors. It is an extension of a previous study of two other forms in the species *Zonotrichia leucophrys nuttalli* Ridgway and *Zonotrichia leucophrys pugetensis* Grinnell. One of the major objectives of the present study was to determine the beginning of gonadal recrudescence and analyze more accurately its relation to changes in meteorological factors. With more abundant material in the present study, the authors state that they "can substantiate many of the doubtful points of the first paper" (Blanchard, 1941). The aspects of the cycle that are reported are behavior, the testis cycle, and preparation for spring migration. The data were obtained from extensive field observations and material collected at Davis and Santa Barbara, California, which are in the wintering area, and on migration routes and breeding grounds in British Columbia. *Behavior:* Ample data from California (nine years) and British Columbia (13 years) demonstrate clearly that the Gambel Sparrow spends about seven months on its wintering grounds, from less than two to a maximum of four months on its breeding grounds, and the rest in migration. When migrants arrive in British Columbia they may remain in the lowlands from ten days to a month before their high mountain breeding grounds become habitable. Nesting is compressed into less than two months, and the birds return to the lowlands by early July, six to eight weeks before the start of fall migration. On the lowland breeding grounds in Alaska, the cycle is less compressed. *Testis cycle:* Histological stages are identical to those described in the previous study of *nuttalli* and *pugetensis*. Several types of intertubular cells are described. They vary seasonally in size and abundance and an hypothesis of their interrelationships is postulated. True Leydig cells are absent from all specimens between September and early January. "Their subsequent appearance precedes by about four weeks any visible change in the tubules, and hence constitutes the first sign of recrudescence detectable by routine histological means." Leydig cells undergo an enormous absolute increase (approximately 130 times) from the time of recrudescence until mature sperms appear in the tubule lumens. Correlation between changes in the testis and behavior suggests strongly that Leydig cells may be one source of male sex hormone in this species. *Preparation for spring migration:* Physiologic thresholds for spring migration are similar at Davis and Santa Barbara. Minor differences in the southern population at Santa Barbara are: smaller average testis volume, less advanced stage of molt, and assumption of more fat. "Migration is considered to be the culmination of a long physiologic preparation which begins with the first change in the testis." *Correlations with climate:* "The first change in the testis occurs so close to the shortest day and the most inclement period in both latitudes, 38°30′ (Davis) and 34°30′ (Santa Barbara) that neither light nor any other climatic factor may be considered of primary dynamic importance in initiating the reproductive cycle in this form. Nonetheless, the date of first change in the Santa Barbara population showed annual variations in the direction of occurring later in the colder of two years. Our hypothesis, first proposed for *nuttalli*, of an inherent annual rhythm modifiable only within narrow limits by the environment is substantiated by the richer *gambeli* material."

On the whole, the data are well presented in tables, graphs, and one summarizing chart, and there is an excellent series of plates on the histology of the testis. However, for the benefit of other investigators and for the evaluation of the conclusions, it would have been desirable to record for the testes the actual

dates of collection, the numbers collected, and the histological stage for all individuals. Instead, the authors record in the appendix the testis volumes, weights, and numbers by two-week periods or longer (except for migrating birds), omitting the Santa Barbara birds: and they only summarize the histological data in the text and in the figures. Similarly, the analysis of fat deposition in relation to time would have been more useful if presented in relation to a more precise unit of time than the month. One point that is not clear in figures 6 and 7, which analyze climatic factors, is the curve for daylight. The legend states that the curve indicates total hours and minutes of daylight. On the ordinate, the figures listed are 12:36, 14:36, and 16:36, and on the abscissa the points are recorded for two-week intervals of time. Thus, for the period December 8-21, the total daylight is 12:36. This figure could not be the average total daylight per day nor could it be the total daylight for the two-week period.

