

Building about 300 yards from Bailey Hall, at which time swifts were still roosting in nearby chimneys in flocks of several hundred.

These nesting dates may not be significantly early or late but it is interesting to note that swifts apparently begin nesting before the flocks break up in the spring and continue nesting after flocking has begun in late summer.—Pauline James, Texas College of Arts and Industries, Kingsville, Texas.

Chickadee in Convulsion.—Five chickadees were at my feeding station eating sunflower seeds and peanut butter when suddenly one of the birds flew up in crazy circles, bumped the outer branches of a nearby spruce tree about five feet above the snow time and again until the circles became more narrow and they gradually amounted to a whirl downward; then he plunged into the snow, two inches of which was soft above the crust, and continued to spin about always in a clockwise manner. Now by slow degrees the circles widened and he wound up against a twig of a rose bush the end of which was buried in the snow, and he grasped it with a deadly grip and froze with his head still inclined to the right for fully three minutes.

The instant that I noticed that he was flying crazily I recognized it as a fit and watched constantly wondering if he would die in it. However, at the end of the three minutes of freezing, his head twisted farther to the right until I thought he would wring it off, he slowly turned back and looked the other way and finally flew to the spruce tree nearby apparently fully recovered.

It was 8 A.M. sunny and calm, the thermometer stood at 1 degree below zero. The Blue Jays had left after their first breakfast and did not return until 8:30 so the chickadee was not frightened by one of them. A number of English Sparrows were sitting in the rose bush and the other four chickadees were flitting about the station so there seemed to be nothing unusual to cause fright. Whether the convulsion was caused by fright, injury or an internal ailment it is impossible to say.

For the past ten years I have carried on experiments with canaries, crossing them with the American Goldfinch and the South American Black-hooded Red Siskin and their progeny. Out of about a thousand birds I have observed less than a dozen individuals that were subject to fits. In one case the condition was brought on by fright but was not very severe. This bird invariably had a fit when his cage was cleaned. Usually I held his head under the cold water faucet and he came to, though I found he would slowly recover by himself when left alone.

One other case was very severe, the bird fairly thrashing himself to pieces on the floor of the cage. He dropped off the perch oftentimes for no apparent reason and kept this up for several weeks but after some time he fully recovered and sang for many years afterward.

All other cases either ended in instant death or gradual decline, the individual never fully recovering and usually left with a condition that caused him to turn his head to the right constantly and sometimes not being able to keep his balance or to eat properly. A watery right eye or a constant irritation causing the bird to scratch the right side of the head indicated some internal ailment. If an individual did not die immediately but lingered on death seemed due to the fact that he was unable to nourish himself sufficiently.

Though such a condition has been called paralysis by Stroud in his "Digest of the Diseases of Birds" I am inclined to believe it an injury to or pressure on the brain brought on by injury, parasite, or fright.—Olive P. Wetherbee, 11 Dallas St., Worcester 4, Massachusetts.

RECENT LITERATURE

Reviews by Donald S. Farner and others

Reprints of this section may be purchased from Charles B. Floyd, 210 South Street, Boston, Massachusetts, at 75 cents each.

BANDING

(See also Numbers 58, and 70.)

1. **A Review of Twenty-Five Years' Activity by the Vogelkundliche Beobachtungsstation "Untermain" der staatlichen Vogelwarte Helgoland.** (25 Jahre. Vogelkundliche Beobachtungsstation "Untermain" der staatlichen Vogelwarte Helgoland e. V., Sitz Frankfurt a. Main—Fechenheim.) H. Lambert. 1949. *Vogelkundliche Beobachtungsstation "Untermain" der staatlichen Vogelwarte Helgoland e. V. Sitz: Ffm.—Fechenheim. Jubiläums—Bericht, 1948/1949: 7-19.* This is principally a brief resumé of the activities of the organization since its inception in 1924. Also included is a summary of banding activities for 1948 during which 2,660 birds of 64 species were banded. Species banded most frequently were the Pied Flycatcher, *Muscicapa hypoleuca* (Pallas) 444; European Robin, *Erithacus rubecula* (Linnaeus) 202; Swallow, *Hirundo rustica* Linnaeus 184; and European Redstart, *Phoenicurus phoenicurus* (Linnaeus) 158. Seven foreign recoveries are recorded.—D.S.F.

2. **Bird-Banding by the Museum of Natural History of Göteborg in 1947.** (Göteborgs Naturhistoriska Museums ringmärkning av flyttfåglar under 1947.) Viking Fontaine. 1949. *Göteborgs Musei Årstryck, 1948: 72-97.* During 1947, 1,954 cooperators banded 13,650 birds of 152 species. Since the inception of the banding program in 1911, 187,258 birds have been banded; there have been 5,176 recoveries and returns. Species banded most frequently during 1947 include: Starling, *Sturnus vulgaris* Linnaeus 1,045; Great Tit, *Parus major* Linnaeus 2,001; Pied Flycatcher, *Muscicapa hypoleuca* (Pallas) 1,693; Black-headed Gull, *Larus ridibundus* Linnaeus 538; Common Gull, *Larus canus* Linnaeus 404. From 1 April 1947 to 1 April 1948, there were 286 recoveries and returns. The species for which the greatest numbers of returns and recoveries were recorded include: Starling 14, Great Tit 42 (mostly at banding locality within one or two years after banding); Pied Flycatcher 11; Heron, *Ardea cinerea* Linnaeus 12; Black-headed Gull 31; Common Gull 16; Herring Gull, *Larus argentatus* Pontoppidan 13. Six records of birds banded in other countries and recovered in Sweden are included. A Swift, *Apus apus* (Linnaeus), banded 3 August 1941 has been retaken at the banding place each summer 1942 through 1947; there are nine other records of returns to the banding place the summer after banding.—D.S.F.

MIGRATION

(See also Numbers 9, 66, 68, and 70.)

3. **Spring Migration of Chaffinches along the Coast and in Schären West of Helsinki in Relation to Weather and Leitlinien.** (Om bofinkens, *Fringilla coelebs* L., vårsträck i Helsingforstrakten i relation till väderlek och ledlinjer.) Göran Bergman. 1949. *Ornis Fennica*, 26(2): 43-57. In clear warm weather with weak winds the height of flight over the Schären is relatively great (80-300 meters) and the direction NNE or N. In bad weather this flight ceases and is replaced by a "Leitlinien" flight following the direction of the coast. This type of flight is accompanied by appreciable reversed movements. Flight is low. Resting birds are observed frequently and sudden snowfall results in mass reverse movements. The direction of these reverse movements is the function of two factors, (1) tendency to reverse original direction and (2) opposition to wind. "Changes in migration direction in the course of the morning at a favorable observation point are dependent moreover on the following external factors: constancy of assumed migratory direction even in a region where the *Leitlinien* (guiding lines of landmarks) at the beginning of the flight effect an entirely different flight direction, as well as phenomena of the same nature as changes in migratory direction in autumn, whenever the birds fly first toward the SW, then, however, back in Ortstreuerichtung. In spring under constant weather conditions the most important external factors are probably changes in light and temperature." (p. 56.) "The relatively longer duration of flight toward mid-day

in spring is interpreted hypothetically as the result of a retarding effect on fall migration by Ortstreue and a correspondingly stimulating effect in spring migration." (p. 57.)—D.S.F.

4. Considerations Concerning the "Zwischenzug" of the Common Heron. Alfred Seitz. 1949. *Vogelkundische Beobachtungsstation "Untermain" der staatlichen Vogelwarte Helgoland e. V. Sitz: Fjm.—Fechenheim. Jubiläums—Bericht, 1948/1949*: 30-35. This is a brief discussion of the late summer dispersal movements of young *Ardea cinerea* Linnaeus. Questions are raised concerning the initially explosive nature of these movements and the ecologic requirements of the birds in terms of lowlands and water.—D.S.F.

5. Inland Migration of Waders and Terns. R. A. Hinds and J. G. Harrison. 1949. *British Birds*, 42(10): 308-319. Another fine publication of the British Trust for Ornithology chiefly based on observations during April and May, 1947 and 1948, by over a hundred people. Some of the conclusions reached are well worth quoting: "The period of passage of a species should be described by giving the date or period during which the greatest number of records were obtained, and the grouping of the other records about this. . . . The date of arrival of migrants is . . . to some extent dependent on all the environmental conditions along the whole of the route. It is therefore unlikely that we shall be able to trace a simple and invariable relationship between one or a few environmental factors and the peak dates for the different species; but it is generally agreed that temperatures and wind play a leading role. Although the waves of migrants may frequently arrive under certain pressure conditions (the 1948 Dunlin waves do, in fact, all occur just after a period of low pressure), this is more likely to be due to the associated wind and temperature conditions, than to the bird's sensitiveness to pressure changes." (p. 317.) Waves of migrants have coincided with high temperatures in Spain and southern France and southwesterly gales over the British Isles that blew the birds eastward to inland stations.—M. M. Nice.

6. Passerine Migration through England. David and Elizabeth Lack. 1949. *British Birds*, 42(10): 320-325. Stimulated by the discovery of Dutch ornithologists of diurnal autumn migration along the coast, the Lacks found similar migration deflected west by the escarpment of the Berkshire Downs south-west along the Chiltern escarpment. The chief migrants are Skylarks, *Alauda arvensis* Linnaeus (sometimes singing as they pass); Chaffinches, *Fringilla coelebs* Linnaeus; and Starlings, *Sturnus vulgaris* Linnaeus.—M. M. Nice.

LONGEVITY AND MORTALITY

(See also Numbers 48, 49, 50, 55, and 58.)

7. The Dynamics of Two Populations of Pied Flycatchers with Respect to Age and Origin. (Die Entwicklung zweier Populationen des Trauerschnäppers, *Muscicapa h. hypoleuca* (Pall.), nach Herkunft und Alter.) G. Creutz. 1949. pp. 27-53 in *Beiträge zur Vogelkunde*. Akademische Verlagsgesellschaft, Leipzig. Analysis of the populations of Pied Flycatchers in an orchard and the park of an estate. Nearly all females and young were banded. In the orchard the hanging of over 100 nest boxes resulted in the first seven years in an increase from two to only six pairs, within five more years it rose explosively to 45 pairs. Mean life expectancy is 2.2 years. The population of breeding females is composed of 20-30 percent returning adults, 5-6 percent returning young, and 65-74 percent newcomers. The latter are apparently young birds from other localities. Among the adult females 51 percent was one year old, 38.4 percent two, 7.3 percent three, and 3.3 percent four. Some males reached an age of five, six, or seven years.—E. Mayr.

8. Notes on the Longevity of Captive Birds. Ken Stott, Jr. 1948. *The Auk*, 65(3): 402-405. Birds received in the period 1924-1940 and, with two exceptions, still living on May 25, 1948, are listed by the year they were received at the Zoölogical Gardens of San Diego, California. The oldest are raptorial, psittaci-

form, and charadriiform species. Also, a Kagu, *Rhinocetus jubatus* J. Verreaux and Des Murs, lived 20 years and nine months; a Satin Bowerbird, *Ptilorhynchus violaceus violaceus* (Vieillot), acquired in 1927 was still living; and a Piping Crow, *Gymnorhina tibicen tibicen* (Latham), died at 20 years and two months. About a hundred species are listed, allowing for repetition of names in different years.—Ralph S. Palmer.

PHYSIOLOGY

(See also Number 74.)

9. On the Diurnal Rhythm of Activity and Rest in Birds. Pontus Palmgren. 1949. *The Ibis*, 91(4): 561-576. This paper reviews, from a somewhat different aspect, much of the material published earlier by the author in his "Studien über die Tagesrythmik gekäfigter Zugvögel" (*Zeitschrift für Tierpsychologie*, 6(1): 44-86. 1944. See *Bird-Banding*, 18(2): 83-84. 1947.) and introduces some additional pertinent material. In higher latitudes there is a striking tendency for birds to increase their period of daily activity in relation to sunrise, by arising before sunrise and retiring after sunset as the days become shorter. The biologic necessity of this is obvious and cannot be explained solely on the longer winter twilight periods. The tendency is reversed in summer when the days are long and the daylight periods are separated only by periods of twilight. Chaffinches, *Fringilla coelebs* Linnaeus, and Bramblings, *Fringilla montifringilla* Linnaeus, require a minimum sleeping time of five hours; this usually comes before midnight. The *Wechhelligkeit* ("waking brightness") as discussed by several authors, is regarded as a factor in determining the period of activity; however, it is not the sole factor since birds subjected to constant lighting retain the normal sleeping time for some time. Sleep is regarded as an "autonomous periodical function, although largely controlled by the light conditions." (p. 564.) "A tendency towards a diphasic sleep is inherent in most birds, indicated by their afternoon period of inactivity . . ." (p. 564.) This alternates with the characteristic diphasic song output of many species. Other diphasic activity patterns may involve sexual activity, nest-building activity as observed in Willow Warblers, feeding activities in many species, incubation activities in some species; and mobility in caged passerine species. Activity patterns associated with migration are complex and are obviously of several fundamental types. "In Fringillids the onset of migrational behavior manifests itself only as a marked increase in the general morning peak of activity . . ." (p. 570.) "The activity graphs of nocturnal restlessness of night-migrating insectivorous birds . . . agree also very closely in form with the rhythm of night migration as observed in nature. The activity starts, as a rule, after a short period of sleep ($\frac{1}{2}$ -2 hours), culminates before midnight and fades out gradually. The short period of sleep often intercalated between the last, sometimes quite pronounced, activity of daytime and the migration restlessness is not without interest. It can be as little as 10-15 minutes, but still the birds go on falling asleep at the proper time evening after evening. We must conclude that the falling asleep is induced with an astonishingly strong rigidity by a certain condition of diminishing light and/or a certain phase of the general physiological diurnal rhythm." (p. 571.) In some individuals the outburst of restlessness may occur during the latter part of the night; this is the second most common type of migratory rhythm. Nocturnal restlessness is very seldom displayed symmetrically in relation to midnight. "In many instances the approaching outbreak of migration restlessness has already announced itself through a gradual decrease of the day-time activity." (p. 571.) Full nocturnal *Zugunruhe* (migratory restlessness) may likewise be anticipated a few days in advance by ". . . some few jumps or slight wing vibrations . . ." one to three hours after nightfall. The author reiterates his theory that activity patterns represent summations of various rhythmic activities of various frequencies (24 hours must be the longest). Thus, "Apparently the activity of birds is very susceptible to changing light conditions . . ., decreasing light checking, increasing light stimulating activity at a certain intensity of illumination. It seems a reasonable hypothesis that all or most of the postulated nervous centers react uniformly. This would imply that a short time before their being in a simultaneous state of de-

creasing activity, caused by the decreasing light and resulting in sleep, they must be at a high level of stimulation. This immediately explains the almost general occurrence of the typical evening peak of activity, and *mutatis mutandis* also of the morning. The sinking level of activity in the middle of the day is a natural consequence of the centers getting out of step, and also the common occurrence of minor waves. The hypothesis would also imply a deep minimum soon after the falling asleep, as it were mirroring the evening peak, and followed by a rising level of nervous stimulation." (p. 575.) This is a significant and commendable attempt to synthesize the available knowledge on daily activity patterns into a coherent hypothesis.—D.S.F.

10. The Origin of Stomach Oil in the Petrels, with Comparative Observations on the Avian Proventriculus. L. Harrison Matthews. 1949. *The Ibis*, 91(3): 373-391. From histologic studies it is inferred, with strong circumstantial evidence, that these characteristic stomach oils, or their precursors, are produced by the epithelial cells of the proventricular glands. The following suggestions are made concerning the function of stomach oil: (1) a supplement to the secretion of the preen gland, (2) an excreted by-product of the metabolism of excessively fat foods, or (3) a role in water metabolism.—D.S.F.

11. Body Temperature of Birds and Mammals. (Kroppstemperatur hos fugler og pattedyr.) Edvard K. Barth. 1949. *Fauna och Flora*, 1949 (4/5): 163-177. This paper contains a number of interesting observations on birds. Nestling Snowy Owls, *Nyctea scandiaca* (Linnaeus), show temperature variations with changes in air temperature, and more so with rain, typical of poikilothermy. However homoiothermy develops with increasing age; it is fairly well established by 12 days. A young Merlin, *Falco columbarius* Linnaeus, (5-7 hours) showed body temperature to be a direct function of air temperature. A young Meadow Pipit, *Anthus pratensis* (Linnaeus), (five days old) was typically poikilothermal with body temperature dropping almost to environmental temperature when the bird was uncovered. A pair of Shore Larks, *Eremophila alpestris* (Linnaeus), did not cover their young, even during the rain. At eight days the young had body temperatures of 33.5° C., at 12 days, 38° C. (Air temperatures, 5.5° C. and 7° C.) This appears to be an interesting adaptation. At the age of seven hours, uncovered young Dotterels, *Charadrius morinellus* Linnaeus, were able to maintain body temperatures at 31° C. in air at 12° C. Young Oyster-catchers, *Haematopus ostralegus* Linnaeus, at three and five hours of age maintained body temperatures of 31° C. and 33° C. ten minutes after uncovered by adults in air at 14° C. At 18, 23 and 30 hours body temperatures of 37° C., 39° C., and 41° C. were recorded with air temperature at 14° C.—D.S.F.

FOOD HABITS

(See Numbers 35, 38, 58, and 59.)

NIDIFICATION AND REPRODUCTION

(See also Numbers 17, 20, 33, and 41.)

12. Contributions to the Oölogy of Java. (Bijdrage tot de Oölogie van Java.) A. Hoogerwerf. 1949. *Limosa*, 22(1/2): 274 pp. This amazing publication describes the eggs of 350 species; 306 are illustrated in color. For each species there is given the number of eggs and clutches studied, size of clutch, measurements (with variations), normal time and period of laying and general description including form and shell structure, ground color, and kind and color of flecks.—D.S.F.

13. The Nesting of *Chaetura andrei meridionalis*. Helmut Sick. 1948. *The Auk*, 65(4): 515-520. Three nests of the swift, *Chaetura andrei meridionalis* Hellmayr, were found in hollow trunks of burití palms, on the Rio das Mortes, Mato Grosso, Brazil. They were of the open cup *Chaetura* type, made of leaf

stalks glued with saliva. Two nests contained clutches of five, the other four, eggs. Two sets were fresh on October 15, 1946. The breeding season "corresponds with the end of the dry and to the beginning of the rainy period." A bird, shot off a clutch of eggs in the afternoon, proved to be a female.—Ralph S. Palmer.

14. The Nest and Eggs of the Green Heron. (In Japanese.) Keisuke Kobayashi. 1948. *Tori*, 12(57): 53-57. *Butorides striatus amurensis* (Schrenk) is fairly common in summer in western Japan. In the Kensai area it nests fairly commonly even in the big cities. It may nest singly or in colony. Nesting trees usually are lacking their lower branches. Seven nests observed by the author had clutches of three to six eggs. The structure of the nests is so flimsy that the wind may cause the eggs to fall out. (From English resumé).—D.S.F.

15. The Nesting of *Reinarda squamata* (Cassin). Helmut Sick. 1948. *The Auk*, 65(2): 169-174. A nest of the Fork-tailed Swift was found on December 27, 1946, in a grove of buriti palms on the right bank of the Rio das Mortes, Mato Grosso, Brazil. Dry leaves of the palm hang downward by their stalks and are jerked violently by the wind. The nest, made of bird feathers cemented together with mucus, is in a center fold near the top of the leaf and well concealed. Its roof curves outward, downward, then a cup ("egg shelf") is formed inward toward the leaf, with entrance between leaf and cup. The suggestion is made that perhaps the eggs are pasted to the shelf, as has been reported for two other swift genera. On the night of October 21 a male, clinging underneath the nest, was shot and its mate flew out of the nest, which contained three eggs near hatching. The right-hand picture on the plate accompanying this article is printed upside down.—Ralph S. Palmer.

LIFE HISTORY

(See also Numbers 13, 14, 15, 18, 37, 70, 71, 76, and 81.)

16. The Life History of the Ostrich in Captivity. (Vom Brutleben des Strausses (*Struthio*) in Gefangenschaft.) K. M. Schneider. 1949. pp. 169-272, in *Beiträge zur Vogelkunde*, edited by Gerhard Creutz. Akademische Verlagsgesellschaft, Leipzig. A very detailed life history of the ostrich, based on captivity observations in German zoos. Females of four subspecies reached a peak of egg laying late in May while in parts of Africa the breeding season is from October to December. The significance of the seven principal calls is described, in addition the ostrich has "instrumental music" consisting of bill clapping, wing rattling, etc. Displays of males and females are described in detail. The mean weight of eighty eggs was 1270 grams, the largest weighed more than 2000 grams. In Marseilles one female laid sixty-five eggs in three months, averaging 1500 grams. Incubation was by the male only, although occasionally incubation by females is reported in the literature.—E. Mayr.

17. A Last Remnant of Ivory-billed Woodpeckers in Cuba. John V. Dennis. 1948. *The Auk*, 65(4): 497-507. After a brief historical discussion the author gives data on a few hours' observation of *Campephilus bairdii* Cassin made in 1948 "somewhere in Cuba." This rare bird was found in mountainous country in cut-over pine forest, with scattered deciduous trees and an understory of palms and grasses. Their insect food is obtained by knocking the bark off dead or dying pines. A nest was located, with entrance 30 feet up in a dead pine stub. The birds were incubating on April 17 and male and female were seen exchanging places at the nest. A former nesting site, found in the trunk of a fallen pine 20 or 30 feet away from the occupied tree, indicated continued occupation of the locality. The interesting point is made that this zygodactyl species actually grasps a tree trunk by placing three toes forward and one backward. Brief data are given on tapping, nest defense, and voice; there are frequent comparisons with the American Ivory-bill, *Campephilus principalis* (Linnaeus). The chief threats to continued existence of the few remaining Cuban birds are logging operations

destroying their habitat and perhaps removal of nestlings by humans for food.—Ralph S. Palmer.

18. Observations of the Short-tailed Brush-Warbler. (In Japanese.) Ikuzo Furusawa. 1947. *Tori*, 12(56): 6-11. Observations were made on *Urosphena squameiceps* (Swinhoe) on the slopes of Mt. Fuji. A nest with six young was observed. "Both parents fed young 43-53 times in a day with worms, locusts, spiders, etc." (p. 11.) In a second nest, the first egg was laid on 21 May; incubation began just after the completion of the clutch of six. (From English resumé.)—D.S.F.

19. "A Natural History of the Pryer's Grass-Warbler, *Bradypterus pryeri pryeri* (Seeböhm)." Toku T. Momiyama. 1949. *Tori*, 12(58): 115-143. This is a summary of the available data on one of the rarest Japanese species. From 1884 to 1923 only ten specimens were collected; during the winter 1931-1932 five were recorded but no specimens were taken; during the winter 1932-1933 20-25 were captured; and during 1936-1937 four were taken. The author is of the opinion that this sudden increase in records is due to the popularity of roasted song birds sold in the streets of Tokyo. To fill the demand the netters have moved into the reed beds of lakes and rivers north of Tokyo. This paper contains information on history, morphology, relationships, habits and rearing (in captivity) of this species. (From English resumé.)—D.S.F.

20. On the Breeding Biology of the Polyandrous Chinese Jacana. (Ueber die Brutpflege des polyandrischen Wasserfasans, *Hydrophasianus chirurgus* (Scop.). Alfred Hoffman. 1949. *Zoologische Jahrbücher (Systematik)*, 78(4): 368-403. Very interesting study made in 1946 and 1947 in Peking, China. The female is larger than the males and she defends the territory vigorously, the male defending the nest area from all other birds. Of two females watched, one had two mates, the other three; the first laid six sets of four eggs, the other five. All incubating and practically all care of the young is done by the male. The headquarters of the male, a fixed place on the water-lily pads to which he ". . . calls the hen and where the ceremonies of nuptial display that lead to copulation take place, develops during the short mating period into the nesting place, the male (more than the female) throwing up and tearing up nearby water plants in a quite unordered and unsystematic manner." Incubation lasts 22-24 days; the young find their own food from the first, but are hovered and watched by the father for the first two weeks or so, after which he starts incubating a new clutch. Four times young took shelter from sudden rains under their mother that happened to be standing near. The male may move a set, endangered by rising water or human disturbance, to a distance up to 15 meters. The author was never able to see this, but four experiments threw some light on the bird's behavior; three eggs of the set were removed from 20 centimeters to two meters; the bird rolled them back, by pulling them under him. Only 30 percent of 52 eggs hatched successfully, the chief enemy being man. Different calls of male and female are described and many details given as to behavior—the shading of the eggs from hot sun by the father, the rhythm of incubation, etc.—M. M. Nice.