From a qualitative viewpoint, the observations and data presented in this paper are a valuable contribution to our knowledge of the annual cycle in migratory passerines. Especially noteworthy are the observations that not all of the birds of one flock are ready to leave for the breeding grounds on the same day, that migrants spend almost as much time in the lowlands before and after breeding as they do on their high-mountain breeding grounds, and that there is an absolute increase in the number of Leydig cells from the time they appear until mature sperm appear in the tubule lumens. From a quantitative viewpoint, however, some of the observations and methods seem to me to be inadequate, and hence the conclusions based on them are open to question. For example, January 20 is stated to be the probable average date for the attainment of stage 2 (beginning of recrudescence) for the population at Davis in 1943. This is based on the following facts: of three individuals collected on January 5, one had reached stage 2; on the next date of collection, January 20, seven specimens out of 11 collected were sectioned and five of these were in stage 2; specimens in inactive condition were not observed after January 27. As a rule, collecting was done throughout the study at two-week intervals. The above data, in the opinion of the reviewer, are insufficient to establish January 20 as the average date for the attainment of stage 2 in the population. In a similar example, the authors state (p. 272), that in 1946-1947 the median date of first change from inactive winter condition in the Santa Barbara population (35 specimens examined, which were collected between December 21 and late February in 1942-1943 and 1946-1947) "was probably at least two weeks later than in 1942-1943." The authors point out, furthermore, that this difference can be correlated with colder two-week averages of mean temperature for the periods December 8-21 (2.3°F colder) and January 5-18 (3.9°F colder), and that on the basis of the studies in *nuttalli*, the possibility of an effect by these small differences cannot be precluded. (What possible relation there may be between two-week averages of mean temperature and the physiology of the bird, as opposed to monthly or weekly averages is not brought out.) The reviewer does not deny the possibility that temperature may affect the rate of spermatogenesis or the growth of the testis, but he finds the quantification of some of these aspects in the present paper unjustified. Neither the methods employed nor the data obtained seem to warrant such an analysis. In another instance, the authors remark on the remarkable closeness of the correspondence in departure dates and histologic stages achieved before migration by the Santa Barbara and Davis populations which winter in latitudes about four degrees apart, and "in climates differing substantially as to hours of daylight, temperature, and precipitation." (p. 280.) Whether the climates are "substantially" different seems to be a matter of opinion.

Turning from the body of the data and the methodology to the fundamental assumptions and conclusions, the reviewer finds much that bears discussion. This may be due in part to the fact that the authors were not aware of several important studies in this field. For example, notably absent from the "literature cited" are the numerous papers of Baker and of Burger. The authors consider migration to be the culmination of a long physiologic preparation which begins with the first change in the testis. This is based on "the assumption of a coherence of pattern between migration and reproductive cycle" and the hypothesis that "the earliest appearance of any part of the pattern is to be taken as the

initiation of an adjusted and coherent whole." (p. 285.) In the opinion of the reviewer, the assumption is open to question, but even granting it, it does not follow that the initiation of one phase (reproductive cycle) is an indication of the initiation of the other (migration). As the authors point out: "It must, however, always be admitted that gonad changes might be a separate element dependent on the inherent cycle or on its own set of environmental factors, while other subsequent elements might, at their own time, respond to different internal or external stimuli." (p. 285.) In either view, the concept of a long, physiologic preparation for migration might be embodied, but the data seem to indicate a rapid, rather sudden change which is followed by migration, namely, the increase in deposition of fat. It occurred in *gambeli* "quickly, within 12 days before departure." The rapid increase in fat deposition preceding migration has been brought out also in the experimental and observational studies of other investigators. Its significance is further emphasized by the fact that although the resident race *nuttalli* shows recrudescence of testes and molt, as do the migrant races, it does not show a heavy deposition of fat. With respect to climate, the authors concluded that "neither light nor any other climatic factor may be considered of any primary dynamic importance in initiating the reproductive cycle." (p. 291.) This conclusion stems primarily from the fact that the cycle begins close to the shortest day and the most inclement period of the year in both latitudes. The authors neglect the possibility that constant, short daylengths or decreasing daylength, can be a factor of dynamic importance. Because increasing daylengths have been used extensively in experimental studies the authors place undue emphasis on the fact that the daylength is more or less constant preceding the start of recrudescence. It is possible on the basis of existing experimental data to show that constant daylengths may be effective, and to postulate that a period of decreasing or short daylengths may be a factor in the initiation of the reproductive cycle. The authors' final conclusion, which stems directly from the previous one, is that their results justify the original hypothesis ". . . of an inherent annual rhythm, modifiable only within narrow limits by the environment." On the basis of the previous comments, it is obvious that such a hypothesis is justifiable only when one assumes that increasing daylength (or some other changing climatic factor) is the sole possible environmental factor that can initiate the gonadal cycle. The authors have demonstrated certain *correlations* between the initiation of the reproductive cycle and climatic factors. Their hypothesis, however, which states *causation*, must be regarded as poorly founded until tested by experimentation. In this connection, the results of extensive experimentation to date by other investigators with this and related forms, points to the opposite conclusion—a rhythm that is *modifiable within wide limits* by the environment and that is dependent on the environment for its regulation, but perhaps not its rhythmicity.—Albert Wolfson.