21. Comparative Study of the Nesting Behavior of the Chestnut-sided and Nashville Warblers. Louise de Kiriline Lawrence. 1948. *The Auk*, 65(2): 204-219. A nest of the Chestnut-sided Warbler, *Dendroica pensylvanica* (Linnaeus), was studied in 1945 and one of the Nashville, *Vermivora ruficapilla* (Wilson), in 1946, in the township of Calvin, Ontario. Detailed and well-recorded observations are given, also text figures showing "attentivity" during part of the incubation and nestling periods. These points are of particular interest. The male Chestnut-sided, on guard during incubation, sang while the female was away from the nest. The male Nashville also sang during incubation and always escorted the female when she was off the eggs. Both females, when away from the nest, chirped and flitted about, evidently trying to attract the attention of their respective mates. The female Chestnut-sided apparently fed her brood by regurgitation at first and, after such feedings, "yawned and smacked her mandibles

in a curious way, possibly a reaction following regurgitation. This ceased later after, it may be assumed, she became accustomed to this manner of feeding." The method was abandoned gradually over the first four days and replaced by direct feeding. The female Nashville showed no particular reactions after a Cowbird, *Molothrus ater* (Boddaert), hatched, but was notably restless after her first two young hatched. The parent Nashvilles actually forced food down their nestlings' throats—"a rather awful-looking operation." Several times the female pulled at a wing or leg of a nestling to get the smaller bird out from under the Cowbird, on whom she sometimes stood when tending her own offspring.—Ralph S. Palmer.

22. The Last Passenger Pigeon. William C. Herman. 1948. *The Auk*, 65(1): 77-80. The keeper of the Cincinnati Zoological Gardens reared about 14 Passenger Pigeons, *Ectopistes migratorius* (Linnaeus), in captivity. Their average life in confinement was 10 to 15 years and they bred in the outdoor cage where they lived the year round. The male of the last surviving pair lived 26 years; 'Martha,' the female, and last of the species, lived 29 years and died of "advanced age" on September 1, 1914. Interesting historical and life history data are given.—Ralph S. Palmer.

23. Two Days with a Wren Family. Minna Anthony Common. 1948. *The Auk*, 65(2): 174-179. Common and scientific name of the wren species [House Wren, *Troglodytes aedon* Vieillot], and year and locality of observations seem to have escaped both author and editor, nor are these matters included in later corrigenda. The paper was submitted from Watertown, New York. A nest in a cocoon shell was watched five hours on June 2 and two hours on June 4. The male brought food 38 times, the female 78 times, but his contributions were larger per trip. He fed through the door, entering only twice. The female attended to nest sanitation. The young left suddenly within a few hours of each other and, after less than a day, deserted the neighborhood.—Ralph S. Palmer.

24. Observations on Nesting Associates. J. Southgate Y. Hoyt. 1948. *The Auk*, 65(2): 188-196. All observations were at or near Ithaca, New York. A Red-eyed Towhee, *Pipilo erythrophthalmus* (Linnaeus), and a Field Sparrow, *Spizella pusilla* (Wilson), nested successfully 18 inches apart in a pine. Four Robin, *Turdus migratorius* Linnaeus, nests were 10 to 30 feet from each other (unusually close for this species), with a Yellow Warbler, *Dendroica petechia* (Gmelin), nest near one and a Catbird's, *Dumetella carolinensis* (Linnaeus), six feet from another. Broods were raised in two Robin nests with no apparent difficulty, but another nest was deserted while the fourth was being constructed. The associate species reared their broods successfully. At another Yellow Warbler nest the female twice was attacked by a female Cowbird, *Molothrus ater* (Boddaert), the latter once accompanied by two posturing males. The nest, with one warbler egg, was deserted and later partly pulled apart by the female who re-nested in the vicinity. A Pileated Woodpecker, *Ceophloeus pileatus* (Linnaeus), and a Flicker, *Colaptes auratus* (Linnaeus), had cavities on opposite sides, and with entrances nearly on the same level, of a tree where it was 17½ inches in diameter. The cavities nearly joined. Young of the former left the nest while the latter bird still was incubating. A Starling, *Sturnus vulgaris* Linnaeus, laid an egg in a Pileated Woodpecker's nest; by coincidence the woodpecker's clutch and Starling egg hatched the same day. The young Starling disappeared the following day. Two Mallards, *Anas platyrhynchos* Linnaeus, had nests that touched each other and both ducks were believed to have the same drake. The same condition at the same locality was reported for the five preceding years. This reviewer feels that different terminology is called for when referring to: (1) close nesting in the same species and (2) close nesting by different species.—Ralph S. Palmer.

25. A Changing Nesting Habitat of the Wood Duck. T. E. Musselman. 1948. *The Auk*, 65(2): 197-203. Very interesting data are given on the frequent nesting of *Aix sponsa* (Linnaeus) in recent years in river towns in Illinois; the birds nest in tree cavities along streets, in parks, cemeteries, and courtyards. For-

merly they nested in lowland trees. The change may have come about because of a current dearth of sites in the former habitat, or to avoid predators, or for unknown reasons. When the ducks are breeding there is increased predation by the human species, now that the ducks nest in population centers on uplands away from water. In one instance the author solved the difficult problem of rearing orphaned ducklings in captivity by providing a broody bantam hen and by collecting insects with two electric insect exterminators. The insects, alive though injured, were dropped in water and the ducklings picked them up readily.—Ralph S. Palmer.

26. Life History of the Golden-naped Woodpecker. Alexander F. Skutch. 1948. *The Auk*, 65(2): 225-260. *Tripsurus chrysauchen* (Salvin) is endemic in an isolated region of lowland rain-forest on the Pacific side of Costa Rica and in extreme western Panamá. The birds nest and sleep in tree holes. Male and female share rather equally in digging a hole when one is needed immediately as a dormitory or nest; at other times the male may work alone, leisurely, for months. In the Basin of El General, Costa Rica, the breeding season lasts from late March to June. This single-brooded species may try twice more if the first nesting is unsuccessful. Male and female stay in the nest cavity at night with eggs (the male probably incubating) or young and often are in together briefly during the day. During the day they alternate in incubating. The young are fed solid food, not by regurgitation. Three was the maximum number of young observed to be fledged; six fledged broods contained 13 males and three females. During the nestling period, about 33 days, the parents clean the nest. The fledged young return to the nest at night, sometimes on call from a parent, and sleep in the cavity with their elders. In some broods at least, they continue to be fed as though nestlings and the cavity is cleaned. They continue to sleep together until shortly before the next breeding season. Many other bird species compete for the holes this woodpecker digs. The value of this paper is increased by the frequent comparisons of behavior of various woodpeckers. On pages 257-258 the author attempts a classification of woodpeckers according to their life history patterns.—Ralph S. Palmer.

BEHAVIOR

(See also Numbers 20, 24, and 25.)

27. The Function of the Red Spot on the Bill of the Herring Gull. (De functie van de rode vlek op de snavel van de Zilvermeeuw (*Larus a. argentatus* Pontopp.) N. Tinbergen. 1949. *Bijdragen tot de Dierkunde*, 28: 453-465. By the use of adult head models and the reactions elicited by them from young birds the author has attempted to ascertain the function of the red spot on the bill and the basis for this function. Two factors appear to be important in the stimulating action of the spot—contrast with bill-color and color of the spot, red being most effective and black, blue, white and no spot being successively less effective. Contrast, whether the spot is lighter or darker than the bill, is also important. Color of the bill appears to be relatively unimportant although a red bill is more effective, perhaps because of similarity to the normal red spot. The important function of bill color, however, is that of providing contrast with the spot. Head color seems to be relatively unimportant. Response to an abnormally ovate head model with red spot in approximately correct position was less than to a normal head with normal spot, but greater than the response to an otherwise normal head without the spot. Position of the bill spot is also important as indicated by much poorer response to models with the spot on top of the head. A very interesting paper.—D.S.F.

28. What stimulates the Oyster-catcher to Incubate? (Wat prikkelt een scholekster tot broeden?) N. Tinbergen. 1948. *De Levende Natuur*, 51(5): 65-69. A few simple experiments with *Haematopus ostralegus* (Linnaeus) involving displacement of eggs from the nest (30 centimeters) and the use of smaller or larger eggs indicate both sight of the eggs and sight of the "nest-place" stimu-

late incubation; sight of the eggs seems to be the stronger of the two stimuli. Size appears to be relatively unimportant in the acceptance of eggs, eggs from half normal size to 15.5 centimeters in length being accepted. Eggs apparently are returned to the "nest-place" only when the "nest-place" is closely associated with a conspicuous mark of some sort. "The noteworthy aspect of the experimental results is, that with respect to size as well as number, the normal (Oystercatcher eggs and clutch of three) is not the strongest or most optional stimulus but that 'hypernatural' situations may be stronger stimuli than the natural stimuli." (p. 69.)—D.S.F.

29. The Time of Beginning and Ending of Daily Activity by the Spotted Flycatcher. (Über den Anfangs und Endzeitpunkt der Tagesaktivität beim Grauen Fliegenschneider, *Muscicapa striata* (Pall.)) Leo Lehtonen. 1949. *Ornis Fennica*, 26(2): 35-43. The data on which this paper is based were gathered in the course of 22 morning observations and 57 evening observations during the summers of 1947 and 1948 on the Island of Korkeasaari near Helsinki. Although there is some rather confusing mixture of fact and speculation there are however some fundamentally important ideas which should be noted. With the exception of a period during the warmer part of the summer, Spotted Flycatchers begin activity rather late in the morning (somewhat after sunrise); perhaps this is to be correlated with the fact that their food consists primarily of insects which become active only when it is warmer. During the warmer part of the summer activity may continue after sunset for as long as an hour. The daily activity curve is very similar to that of the Swift, *Apus apus* (Linnaeus). Compared to Coal Tits, *Parus ater* Linnaeus, the Spotted Flycatchers begin their daily activity an average of 17 minutes earlier in June and July but ten and seven minutes later in August and September respectively. The sudden expansion of activity (beginning before sunrise and ending after sunset) in June is to be associated with the prevalence of *Bruttrieb* over *Zugtrieb* whereas the abrupt curtailment of activity to approximately the period between sunrise and sunset is associated with the dominance of *Zugtrieb*.—D.S.F.

30. Individual Distance. P. J. Conder. 1949. *The Ibis*, 91(4): 649-655. Observations on a variety of species prompt the author to suggest ". . . that *individual distance* [italics by reviewer] is an area around a bird, which moves with it, has no topographical reference, and into which no other individual is allowed to come. It seems to be caused by a feeling that makes a bird attack or move away from another individual . . ." (p. 651.) Wheatears, *Oenanthe oenanthe* (Linnaeus), in migration on Skokholm, were noted to establish temporary territories which ". . . seem to be transition stages between individual distance where the feeling of territory has little or no topographical reference, and individual territory where the feeling of territory has had time to acquire topographical reference." (p. 651.) *Mated-female* distance is the distance to which a male of a pair will defend around the female; it is about double the individual distance and is noted in species where the nature of the breeding ground makes a true breeding territory impossible (e.g. auks) and as a "transition stage between individual distance and breeding territory" (e.g. flocks of ducks and geese in which pairing has occurred). *Mated-female* distance is a sexual area with no topographical reference. Breeding territory is a sexual area with topographical reference. *Juvenile distance* is the distance to which defense will be made around juvenile birds. This applies to nidifugous birds and implies mobile centers of defense. These are very interesting concepts and relationships.—D.S.F.

31. Ornithological Observations in the Antarctic Seas 1946-1947. Martin Routh. 1949. *The Ibis*, 91(4): 577-606. This paper is based on observations made by the author in a whale-factory ship which was near the pack ice in the Indian Ocean sector of the Antarctic from 17 November 1946 to 20 April 1947. There is an abundance of interesting information on distribution, behavior, and interrelations among species in reference to more than 30 species. The melting of ice in spring results in northward moving masses of surface water, rich in phosphates and nitrates, which, in conjunction with increased sunlight, allow

a profuse development of phytoplankton. This phytoplankton, in turn, supports a flourishing zooplankton which attracts the southward migration of seals, whales and oceanic birds. The author recognizes four groups of birds on the basis of the distances from pack ice at which they are most frequently found. (1) Those which follow the receding ice edge very closely, scarcely ever moving out of sight of it. Included are the Snow Petrel, *Pagodroma nivea* (Forster); Peale's Petrel, *Pterodroma inexpectata* (J. R. Forster); Arctic Tern, *Sterna paradisea* Pontopidan; and presumably also Antarctic Tern, *Sterna vittata* Gmelin. (2) Those which frequent the edge of pack ice, but which may be found as much as 50 miles from the nearest pack ice. Included are Silver-grey Petrel, *Priocella antarctica* (Stephens); Antarctic Petrel, *Thalassoica antarctica* (Gmelin); Cape Pigeon, *Daption capensis* (Linnaeus); Giant Petrel, *Macronectes giganteus* (Gmelin); skuas, at least in part, *Catharacta skua* Brünnich; and Wilson's Petrel, *Oceanites oceanicus* (Kuhl). (3) Those that frequent the open sea for preference but are frequently encountered along pack edge. Included are Sooty Albatross, *Phoebastria fusca* (Hilsenberg); Light-mantled Sooty Albatross, *Phoebastria palpebrata* (Forster); and White-headed Petrel, *Pterodroma lessonii* (Garnot). (4) Those which frequent the open sea for preference and only occasionally reach to the ice. Included are Prions, *Pachyptila* spp., Blue Petrel, *Halobaena caerulea* (Gmelin); White-chinned Petrel, *Procellaria aequinoctialis* Linnaeus; Short-tailed Shearwater, *Puffinus tenuirostris* (Temminck); and Wandering Albatross, *Diomedea exulans* Linnaeus. Floating icebergs in the open sea are used for rest and shelter, as a source of food, or as a base for feeding forays. Moving icebergs churn the water and make food available. Prions and Blue Petrels feed close to the base of icebergs. Species seen resting on icebergs, in order of decreasing frequency, are Antarctic Petrels; Short-tailed Shearwaters; Snow Petrels; Giant Petrels; Arctic Terns; Adelle Penguins, *Pucheranphus adeliae* (Hombron and Jacquinot); and Ringed Penguin, *Pygoscelis antarctica* (Forster). There is a very interesting series of notes on specific differences in height of flight. The flocks of Antarctic Petrels fly higher than any other species. Short-tailed Shearwaters were seen feeding in association with Humpback Whales; Sooty Albatrosses were seen to follow whales even though they were not feeding. This is a very interesting series of observations.—D.S.F.

32. Behavior of the Plain Titmouse. Keith L. Dixon. 1949. *The Condor*, 51(3): 110-136. An interesting study of 35 color-banded *Parus inornatus* Gambel, in the Berkeley Hills of California. "Adult Plain Titmice, established on territories, tend to remain paired for life and defend their territories throughout the year." "Cavities for use as nest sites appear to be a critical factor in limiting population density in this species. Twelve territories averaged 6.3 acres in area. Pair-formation occurs in a majority of cases in young birds soon after family flocks break up in early summer." (p. 134.) The female chooses the nest-site, constructs and incubates the eggs, the male accompanying her as she builds and feeding her until the young hatch. Incubation lasts 14-16 days, fledging about three weeks, while the family group remain together for another three to four weeks. Four of 18 young birds banded were established on territories in the area the following year, averaging 375 yards from their parents' territories.

It is a pity that a good factual study such as this should be marred by the author's insistence on interpreting male and female behavior in terms of "sexual dominance." He considers the male's "unilateral aggressive contacts" as expression of sexual dominance and that the spring song ". . . aids the male in maintaining dominance over the female." (p. 134.) Most surprisingly he states that: "Lack (1939: 191) has pointed out the necessity for male dominance, since the female must assume a submissive posture in order for mating to be accomplished." (p. 124.) What Lack (*Proceedings of the Zoological Society of London*, Ser. A, 109: 169-219) actually said is this: "The male's impulse to copulate seems normally released when the female keeps still and lowers her head, but not otherwise." (p. 191.) Moreover, in 1940 Lack (*The Condor*, 42: 269-286) wrote in regard to sexual dominance that he had ". . . not studied at first hand any species in which it occurs." The existence of sexual dominance is easily assumed, but as yet has not been satisfactorily proved in the case of any bird.—M. M. Nice.

33. Nest Building by the Great Reed Warbler. (De Nestbouw en het huwelijksleven van de Grote Karekiet.) H. N. Kluijver. 1949. Reprint from *In het Voetspoor van Thijsse*. H. Veenman and Zonen, Wageningen, Holland. pp. 23-36. Detailed description illustrated with seven excellent line-drawings of the process of nest construction with *Acrocephalus arundinaceus* (Linnaeus), soaking the material, weaving and molding it. The female builds the nest and incubates the eggs, the male busily feeding her during this latter period. Incubation lasts 14 days and fledging 10-12, the young leaving the nest before they can fly, but making no mistakes in landing as they hop from one reed stem to another. There were three unmated males in the marsh studied, while two males each had two mates. This condition seemed to depend on the type of territories held by the males; those of the unmated ones offered poor opportunities for nest construction, those of the polygamous ones excellent opportunities. The nests of the two females were 11 meters apart in one case, 10 meters in the other; the first two nests were destroyed, but the other two were successful. The females allowed the other in the vicinity of her nest, but the male helped feed both of his families that hatched about the same time.—M. M. Nice.

34. Spring Observations on Color-banded Yellowhammers. (Frühjahrsbeobachtungen an bunt beringten Goldammern (*Emberiza c. citrinella*)). Gerd Diesselhorst. 1949. *Ornithologische Berichte*, 1: 1-31. Intensive study of a population of 50 pairs on 70 hectares 25 kilometers northwest of Munich. In winter, the birds live in loose flocks; temperatures above 0° C. after the middle of February stimulate them to take up their territories, with song and fighting. Territories facilitate pair formation and nest building, but do not provide food. Size of territories depends somewhat on density of population; they vary from 2500 square meters to two hectares, averaging 3000 square meters. Other species are not driven off by the Yellowhammers. Usually the female does not participate in territory defense. Male and female differ in appearance; a male decoy was effective in capturing other males when placed on or near their territories in contrast to my experience with Song Sparrows where birds had to be personally acquainted with a caged intruder in order to become excited over it. A stuffed Yellowhammer brought no response from Dr. Diesselhorst's birds. The author compares his findings with those of Howard, Tinbergen, Nice and Ryves; he discusses "territorial" and "sexual" fighting, the influence of the female on territorial fights of the males, defense of the female, dominance and territory, the releasing mechanism—the decoy had to move, whereas Lack's Robins attacked a bunch of red feathers—, and many aspects of territory. A very fine paper.—M. M. Nice.

35. The Opening of Milk Bottles by Birds. James Fisher and R. A. Hinde. 1949. *British Birds*, 42(11): 347-357. "In 1921 birds described as tits were observed to prise open the waxboard tops of milk bottles on the doorsteps in Swaythling, near Stoneham, Southampton, and drink the milk. This is the first known record of an act which has now become a widespread habit in many parts of England and some parts of Wales, Scotland, and Ireland, and which has to date been practiced by at least eleven species of birds." On the basis of 450 replies to questionnaires sent out by the British Trust for Ornithology and to appeals in the press, sufficient information was obtained for the preparation of seven maps showing the spread of the habit throughout the United Kingdom. Different methods are used for getting at the milk, even by the same bird. It is therefore quite certain that the process which has been learnt is the whole business of obtaining milk from milk bottles, and not any particular technique for opening bottles." Four excellent photographs are given of Blue Tits, *Parus caeruleus* Linnaeus, and Great Tits, *Parus major* Linnaeus, opening milk bottles.—M. M. Nice.

36. Some Statistical Information about Wren Song. R. B. Clark. 1949. *British Birds*, 42(11): 357-346. All day records on the singing of *Troglodytes troglodytes troglodytes* (Linnaeus) were made for one day in each April, May, June, and July; 20 graphs are concerned chiefly with songs per hour and intervals between songs. Songs usually last five seconds, intervals ten seconds. "The

birds begin to sing 30-40 minutes before sunrise as a rule and maintain song-output at a high level for some 5 to 6 hours." (p. 346.) From fig. 14 we gather that the Wren gave some 700 songs on April 14, about 1200 on May 12, about 1400 June 23, and nearly 1100 on July 14. The largest number sung in any one hour was about 142. (Fig. 4). The stage reached in the nesting cycle on these four dates was not known.—M. M. Nice.

37. The Young Gannet. G. T. Kay. 1949. *British Birds*, 42: 260-263. Young *Sula bassana* (Linnaeus), after a period of starvation, fly down to the sea, then slowly swim southeast, going at a speed of from half to three quarters of a mile per hour. The adults pay no attention to them. In time they lose their fat and are able to fly and dive for fish.—M. M. Nice.

38. Barn Owl Growth and Behaviorisms. Gayle Pickwell. 1948. *The Auk*, 65(3): 359-373. The nesting of a pair of Barn Owls, *Tyto alba pratincola* (Bonaparte), was studied in 1928 at San Jose, California. There are incidental notes from other localities. The nesting site was in a casement of a college tower. The data are mainly on weight (given in tables), growth, food (chiefly Pocket Gophers, *Thomomys*), voice, and changing reactions of the young birds. Six of the seven eggs hatched, over a span of 15 days. Both parents brought food for the chicks. Two young survived to fledging age (62 and 66 days) and then weighed about 30 times average weight on hatching. They showed a decline in weight near the end of the nestling period. Departure was gradual, the fledged young returning for several days to the casement to be fed, then being heard for several days thereafter in the vicinity. At least one of the chicks that died was partly eaten, perhaps having been fed by a parent to the remaining young (p. 363). The use of "behaviorisms" in the title of this paper is rather unfortunate.—Ralph S. Palmer.

39. The Seasons of Bird Song. Revival of Song after the Postnuptial Molt. Aretas A. Saunders. 1948. *The Auk*, 65(3): 373-383. "After some study of records in relation to the information I can get about molts, I have concluded that the study of revival belongs mainly or entirely to passerine birds." (p. 373.) The author considers that acquirement of fat in fall has more to do with cessation of singing than similarity of or differences in plumage before and after the post-nuptial molt (p. 374), regarding which theories have been propounded. He lists fall song of three passerines, reported by other observers from various localities, and of 63 passerines and the White-breasted Nuthatch, *Sitta carolinensis* Latham, based on his own studies in Connecticut and in Allegany State Park, New York. There are yearly differences in the amount of fall song generally. The "most regular and dependable fall singer of all our birds" is the Song Sparrow, *Melospiza melodia* (Wilson). Omitted are rarities, also crows and jays (not considered "true singers"), and there are no data on revival of song substitutes of non-passerines. This reviewer has heard decidedly melodious fall songs of a number of Charadriiform species in the molt that are silent earlier during the latter part of the breeding cycle; these birds, structurally, are less well equipped for singing than the Corvidae. A discussion of any relation of song after the molt to territory would have been interesting.—Ralph S. Palmer.

40. Observations on *Nyctibius grandis* in Surinam. Fr. Haverschmidt. 1948. *The Auk*, 65(1): 30-32. Little is known of the life history of the Great Goatsucker. "According to my observations, it seems clear that this species has a definite roost where it remains dozing during the day and that it starts hunting from a lookout as soon as darkness has fallen." Two photographs of a nestling are reproduced.—Ralph S. Palmer.

41. Nesting Behavior of the Poor-will. Robert T. Orr. 1948. *The Auk*, 65(1): 46-54. The nesting of a pair of *Phalaenoptilus nuttallii* (Audubon) was studied over a two-week period in 1946 at Lake Tahoe, California. The two eggs hatched on successive days. The attending parent sat very close in the daytime. The young, which are covered with down when hatched, are fed by regurgitation

(one observation). The adults (sexes could not be distinguished) landed some distance from the eggs or chicks and hopped and waddled to them. They took turns at incubating and brooding and there was a changing-over ceremony at dusk, involving bobbing of the head and displaying of the white throat patch. Data on calling and on defensive behavior are given. The observers left the area when the young still were small.—Ralph S. Palmer.

42. The Flight of Swallows. Charles H. Blake. 1948. *The Auk*, 65(1): 54-62. In a review it is difficult to summarize the author's careful analyses and descriptions of the distinctive manner of flight of each of the following species: Tree Swallow, *Iridoprocne bicolor* (Vieillot); Bank Swallow, *Riparia riparia riparia* (Linnaeus); Rough-winged Swallow, *Stelgidopteryx ruficollis serripennis* (Audubon); Barn Swallow, *Hirundo rustica erythrogaster* Boddaert; Northern Cliff Swallow, *Petrochelidon albifrons albifrons* (Rafinesque); and Purple Martin, *Progne subis subis* (Linnaeus). There are three main patterns of flight—"circles, long, straightish runs, and zigzagging." The "wing-flapping rates for coursing increase with increasing size of the species." "The difference in rate between coursing and quick flapping corresponds in a general way to the difference in maneuverability, although this point cannot be pushed too far." It is greatest for the Barn Swallow, nearly as great for the Tree Swallow, and least for the Rough-wing and Purple Martin. "It may be significant that the last species seems most dependent on the tail in maneuvering."—Ralph S. Palmer.

43. Anting by Four Species of Birds. Hervey Brackbill. 1948. *The Auk*, 65(1): 66-77. In Maryland the author observed a total of 15 performances of anting by the Southern Robin, *Turdus migratorius achrusterus* Batchelder; Starling, *Sturnus vulgaris* Linnaeus; Catbird, *Dumetella carolinensis* (Linnaeus); and Purple Grackle, *Quiscalus quiscula stonei* Chapman. The actions of the birds are described in detail and the names of the ant species are given. Many performances seemed desultory, also variations in manner of anting, compared with the reported high excitement and fixed pattern of some semi-captive birds. The proposed explanations, by various authors, of anting are discussed; he considers that of Kelso—for irradiation and vitamin development of various juices and their later ingestion (*Biological Leaflet* No. 35, Dec. 27, 1946)—to be most acceptable.—Ralph S. Palmer.