40. Rocky Mountain Naturalists. Joseph Ewan. 1950. University of Denver Press, Denver. xv + 358 pp. $5.00. The plant taxonomist, Joseph Ewan, writes of the naturalists of an area with which he was associated long enough to become one of their number. His book grew from a series of seven sketches published in *Trail and Timberline*, on Rocky Mountain botanical explorers; those sketches were revised and extended so that in their final form, in the present book, they deal with nine men, namely, Edwin James, John Charles Fremont, Charles Christopher Parry, Edward Lee Greene, Thomas Conrad Porter, Harry Norton Patterson, Marcus Eugene Jones, Eugene Penard, and Theodore Dru Alison Cockerell. A brief historical introduction is added, a second part, consisting of a roster in biographical dictionary form of 798 men and women who have left their mark on Rocky Mountain natural history, is included, and the whole work is extensively documented and indexed. This book is important for several reasons. In the first place, it is delightful reading, the product of an enthusiastic worker who can tell what he has to say in an interesting style. In the second place, the documentation will enable the worker who wishes to proceed farther with his investigations to do so. Most noteworthy, perhaps, is the fact that the book preserves many of those elusive bits of information which either are not to be found in print elsewhere, or, if so, are in publications of ephemeral nature; consequently, it preserves much of the otherwise evanescent background of the

natural history of an important geographical area. The world of the naturalist includes a motley assembly; not only professionals, but, in the area under consideration, "priests and clergymen, professional geologists, itinerant prospectors and woodsmen, alpinists, landscape painters, a one-time coal miner, a Shakespearean actor, wealthy English noblemen, attorneys, doctors, invalid consumptives, mining engineers, a mesmerist, a literary fraud, a sugar-beet chemist, a sewing machine mechanic, a street car operator, and a railroad station hand (who collected insects on his lay-overs incident to freight schedules across northern New Mexico)." It is perhaps in the chronicles of this non-professional assembly that the ornithologist will find the greatest fund of information; in sketches of men like the physician William Henry Bergtold, the Colorado Springs business man and part-time museum curator Edward Royall Warren, the amateur oölogist William Chase Bradbury, the financier Robert Blanchard Rockwell, and others on the local scene. Professional ornithologists of the region and teachers of ornithology are, of course, included, as well as others of the last century and the present day alike who visited the region and whose visits, in some cases, are otherwise unchronicled in the permanent literature.

The chief criticism of the book is that errors, chiefly of omission, have crept into the brief sketches of the roster. Some of these could have been eliminated had the author contacted more of the living naturalists included. It is only fair to state, however, that he was by no means wholly negligent in this respect, as almost three pages of acknowledgments will attest; yet he might have gone farther. The allotment of space might also be criticized. It is a surprise to find some important men of the region missing from part one, as well as to find the names of some who have made definite contributions to Rocky Mountain natural history missing from the roster. It is unfortunate that these defects must mar so fine a book.—Maurice T. James.

41. Lifelong Boyhood. Loye Miller. 1950. University of California Press, Berkeley 4, California. x + 226 pp. $2.75. The career of Professor Loye Miller is a dominant and inseparable facet of the development of biology and natural history in the Far West. Consequently this charmingly written collection of memoirs is an omnibus of incidents and experiences which contribute much to an understanding and appreciation of many of the chapters of the history of western biology. Rancho La Brea, the John Day Basin, Pacific Grove, the University of California, Baja, California, Scripps Institution of Oceanography and many other institutions and localities well known to biologists are entwined in the author's wealth of experiences. Throughout the all-too-few pages one senses the profound feeling of enthusiasm and satisfaction of the successful teacher and investigator. Part Three, *Selected Writings*, exemplify the author's enviable facility in presenting scientific information and thought in an interesting, non-technical, yet accurate manner. This little book is heartily recommended to biologists in all fields.—D. S. Farner.

42. Records of the Parrot-like Birds Bred in the United States of America. Arthur A. Prestwich. 1949. Published by the author, Chelmsford Road, Southgate, London, N. 14. 57 pp. This list consists of those records which have appeared in *Aviculture* plus those in the lists of Lee Crandall which have appeared in the *Bulletin of the New York Zoological Society*. Although this little book will be of interest almost exclusively to fanciers of parrots and aviculturists it may be of some value also to investigators who may desire to use such species experimentally.—D. S. Farner.

NOTES AND NEWS

At its January meeting, the Northeastern Bird-Banding Association voted a formal expression of thanks to its retiring Secretary-Treasurer, Mr. Charles B. Floyd, for his efficient and untiring service. Few officers of any banding group had served a longer term, since his term of office (first as Treasurer and then as Secretary and Treasurer) went back more than a quarter of a century. Not many of the newer members of the Association realize that more than 50,000 birds have been banded under his permit, with special emphasis on herons and terns on Cape