44. Notes on Voice and Display of the Jay. Derek Goodwin. 1949. *British Birds*, 42(9): 278-287. Detailed description, based on observation of wild and captive *Garrulus glandarius* (Linnaeus), of seven postures and eight notes with the occasions on which they are used.—M. M. Nice.

CENSUSES AND POPULATIONS

(See also Number 7.)

45. Twelve-year Census of Hole-nesting Birds in a Park in Northwest Saxony. (Zwölf Jahre Kontrolle des Höhlenbrüterbestandes eines nordwest-sächsischen Parkes.) R. Berndt. 1949. pp. 1-20 in *Beiträge zur Vogelkunde*, edited by Gerhard Creutz. Akademische Verlagsgesellschaft, Leipzig. On 23 hectares of an estate in Saxony the hole-nesting birds were censused during a twelve-year period. There was a great surplus of nest boxes (28-55 percent empty boxes) so that the annual fluctuations reflected directly the population size. Sixteen species with 123 (1940) to 239 (1937) pairs utilized the nest boxes. Starlings, *Sturnus vulgaris* Linnaeus, fluctuated between forty and 100 pairs, parallel changes occurring in most censused areas of Germany. Titmice and other resident species had drastically reduced numbers after severe winters, except in areas with winter feeding. Normal numbers were usually restored within a single year. Annual fluctuations in the number of migratory species (e. g. flycatchers) were surprisingly parallel over wide areas of Germany.—E. Mayr.

46. The Hawk and Owl Populations in a Census Area in the Sandstone Cliffs along the Elbe. (Der Raubvogel- und Eulenbestand einer Kontrollfläche des Elbsandsteingebirges in den Jahren 1932-1940.) R. März. 1949. pp. 116-146 in *Beiträge zur Vogelkunde*, edited by Gerhard Creutz. Akademische Verlagsgesellschaft, Leipzig. Seven species of hawks (24 pairs) and four species of owls (nine pairs) were found nesting in the census area of six square kilometers. The fate of each pair and the shifts of the nesting place through the years are described in detail. Two pairs of Eagle Owls were extremely destructive, killing at least 23 hawks (including eight peregrines) and twenty-five owls in a seven-year period.—E. Mayr.

47. New Census of Storks in Alsace. (Nouveau recensement des Cigognes en Alsace.) H. Heim de Balsac and A. Schierer. 1948. *Alauda*, 16: 180-188. A complete census in 1947 indicates that 527 young were produced. This is probably not greatly different from the productions in 1927 and 1932 although the data are not strictly comparable.—D.S.F.

48. A Catastrophic Season for Swifts. (Trauriges Spyrrenjahr 1948.) E. Weitnauer. 1949. *Der Ornithologische Beobachter*, 46(3): 80-85. The author's colony of *Apus apus* (Linnaeus) contained 14 nests (32 young) in May 1948. Prolonged rainy and cool weather resulted in the failure of adults to obtain adequate quantities of food for the young. Without the assistance of the author, doubtless all of the young would have perished; actually, only a few survived. By 12 July only 12 of the original 28 adults were present, one had died in its own nest. An interesting observation is recorded for 15 July: "The young bird in Box 7 was fed by both adults a few times today . . . It was 42 days old and should be able to leave the nest. In the evening both adults flew away and did not return again. They had, despite all of the difficulties, persevered to the last day of normal fledgling period . . ." (p. 85.) Swifts were last observed on 28 July.—D.S.F.

49. Effects of the Cold Spell of 1947 on the Coot in North Somerset. Ronald Alley and Hugh Boyd. 1949. *British Birds*, 42(7): 225-232. Observations on a population of *Fulica atra* Linnaeus at Blagdon Reservoir during the cold spell of early 1947 showed that 135 perished, "about half those present in January; and the breeding population in 1947 was reduced to 100-110, as compared with c. 220 in 1946." During the severe weather territorial behavior disappeared; the birds became much less wild and fed away from the pond. A loss in weight of some 40 percent occurred before death.—M. M. Nice.

50. The Influence of the Period of Rain and Cold in 1948 on the Swifts. (Wirkung der Regen- und Kälterperiode 1948 auf den Mauersegler, *Micropus apus* (L.)) Rudolf Kuhk. 1948. *Die Vogelwarte*, 1(1): 28-30. For a period of more than a month from mid-June to mid-July, there was unusually cold and wet weather with markedly decreased quantities of aerial plankton. In the Radolfzell region apparently no broods of Swifts were fledged as a consequence. During the period of unfavorable weather large numbers of Swifts gathered along the shore region between Radolfzell and Constance. "This gigantic flock of Swifts, among which certainly in addition to immature individuals, there were many old birds searching for food far from the breeding locality, sought . . . sleeping places in neighboring buildings . . ." (p. 29.) Large numbers were observed to sleep together in compact masses. Many dead birds were found in Radolfzell and Constance. Instances of complete or almost complete mortality of nestlings during this period are cited.—D.S.F.

ECOLOGY

(See also Numbers 4, and 31.)

51. The Bobwhite Quail in Arkansas. W. J. Baerg and Lloyd O. Warren. 1949. *University Arkansas College Agriculture, Bulletin*, 488. 46 pp. A good

popular treatise on *Colinus virginianus* (Linnaeus), stressing the importance of habitats and food. Modern farming practices are mostly detrimental, especially over-grazing and clearing of fence rows. "Predators get the old, sick, weak, or otherwise subnormal birds, leaving the strong and healthy specimens. Man can be the worst of predators and in his hunting he is not selective."—M. M. Nice.

52. Mimicry of the Monarch Butterfly by the Viceroy. Oscar M. Root. 1949. *Turtax News*, 27(7): 153-154. The author points out that, although the Viceroy Butterfly, *Basilarchia archippus* (Cramer), is frequently cited as a mimic of the Monarch Butterfly, *Danaüs plexippus* (Linnaeus), there is apparently no published evidence that either species is ever taken by birds.—D.S.F.

53. Unusual Nesting Sites of the Marsh Harrier in the Noordoostpolder. (Afwijkende broedplaatsen van de bruine kuikendief, *Circus ae. aeruginosus* (L.), in de Noordoostpolder.) D. Bakker. 1949. *Limosa*, 22(3): 321-323. Until 1945 *Phragmites communis* Trinius and *Scirpus maritimus* Linnaeus were predominant in the polder and Marsh Harrier nested commonly. With the rapid conversion to cultivation, Marsh Harriers have begun to breed in agricultural crops (small grains, alfalfa, rape).—D.S.F.

54. Inbreeding among Birds in the Wild State. L. E. Richdale. 1949. *The Emu*, 48(4): 282-290. In the course of an extensive study (1936-1948) of the Yellow-eyed Penguin, *Megadyptes antipodes* (Hombroon and Jacquinot), 96 birds, banded as "fledglings," were ultimately found breeding. Only 17 were found breeding at the place of hatching. Only eight began breeding when one parent of the opposite sex was still alive; hence the opportunity for parent-offspring inbreeding was very slight. The only case of inbreeding discovered was between a brother and sister. The author was able to find only four cases of inbreeding wild birds recorded in the literature.—D.S.F.

55. Another Record of a Bird Captured in a Spiderweb. (Nouvel exemple d'un oiseau capturé dans une toile d'araignée.) Fr. Haverschmidt. 1948. *Alauda*, 16: 217. Blue Tanager, *Thraupis episcopus* (Linnaeus), captured in spiderweb in Surinam.—D.S.F.

56. Swiss Birds as Distributors of Seeds. (Unsere Vögel als Samenverbreiter.) P. Muller-Schneider. 1949. *Der Ornithologische Beobachter*, 46(4): 120-123. Three modes of dispersal of seeds are recognized: (1) *Dyszoochoryl* in which birds in extracting seeds from fruits lose some of the seeds. (2) *Endozoochoryl* in which the seeds actually pass through the digestive tract. (3) *Epizoochoryl* in which seeds become attached to external parts of birds.—D.S.F.

57. Additional Data on African Parasitic Cuckoos. Herbert Friedmann. 1949. *The Ibis*, 91(3): 514-519. These notes are supplementary to the author's "The Parasitic Cuckoos of Africa" (*Bird-Banding*, 20(2): 125. 1949.)—D.S.F.

58. The Waubay Lake Colonies of Double-crested Cormorants. Arthur R. Lundquist. 1949. *South Dakota Bird Notes*, 1(1): 8-10. Except for the years during the drouth this colony has been in existence since at least 1910 and probably long before that. Adults may feed at distances up to 20 miles. Food includes perch, bullheads, and mud puppies. Banding returns show clearly that the migratory route follows the Mississippi River to the Gulf of Mexico. The oldest banded bird recovered was one at least 14 years of age shot in Louisiana.—D.S.F.

59. Forest Birds and Insects. (Bosvogels en Insecten.) L. Tinbergen. 1949. *Nederlandsch Bosbouw-Tijdschrift*, 1949(4): 91-105. In this paper an attempt is made to evaluate the role of various species of tits, *Parus*, in controlling certain lepidopterous and hymenopterous larvae in forests. The results appear to indicate that it is quite obvious that in large irruptions of caterpillars or saw-fly larvae, their numbers are reduced only slightly by tits and that the ultimate de-

cline is due to other factors than predation by birds. There are indications that tits are not important even in controlling small extensions in numbers of such prey species. "It is possible that this is to be attributed to an aversion to a single-item diet. In a fir forest they [tits] appear therefore to seek a certain prey species with less zeal as soon as this species becomes more numerous than usual. It is possible that this aversion scarcely appears in a pronounced increase of a prey species in the mixed forest with its more varied fauna. If this is true, the tits in such forest should be able to have an important part in the removal of an incipient concentration. This can only be established by further research." (p. 103.) At normal population levels of prey-species tits in a fir forest take large numbers of many, but not all, economically important caterpillars and saw-fly larvae. Whether or not this influences the change of outbreaks of these species, cannot be said.—D.S.F.

60. Birds in an Army Camp. Vincent P. McLaughlin, Jr. 1948. *The Auk*, 65(2): 180-188. Camp Barkeley was built late in 1940 in Taylor County, Texas—in a hot, dry, mostly flat and practically waterless country where birds were scarce. A series of ditches and small interconnected ponds, also settling pools for sewage disposal, caused the vegetation (including planted willows) to grow profusely. With a drop in water level in 1944 and 1945, the picture changed to rich mud flats, surrounded by head-high reeds. The area since has reverted to semi-desert. Between 65 and 70 bird species benefited by the temporary presence of the project. The annotated list contains 148 species.—Ralph S. Palmer.

61. The Tern Colonies of the Dry Tortugas Keys. Alexander Sprunt, Jr. 1948. *The Auk*, 65(1): 1-19. These sand and coral islets, whose interesting recorded history began in 1513, lie about 68 miles off the city of Key West, Florida. Hurricanes have altered the number of islets, there now being six. The Sooty Tern, *Sterna fuscata fuscata* Linnaeus, a ground nester, occurs in tens of thousands; the Noddy Tern, *Anous stolidus stolidus* (Linnaeus), which nests in bushes, occurs in a few hundreds; the Roseate Tern, *Sterna dougallii dougallii* Montagu, occurs in small numbers. Changes in vegetation and altering sizes of the islets cause marked fluctuations in the breeding tern population. Censuses have been made irregularly, 1903-1947, and the figures are given. There is no serious predation at present. The Sooty and Noddy arrive at night and fly over the islets for about two weeks, at night only, then alight and egg laying (one egg per clutch) occurs the next day or shortly thereafter. The feeding range is up to about 60 miles from the islets, although the Noddy apparently does not go as far as the Sooty.—Ralph S. Palmer.

62. The Ringing of Forest-Trees Made by the Pied Woodpecker. (Kružkovanie stromov d'at'lami.) František Turcek. 1949. *Lesnická práce*, 28: 245-248. Author observed both in South- and in East-Slovakia the ringing of some forest-trees made by the Pied Woodpecker, *Dryobates maior pinetorum* (Brehm). A total of 16 Scotch-pines and one Larch was found drilled in a mixed stand of Spruce-Birch-Pine, in March 1949. An additional oak was found damaged by the Green-Woodpecker, *Picus viridis virescens* (Brehm), on an area of about two hectares. The age of ringed trees was 25 years in the case of the pine, 75 years in the case of oak, respectively. The rings interrupted on the northern side of the trunks. An average of 23 rings was found on one meter length of the trunk. Tracks of ringing were found relatively deep in the wood, up to the 15th year-ring, where vacua were found, filled partially with resin, while, the vacua were surrounded by dark wood, probably attacked by any fungi. No cones were found on the attacked trees. Author's English summary.—S. C. Kendeigh.

CONSERVATION

(See Numbers 51, and 83.)

WILDLIFE MANAGEMENT AND METHODS

(See Numbers 78, 79, and 83.)

AVIFAUNAL DYNAMICS (See Numbers 7, and 64.)

SYSTEMATICS (See also Numbers 75, and 84.)

63. The Bony Palate of Birds. Part I. The Palaeognathae. Sam McDowell. 1948. *The Auk*, 65(4): 520-549. The Rheidae, Tinamidae, Casuariidae, Dromacidae, Dromornithidae (fossil), Apterygidae, Dinornithidae (extinct), Aepyornithidae (fossil), Eremopezidae (fossil), and Struthionidae have, since Pycraft (1901), been considered a special superorder of Neornithes, the Palaeognathae, on the basis of studies of the structure of the palate. A history of the classification of the so-called Palaeognathae is given and the palates, when known, are described and those of living forms are figured. It is shown that the previously held definition of the 'palaeognathous' palate does not hold, there being, rather, four morphological types. The author contends that "the palate cannot be used to define such a superorder of birds, and, indeed, seems rather to separate the Palaeognathae into several groups." (p. 536.) He lists and describes in detail (pp. 537-539) four palatal types, with possibly a fifth for *Aepyornis* which is imperfectly understood.

Two possible explanations of the diversity of the palates are: (1) the so-called Palaeognathae are truly closely related, but the palate has become so variable as to lose significance in determining affinities (hypothesis of unity); or (2) this assemblage is not a natural group (hypothesis of disunity). He discusses these and accepts the latter alternative. He presents some evidence for believing that the palates are not primitive, but either neotenic reversals or adaptive developments. Assuming they are primitive, there is a choice between believing (1) that the four main types he outlines "are independent of one another down to the basic Neornithic stem; or that (2) the four lines come from a common ancestor in turn derived from some other Neornithic (ornithurine) group. The author feels the morphology of the palate of known forms is inconclusive in making this choice." (p. 545.)

"It is concluded that the superorders Palaeognathae and Neognathae should be merged, and that the orders Rheiformes and Tinamiformes be combined, the orders Apterygiformes, Dinornithiformes, and Aepyornithiformes likewise combined, and the Struthioniformes and Casuariiformes be allowed to stand as before, thus reducing the 'palaeognathous' assemblage to four orders, each one equivalent to one of the four morphological palatal types here distinguished." (p. 548.)—Ralph S. Palmer.

BOOKS AND MONOGRAPHS

64. Contributions to Ornithology. (Beiträge zur Vogelkunde.) Edited by Gerhard Creutz. 1949. Akademische Verlagsgesellschaft, Leipzig. 280 pp., 29 figs. 18 D.M. A volume published by the ornithologists of Saxony in honor of Stresemann's sixtieth birthday, including papers on the catastrophic decline of the lapwing population in eastern Saxony (P. Bernhardt, pp. 21-26), the migration of the Black-bellied Plover (H. Dathe, pp. 54-97), the early history of ornithology in Saxony (R. Heyder, pp. 102-115), and the fluctuations of the stork population in eastern Saxony (W. Makatsch, pp. 147-168). Four additional papers of this volume (Berndt, Creutz, März, and Schneider) are abstracted more fully in the previous sections. (See numbers 7, 16, 45, and 46.)—E. Mayr.

65. A Sand County Almanac and Sketches Here and There. Aldo Leopold. Illustrated by Charles W. Schwartz. 1949. Oxford University Press, New York. xiii + 226 pp. The late Aldo Leopold was a foremost conservationist, an eminent biologist, a profound philosopher, and a master of English prose. This little book is evidence of all of these facets. Perhaps they are no better

illustrated than in the very first pages of the Foreword. "Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'Standard of living' is worth its cost in things natural, wild and free. For us of the minority, the opportunity to see geese is more important than television, and the chance to find a pasque-flower is a right as inalienable as free speech. These wild things, I admit, had little human value until mechanization assured us of a good breakfast, and until science disclosed the drama of where they come from and how they live. The whole conflict boils down to a question of degree. We of the minority see a law of diminishing returns in progress; our opponents do not." (p. vii.) "That land is a community in the basic concept of ecology, but that land is to be loved and respected is an extension of ethics. That land yields a cultural harvest is a fact long known, but latterly often forgotten." (p. viii.) Part I is "A Sand County Almanac" in which are related by season and in the author's unique choice of words, the experiences of the author and his family in the resurrection of a "worn out" sand farm. These chapters are replete with observations illustrative of fundamental biologic principles and the philosophy that arises therefrom. Every ornithologist will thrill with "March—The Geese Return." "By this international commerce [northward migration in spring] of geese, the waste corn of Illinois is carried through the clouds to the Arctic tundras to grow goslings for all the lands between. And in this annual barter of food for light, and winter warmth for summer solitude, the whole continent receives as a net profit, a wild poem dropped from the murky skies upon the muds of March." (p. 23.) "December—65290" (p. 87-92) contains interesting speculation concerning the factors affecting survival among chickadees. Part II is "Sketches Here and There," a collection of observations and philosophical reminiscences gleaned from the author's extensive travels—a random sample of the multifarious problems of conservation of our biological and renewable physical natural resources. Part III is "The Upshot." It is the "rationalization" of the philosophy of one who objects to our present philosophy of utilization, destruction, and exhaustion of natural resources. Every thinking open-minded citizen should read this. "The Land Ethic" (pp. 201-226) is a masterpiece of appraisal of the failure of protracted progress towards a true system of soil conservation and a sane system of land use.—D.S.F.

66. Birds in Migration. Bird Migration in Relation to Terrain, Weather, and Wind. (Vogel Onderweg. Vogeltrek over Nederland in Samenhang met Landschap, Weer en Wind.) L. Tinbergen. 1949. Van Eigen Erf Monographien ter Verdieping van de Kennis van Eigen Land en Volk. No. 4. Scheltema and Holkema N. V., Amsterdam. iv + 110 pp. This excellent little book has been prepared with the same objectives and at the same level as the author's earlier contribution to this series, *Vogel in hun Domein*. (See *Bird-Banding*, 19(1): 45-46, 1948.) The author has again attained the enviable accomplishment of a book which should be of wide interest and acceptance among laymen and likewise of use and interest to professional biologists. In general the book is concerned more with the empirical aspects of bird migration rather than the more theoretical biologic aspects. Chapters 3, 4, and 5 present very interesting analyses of the effect of topographic features and wind direction on the route of autumn migration of passerine species. The rôle of wind velocity in height of flight is discussed in Chapter 6; in the case of Starlings, *Sturnus vulgaris* Linnaeus, for example, head winds and, to a certain extent, high velocity regardless of direction, cause low flight; flight is usually high (70 meters or more) with tail-winds. In the case of Chaffinches, *Fringilla coelebs* Linnaeus, in fall migration when the wind is SE, S, SW, or W, large masses of birds are seen in migration, their direction being about WSW until the coast is reached after which tremendous numbers follow the coastline in a southwesterly direction; when the wind is E or NE few birds are seen because of high flight and because they do not turn southwest along the coast. Chapter 9 is a brief review of experiments on orientation. The author feels that, although visual orientation on the basis of landmarks is very great, there must also be a basic sense of direction—a "place

sense" or "compass sense." The former would seem to be the most probable in spring migration, the latter in fall migration. Chapter 11 is a summary of migratory activity of a few selected species and Chapter 12 is a brief discussion of fluctuations in the populations of migratory and invasion species. The final and longest chapter, *Vogeltrek het Jaar Rond*, is a summary, by months, of migratory activity in the Netherlands with illustrations (pen and ink) of many of the migratory species. The appendix contains nine useful maps. The book is well prepared, nicely written, and attractively illustrated; it could serve as an example for similar publications for other countries.—D.S.F.

67. High Jungle. William Beebe. 1949. Duell, Sloan and Pearce, 370 Madison Avenue, New York 16. xii + 379 pp. \$4.50. Primarily this is a book of natural history with intimate observations of the jungle comprising its main theme. Incidentally it includes a picture of scientists at work emphasizing the care required in making their observations and drawing their conclusions. *High Jungle* is a collection of "anthromorphic" similies obviously designed for popular reading. It consists of observations of living creatures presented with persuasive humor that perceives human qualities in even the tiniest insects. Each adventure, as that of the "immaculate earwig" (p. 140), viewed by such a keen observer has a catching enthusiasm due in large part to the broad knowledge, experiences and interests of the writer who makes thumbnail sketches of each living plant or animal with descriptive clarity. The majority of living creatures presented are from the lower forms of the animal world. Many detailed phases of the life histories of the local residents of the region and myriad migrants passing through nearby Portachuelo Pass show the inter-relationships in the animal world. Beebe paints no finished picture of any particular animal; he infers that there is much more to learn than is already known and that this learning is a scientific adventure open to anyone with the proper training and interests. The book covers with fragmentary effectiveness the ecology surrounding Rancho Grande which is a romantic unfinished palace left in the Venezuelan jungle when the local politico died in 1935. As a base of operations for the scientists it is ideally located, and Beebe achieves a picture of it and the surrounding countryside at lower elevations.—I. O. Buss.

68. Bird Migration. 3rd. Edition. (Vogeltrek, Derde, geheel derziene druk.) G. J. van Oordt. 1949. E. J. Brill, Leiden, The Netherlands. xii + 148 pp. This "completely revised third edition" differs from the previous edition primarily in the incorporation of some recent materials from the American and British literatures which were unavailable during the preparation of the manuscript for the second edition in 1943. (See *Bird-Banding*, 18(1): 48-50. 1947.) The author (p. 39) notes the recent objections of Williams to the concept of trans-Gulf migration but does not cite Lowery's extensive evidence in support of it. This revised edition contains an enlarged discussion of the possible rôle of the gonads in the stimulation of migration summarizing the increasing evidence against a primary rôle on the part of the gonads or sex hormones in this respect. The section on orientation has been revised only slightly but still represents a fair appraisal of our knowledge, or more correctly, lack of knowledge, concerning this aspect of migration. However this section could have been improved by a few critical comments on the theories of Ising (*Arkiv för Matematik, Astronomi och Fysik*, 32A. No 18. 1945. See *Bird-Banding*, 18(4): 172. 1947.) and Yeagley (*Journal of Applied Physics*, 18(12): 1035-1063. 1947. See *Bird-Banding*, 19(2): 78-79. 1948.) The latter is mentioned briefly in a footnote. Presumably the results of the experiments by Griffin and Hock (*Science*, 107: 347-349. 1948; *Ecology*, 30(2): 176-198. See *Bird-Banding*, 20(2): 104. 1949; 21(1): 22. 1950.) on Gannets have been published too recently for inclusion in this revision. There is a bibliography of 212 titles. Unfortunately, as in the previous editions, there is no index, a handicap for those who do not read Dutch well. Despite these few criticisms the reviewer wishes to emphasize that *Vogeltrek* is among the very best available general treatises on the phenomenon of bird migration and to suggest that serious consideration be given to an English edition.—D.S.F.

69. Bird Life. Edward A. Armstrong. 1949. Lindsay Drummond, 2 Guilford Place, London, W.C. 1. 152 pp. 12s 6d. In this attractive little book with its 23 excellent photographs from all over the world and 45 line drawings by E. A. R. Ennion, the author has "tried to depict how exquisitely" birds "are adapted to their surroundings, how significant are the details of their adornments and habits when studied in their natural setting, and how remarkable are their relationships to one another." The 16 chapters, starting with Light and Life, and Migration, and ending with Chains of Food and Life, and Birds and Men, largely deal with behavior. A vast amount of up-to-date information is given in chatty, informal style, with apt analogies between human and animal behavior often pointed out. There is no index and scarcely an authority is definitely cited. One would like to know more about many matters, for instance: "It has recently been discovered that many brightly-coloured birds have a nasty taste, whereas dull and cryptically-coloured birds are good to eat." (p. 66.) But the only examples given of "dazzling," but unpalatable species are king-fishers and swallows. On page 127 we are told that: "In Cashmere a pheasant-tailed jacana became so worried by a photographer's hiding-tent close to her [*sic*] nest that she trundled all her eggs away over the water-lily leaves and through the water to another place," and a sketch is given of the bird pushing the egg along with his bill, not pulling it under him as Hoffmann describes for the same species. (With Jacanas the male, not the female, incubates both in this species and in *Jacana spinosa* (Linnaeus) as reported by A. H. Miller, 1931, *The Condor*, 33: 32.) Did the bird *push* the eggs or *pull* them? We need to know the reference. The statement is made, "Among herons the female has to show submissiveness before she is allowed to join the male. (p. 36.) This is the interpretation of one observer, but is not accepted by many others. One wonders whether a book like this, no matter how well done, does not give the impression that most problems in the study of bird behavior are pretty well solved; it certainly gives no aid in investigating questions that intrigue the reader.—M. M. Nice.

70. Studies of Waterfowl in British Columbia: Green-winged Teal. J. A. Munro. 1949. *Canadian Journal of Research*, D. 27: 149-178. A fine study of *Anas carolinensis* Gmelin, its migration, reproduction, molt and food. Birds banded in southern British Columbia have been recovered south to California and southeast in New Mexico and Oklahoma. "Egg-laying begins in May; there is some loss of early clutches through crow predation compensated for by later, and usually more successful, nesting. . . . The average number of young in 48 broods counted in July, and 17 broods counted in August, was the same, *viz.* 6.2. This high survival rate may be attributed in part to the spirited defense of young commonly practiced by the female parent." Of 4264 banded birds, 2225 were male, 2039 females. The food consists chiefly of seeds of aquatic plants and of insects.—M. M. Nice.

71. The Life of the White Stork. Fr. Haverschmidt. 1949. E. J. Brill, Leiden. 96 pp. 5.75 guilders. An admirable monograph based both on the author's intensive observations of *Ciconia ciconia* Linnaeus in Holland and on a discriminating synthesis of the large and scattered literature. There are four maps and 38 splendid photographs by the author; bibliographies for each of the three parts of the book and a good index. The first part deals with distribution in Africa, Europe and Asia; with censuses, and fluctuations in numbers. White storks nest throughout most of Europe except France, Italy, and Greece, where they have been killed by the inhabitants.

The largest part of the book is devoted to "The Nest Life." The earlier the arrival in spring, the better the chances for successful nesting. Males usually come first; when a female takes up a nest alone, she is very apt to lay several infertile eggs, which are thrown out when a male arrives. Once a lone female refused to welcome any other Stork, defending her nest fiercely from all comers until July 15, when she at last allowed a mate to stay, but this was too late for breeding. "Storks are not very clever builders. . . ." (p. 30) and it would be impossible for a pair to build the great nest and raise a brood in the same year. Both birds bring nesting material throughout the season. Some nests have been

inhabited for centuries. An occupied Stork nest has a great attraction for wandering Storks, apparently mostly immature birds; fights over the nests are often disastrous to the eggs. From censuses in Holland and three German provinces it was found that the number of young raised per occupied nest varied from 0.3 to 1.8 in a bad year to 2.2 in an average year and 2.4 to 2.7 in an especially favorable year. Each year the results were strikingly similar in all these localities. From 1934 to 1940 (and from 1941 to 1945 in Holland only) the sequence was: one very good year, two average years, two bad, one very good, two average, two bad, two average. In normal and favorable years from 12 to 20 percent of the pairs raise no young, but in bad years this may be true of over 50 percent. Storks usually start to nest at the age of four and five years, although a few do so at three years, but seldom raise young. It is interesting to note that bad years followed three and four years after especially favorable ones. Nesting success is strongly influenced by weather conditions as well as by the age composition of the breeding population. Part Three deals with the migration to South Africa. The Stork is a "high-soarer," making use of ascending air currents. It is estimated that at least 170,000 birds take the southeastern route to their winter home, and some 4,000 the western route by Gibraltar. (p. 81.) Great numbers of young Storks have been banded in the nest and much of interest has been thus discovered. The young leave in the fall before their parents and in some cases nest mates travel together, for twice two, and once three from the same nest were taken in the same region on the same or following day in Spain, France, and Italy. Some year-old birds have been taken in summer in their winter quarters in Africa. As to return to their birthplace, most Storks tend to return to that vicinity, although two have been found nesting 400 kilometers distant and two 600. A very valuable contribution to biology.—M. M. Nice.

72. The Natural History of Nonsense. Bergen Evans. 1946. Alfred A. Knopf, 501 Madison Ave., New York. 275 pp. \$3.00. In his chapter, "Wolf! Wolf!" Prof. Evans of the English Department of Northwestern University does good service in throwing doubt upon the tale of the Wolf-children of Midnapore that has found its way into college text-books in this country and Europe. Other chapters expose an amazing array of superstitions and prejudices held by the uneducated and educated in our civilization on matters of race, physiology and a host of other subjects. If only he had confined himself to mankind! In matters of natural history he has no background and appears to believe implicitly anyone who tries to explode accepted opinion. The most unfortunate example is his reliance on J. A. Loeser's "Animal Behaviour," undoubtedly the worst book on this subject published in many a year (see *Bird-Banding*, 12(4): 184-185. 1941.). On his authority we are told (p. 35): "Newborn ducks do not appear to know how to swallow. Chicks cannot at first distinguish their food from any other substance, and are completely at a loss to know what to do with it until the mother shows them. (Alas for the fate of the millions of chicks each year hatched in incubators!) In an experiment young moorhens starved to death with food before them because they were not shown how to peck." [Moorhens are Gallinules and are fed by their parents for the first three weeks.] "Actually all animals above the level of fish are incredibly helpless at first." (p. 34.) (What about amphibia, reptiles, precocial birds, antelopes, guinea pigs, etc.?) Similar dogmatic and preposterous statements about animals abound throughout the book. To quote Professor Evans: "It can do a great deal of harm to be ignorant of physiology or zoology or anthropology, and the harm that may result from forming an opinion without evidence, or from distorting evidence to support an opinion, is incalculable." (p. 274.)—M. M. Nice.

73. List of Yukon Birds and Those of the Canol Road. A. L. Rand. 1946. National Museum of Canada Bull. 105. 76 pp. This brings together and succinctly presents the previously published but widely scattered distributional information on Yukon birds, as well as the erstwhile unpublished data secured in 1943 along the Alaska Highway by C. H. D. Clarke, and those obtained by the author in 1944 along the Canol Road between Johnson Crossing and Macmillan Pass. The list contains 173 species and subspecies of 36 bird families. An addi-

tional 18 species and subspecies are regarded by the author as hypothetical. All Yukon specimens in the National Museum of Canada in 1944 are listed and many useful taxonomic comments on them are made. There is an excellent account of previous work in Yukon; a useful bibliography; a map, with key, showing localities mentioned in the text; and an index. In such a vast, ecologically varied area much of course remains to be done, particularly in the central and northern parts, but access to southern Yukon is now facilitated by the Alaska Highway. This will accelerate study there. The work here reviewed provides a solid foundation on which ornithologists can build in future.—W. Earl Godfrey.

74. The Developmental Physiology of Animals. (Ontwikkelingsfysiologie der dieren.) C. P. Raven. 1948. *Noorduijns Wetenschappelijke Reeks*, No. 31. 223 pp. J. Noorduijn en Zoon N.V., Gorinchem, Netherlands. 4.90 guilders. This is a general treatise of the physiology of fertilization, the physiology of the fertilized egg, the origin of the germ layers, histogenesis, organogenesis, chemodifferentiation, etc. Since the sources of information are primarily invertebrates and amphibians, the book has only general applicability to birds. Science in this country could be aided extensively by a series of inexpensive authentic reviews such as the series to which this book belongs.—D.S.F.

75. A List of Swedish Birds. (Förteckning över Sveriges Fåglar.) Prepared by the *Sveriges Ornithologiska Förening* under the direction of Ulf Bergström, Carl Edelman, and Gustav Rudebeck. 1949. Bokförlaget Svensk Natur, Stockholm. 100 pp. 5:50 kronor. This little paper-covered book is principally an annotated list of the birds of Sweden. The principal list contains 355 species; for each there is the scientific name, the most acceptable common name, and status and distribution (by provinces) in Sweden. Attention is given to changes in abundance and ranges. In species in which more than one subspecies occur in Sweden, the binomial specific name is given; under this the subspecies are listed and treated in separate paragraphs. In cases of intermediate populations, it is so indicated nomenclatorially, e.g. in magpies, "*Pica p. pica* \leq *Pica pica fenorum* Lönnb." There is a list of ten introduced species and a hypothetical list of eleven. This compact book contains an amazing amount of useful information.—D.S.F.

76. The Lapwing. E.A.R. Ennion. 1949. Methuen and Co. Ltd., 36 Essex St., London, W.C. 2. vii + 47 pp. 6 s. This is the first of a series of *Field Study Books*, published under the auspices of the Council for the Promotion of Field Studies and under the editorship of Doctor Ennion. This series is directed to the older school child, to the teacher, and to the general lay reader with the hope that it may stimulate actual serious field studies. *The Lapwing* appears to achieve this objective admirably—and in the finest literary presentation. The book is organized into twelve chapters, in general one being devoted to the activities of Lapwings during each of the months. Although the presentation is simple, these chapters are filled with important fundamental aspects of avian biology such as gonadal cycles, courtship, territorialism, display flight, migration, etc. There are four colored plates. A series of similar books devoted to North American birds would doubtless be effective in stimulating field studies in this country.—D.S.F.

77. The American Wild Turkey. Henry E. Davis. 1949. Small-arms Technical Publishing Co., Georgetown, South Carolina. viii + 319 pp. \$5.00. Primarily an account of fifty years of wild-turkey hunting in South Carolina by an unusually observant hunter. A lawyer by profession, Mr. Davis has had far more experience with Wild Turkeys than most biologists who write about them (the reviewer included), and he recounts charmingly this wealth of hunting lore. Observations on life history and ecology of the turkey are on the whole biologically sound. The author recognizes that ecological influences such as logging, fires, etc., are basic in determining carrying capacity of turkey range. Management of habitat is properly emphasized along with management of the actual turkey

stocks. A strong case is made for perpetuating only pure-strain wild birds without permitting hybridization with domestic strains. On the other hand, Mr. Davis follows the traditional hunter's line of reasoning on the importance of predators in determining long-term trends in turkey numbers; all predators are vermin. The real interest of the book is not in its biological interpretations but in the myriad of first-hand observations of turkey habits and behavior.—A. Starker Leopold.

78. The Wild Turkey in Alabama. Robert J. Wheeler, Jr. 1948. Alabama Department of Conservation. Montgomery. ix + 92 pp. Investigations in Alabama of the Wild Turkey, *Meleagris gallopavo silvestris* Vieillot, began in 1939 as part of a state-wide inventory of game resources. Results of that survey are summarized in the present paper by Wheeler but are reported elsewhere in more detail (A Game Inventory of Alabama. Frederick S. Barkalow, Jr. 1949. Ala. Dept. Cons. Montgomery. x + 140 pp.). Wheeler's report is largely concerned with a local study of turkey life history and ecology, conducted during the period 1942-1946 on a 2200-acre refuge in Clarke County (Sal Springs Game Sanctuary). The discussion of life history follows more or less conventional lines and good data are included under some of the headings—especially food habits, weights and growth rates. Many topics are merely summarized, however, with relatively few quantitative data being offered. The subject of management is treated with more than usual care and thoroughness, emphasis being given the matter of maintaining food-producing clearings in the forest and of manipulating plant successions generally. The whole report is curiously devoid of outside references, though the author is obviously cognizant of the literature.—A. Starker Leopold.

79. The Game Birds in Hawaii. Charles W. Schwartz and Elizabeth Reeder Schwartz. 1949. Board of Commissioners of Agriculture and Forestry, Territory of Hawaii. 168 pp. The principal game birds of Hawaii, all introduced, are the pheasants referred to by the authors as *Phasianus torquatus torquatus* Linnaeus and *Phasianus versicolor versicolor* Linnaeus and their "hybrids"; California Quail, *Lophortyx californica* (Shaw); Lace-Necked Dove, *Streptopelia chinensis* (Scopoli); Barred Dove, *Geopelia striata* (Linnaeus); Japanese Quail, *Coturnix coturnix* (Linnaeus); the feral Rock Dove, *Columba livia* (Gmelin); and the Jungle Fowl, *Gallus gallus* (Linnaeus). For each of these species there are notes on the introduction to Hawaii, present distribution and population, life history in Hawaii, evaluation of range in terms of requirements of the species, and recommendations in management practices. Included are extensive notes on food habits. There are brief discussions of the less successful exotic game species. There also are brief discussions of "former native game birds." The Hawaiian Goose, *Nesochen sandvicensis* (Vigors), is now reduced to "... less than 50 ...". The population of the Hawaiian Duck, *Anas platyrhynchos wyvilliana* (Sclater), on Kauai, where most of them occur, is estimated at 500. Shooting, which is still allowed, must be discontinued. The present population of the Hawaiian Stilt, *Himantopus himantopus knudseni* (Steneger), estimated at 1000, is in a precarious position. Marked decline in the winter population of the Pacific Golden Plover, *Pluvialis dominica fulva* (Gmelin), brought about a closed season in 1941. It is estimated that 74,000 plover resided in Hawaii during the winter of 1946-1947. The important predators are exotic species, particularly rats and mongooses. This little book is most attractively prepared and appears to delve profoundly into the problems of management of game birds in Hawaii.—D.S.F.

80. Pyramid Valley. The Story of New Zealand's Greatest Moa Swamp. Roger Duff. 1949. The Association of Friends of the Canterbury Museum, Christchurch, New Zealand. 47 pp. This is a concise interesting account of this interesting moa swamp which has yielded 140 skeletons of four genera. Several kinds of data indicate that *Dinornis* (the giant moas), *Pachyornis*, and *Emeus* were extinct before the first moa-hunter immigrants reached the South Island, no later than 1000 A.D. This indicates that the Pyramid Valley moas were accumulated up to about 2000 years ago. The concentration of moa skeletons, which may be

as high as 800 per acre, is probably to be explained on the basis of breaking through the peat crust, "... as a skater through pond ice."—D.S.F.

81. The Sandhill Cranes. Lawrence H. Walkinshaw. 1949. Bulletin No. 29, Cranbrook Institute of Science, Bloomfield Hills, Michigan. x + 202 pp. This important monographic treatise is the product of fifteen years' investigation requiring seventy thousand miles of travel in Alaska, the United States, Cuba and the Isle of Pines. Attention is given to the four recognized subspecies: Little Brown Crane or Lesser Sandhill Crane, *Grus canadensis canadensis* (Linnaeus); Greater Sandhill Crane, *Grus canadensis tabida* (Peters); Florida Sandhill Crane, *Grus canadensis pratensis* Meyer; and Cuban Sandhill Crane, *Grus canadensis nesiototes* Bangs and Zappey. Chapter 2 (pp. 6-20) deals with molts and plumages including measurements with reference to subspecific differences. Voice is described in considerable detail in Chapter 3 (pp. 21-28); there are apparently no distinct subspecific differences. The Cuban Sandhill Crane is apparently much quieter than the other races. The chapter on behavior summarizes much interesting information on flight, swimming, walking, running, and particularly the "Cranes' Dance." This peculiar behavior is performed without regard to "... age, sex, season, place, or time of day." It was observed in a young female captive at the age of five days. There is a rather astounding deficiency of data on pairing, primarily because so little banding has been done. Little territorial defense has been observed but this may be the result of spacious breeding areas in which there is little competition. Thirty-seven pages are used to describe in some detail the nests and nesting of the four subspecies. "The Crane from Fall to Spring" (pp. 110-127) is a résumé of information on migration and wintering. Apparently the range of the Lesser Sandhill Crane formerly extended farther eastward; its numbers have decreased in Hudson Bay and Baffin Island; but it has maintained itself better than the other North American subspecies. Flocks of 30,000 to 100,000 are still reported. The population of the Greater Sandhill Crane, because its range has been exploited to a much greater extent, has been reduced much more drastically with the greatest decrease occurring between 1870 and 1915. Most of its original range has been abandoned. The estimated population in the United States is less than 2000; it has apparently been increasing during the last 10-15 years. The Florida Sandhill Crane formerly occurred in Louisiana; an estimated 25 pairs now breed in Mississippi (1940). The last Alabama breeding record is for 1911. Possibly the greatest numbers in the Okefenokee Swamp, Georgia, occurred in Civil War times, between the disappearance of the Indians and the influx of the whites. The range in Florida has become severely restricted. The estimated present size of the Florida Sandhill Crane population is about 2650. The Cuban Sandhill Crane has been decreasing in numbers; it is still shot for food. Its population is reaching a dangerously low level. More refuges are needed to preserve the populations of the Lesser Sandhill, Greater Sandhill, and Florida Sandhill Cranes. These are only a few samples from the great fund of information in this book. Sometimes the amount of information is bewildering to the defiance of conclusions by the reader; one wishes that the author had included more summarizing paragraphs. There is an unavoidable deficiency of information on natural longevity and related phenomena. There are eleven pages of bibliography and 17 plates. Appendix A is a key to the cranes of the world. Appendix B is a listing of distribution records with appropriate citations to the literature. This book will certainly take its rightful place among the important reference monographs in American ornithology.—D.S.F.

82. Guide to Glacier National Park. George C. Ruhle. 1949. Campbell-Mithun, Inc. 1370 Northwestern Bank Building, Minneapolis, Minnesota. 184 pp. \$1. (plus 15c for mail orders). This excellent little guide book is primarily a series of annotated logs for the highways and trails of Glacier National Park. An already extensive usage of his copy, as attested by its well-worn condition, has demonstrated to the reviewer the usefulness and the meticulous accuracy of the logs. Glacier National Park, in addition to its majestic mountain scenery, has a special interest to ornithologists in that it is one of the few places, if not the only place, in this country where the breeding areas of such Arctic-Alpine

species as the White-tailed Ptarmigan, *Lagopus leucurus altipetens* Osgood, the Gray-crowned Rosy Finch, *Leucosticte tephrocotis* (Swainson); and the American Pipit, *Anthus spinoletta rubescens* (Tunstall), are readily accessible (only a few hundred yards) from a paved highway. In addition to the above-mentioned logs there are sufficiently detailed sections giving general information concerning the park; brief discussions of geology and glaciology; lists of trees, shrubs, and flowers; a list of common mammals; and a list of common birds. The lists are briefly annotated. The list of birds includes by mistake Sprague's Pipit instead of the American Pipit. The discussion of life zones inadvertently places the Douglas Fir among the characteristic plants of the Hudsonian Zone. The number of typographical errors is not unusual for a first edition. Its size (5¼ x 7⅞ inches, heavy paper covers, "Wire-o" binding) and organization insure maximum convenience for the user. This fine guide is not only the product of the author's rich experience as Park Naturalist in Glacier National Park for twelve years but likewise of an amazingly versatile and profound knowledge of the entire spectrum of natural history together with a mature philosophy of the true function of a national park. The use of this guide will enhance by many times the enjoyment to be derived from Glacier National Park by any visitor.—D.S.F.

83. Wisconsin Grouse Problems. Wallace B. Grange. 1948 (released 1950). Wisconsin Conservation Department, Madison 2, Wisconsin. 318 pp. This book is one of the series of Pittman-Robertson reports being published by the Wisconsin Conservation Department. It begins with a review of previous Wisconsin grouse work and continues with booming and hooting surveys, a kill report of a study area, three chapters on grouse numbers (and the cycle), predation studies; migration, distribution; food habits and roosting. Chapter 16 deals at length with grouse mating behavior. The subsequent chapters consider habitat and management, covering such topics as the relation of fire to grouse; habitat chronology and requirements; environmental changes; experimental management; plant succession and opportunity for grouse management. As the dates given in the project history imply, this project was done under war-time conditions and was terminated when the author entered the armed services. In my opinion, the book in its style, presentation, and research thinking runs the complete gamut of proficiency, from exceptional to poor. In many cases the two extremes are so interwoven as to neutralize the whole effort. In Chapter 1, while reviewing two grouse papers by A. W. Schorger, Grange lists a series of important excerpts from these papers and then follows several of them with remarks such as these: "The writer disagrees with the first half of the conclusion"; "The author disagrees . . ." and "The comments require considerable qualification." Without telling why he disagrees with Schorger, the writer's terse comments become meaningless and tend only to confuse the reader. In the chapter on the booming-hooting survey, the following conclusion is drawn, "The booming survey is the best index the writer knows for determining population trends." This seems to be in accord with such surveys elsewhere. In the following chapter this survey showed that Wisconsin prairie-grouse range is deteriorating by the ". . . transformation of open land to heavy brush or forest, after which both species [of prairie grouse] are permanently extirpated from the lost habitat." The ramification of this conclusion flavors most of the chapters that follow.

Grange is at his best in Chapter 6, *Characteristics of the Wisconsin Grouse Cycle*. His schematic diagrams on the amplitude of cycles are interesting and supported by some good thinking. The author's experience with snowshoe hares as well as grouse places him in a position to talk with considerable experience on the subject of game cycles. I do feel, however, that he places more credence in state kill statistics than is warranted. He states (p. 103) that ". . . it is assumed that the error from year to year is approximately the same and that it is more or less equally distributed over the state, in which case the statistics remain useful." The statistics may be useful but it is difficult to see how the error can be approximately the same from year to year when the hunters' reports, which are corrected to 100 percent range from 75 percent (1936-37) to 20 percent (1945-46 and 1946-47) of the total licenses issued. Of nesting studies on all grouse, Grange states that,

"There is, as yet, no really adequate study of grouse nests for the state." (p. 115.) Such as have been made show a mortality of "about 50 percent." The material in Chapter 9, *Predation of Grouse*, deals at length with a series of predators, but only 16 nest-predation records and nine kill records are available for the three species of grouse. In the following chapter on *Special Studies of Predation*, pellets were gathered from roosts and from tethered young horned owls and marsh hawks and showed that grouse predation was virtually nil. However, the writer states that "While data on the relationship of marsh hawks to grouse are meager they seem ample to conclude that marsh hawks are probably a consistent but small factor in the mortality of young on the study area." (p. 136.) The data presented in this chapter showed that in two hawk nest-studies (Tables 28 and 29) only two prey items in 131 (1.5 percent) recovered at the nest site were known to be grouse. This to me does not seem ample to draw any conclusion about the consistency of predatory relationships between the two species. Again in the chapter on *Grouse Food Habits* (page 153), he states of ruffed grouse, "In the list of plant foods from project birds, birch appears only once . . ." but in the Summary, Table N, no birch is listed for ruffed grouse or pinnated grouse, and only once in a sharp-tail crop. However, in the same page under the main ruffed-grouse foods, birch is listed second to aspen in importance. These may be minor discrepancies but there are a sufficient number of such which in aggregate shake the reader's confidence in any but the most obvious deductions. The chapter on *Roosting Habits of Grouse* is interesting and well written, as is the description of grouse mating behavior. It is only when he speaks of "significance" of certain behavior patterns that his interpretations show a lack of familiarity with American and foreign research in bird behavior. When dealing with *Relation of Fire to Grouse*, Grange again exhibits sound ecological thinking and while not all biologists would subscribe completely to his thesis, his reasoning is very convincing. The most important recommendation made on management is, that we begin "here and now" to manage land to prevent the further loss of our prairie grouse. Who, familiar with Wisconsin grouse problems, would deny that this indeed is the proper course of action?

The entire book is refreshingly free from the reduction of biological phenomena to page-long formulae in integral calculus, but in spots the data could well use the clarifying aid of simple biometrical tests of significance. In the chapter on *Forecasting Game Cycles*, I was unable to decipher whether the formula used in forecasting had its roots in higher mathematics or in some mystical system of numbers. In summary, of the material presented, these general impressions remain: that there are many categorical statements and a lack of documentation; that there are numerous ambiguous and contradictory passages; that the manuscript was either hastily written or edited; that there are many excellent ideas and new approaches to grouse management: that the writer does not hedge in stating what he believes to be true and that the time for action to save the prairie grouse is now (1950). Despite its many shortcomings, I believe this book deserves the attention and scrutiny of thinking conservationists and sportsmen alike. I would rather work through a book such as this and glean just a few new ideas from a man like Wallace Grange than to glide through a flawless presentation lacking in originality and ecological ingenuity. The Wisconsin Conservation Department has taken the wise and progressive attitude toward its research reports, namely making them available in attractive bulletins.—Robert A. McCabe.

84. A Check List of the Birds of Ohio, with Migration Dates for the Birds of Central Ohio. Donald J. Borrer. 1950. *The Ohio Journal of Science*, 50(1): 1-32. Dr. Richard A. Popham, Business Manager, Botany and Zoology Building, Ohio State University, Columbus 10. \$1.00. This very useful condensed treatise consists of five separate lists. *Species based on specimens* is a briefly annotated list of 320 species. Location of critical specimens is given for unusual records. When there is more than one race of a species the races are included under the *species* and not as separate items. With this practice the reviewer heartily concurs. *Hypothetical list*, containing 28 species, is based on ". . . old records of specimens that cannot now be located, or on sight records."

Extirpated species consists of a list of eight. Nine species are included in the list of *exotics* which the author observes to be incomplete. *Hybrids and others* includes a list of six hybrids and three species known from bones obtained from Ohio Indian mounds. Of particular importance is the *Table of Migration Dates for the Birds of Central Ohio*. (pp. 14-29.) For each species there are annotations on its status, earliest arrival date, average arrival date, average departure date, and latest departure date. References are given for unusual records. A very useful publication.—D.S.F.