"L" is shortened to ½", bent upwards at an angle of 40 degrees. Apart from holding fewer birds, this design seems as effective as the large Mason, having caught up to five tree sparrows at once. Compared to such small automatic traps as the single-cell Potter, it has the advantage of taking many more birds; it has the disadvantage of requiring a gathering cage, and the location and size of the shelf where it is to be used may determine whether the design will be useful at a given banding station. Dimensions might be reduced another inch in length, width and height if necessary. While the 8" height has the incidental advantage of affording more space inside a trap covering a small area, it was designed to accommodate a weatherproof hopper made of a quart Mason jar, of the type with a two-part lid. The rim of the lid is bolted to the shelf through pieces of wood, ½" thick and arranged in a V with the opening toward the main part of the shelf. The jar may then be screwed into the rim, upside down, and readily removed for refilling. The center insert in the lid is not used.—E. A. Bergstrom, 233 Ridgewood Road, West Hartford 7, Connecticut.

RECENT LITERATURE

Reviews by Donald S. Farner and others

BANDING

(See also Numbers 28 and 31.)

1. The Activities of the Ornithological Station at Ottenby (Sweden). (Verksamheten vid Ottenby fagelstation 1947.) Gunnar Svärdson. 1948. *Vår Fagelvärld*, 7(1):25–44. Included in this paper is a table of observations on the migratory movements (15 June to 18 November) for 126 species. During 1947, 3780 birds of 164 species were banded. Most frequently banded were the European Robin, *Erithacus rubecula* (Linnaeus) 518; the Swift, *Apus apus* (Linnaeus) 393; and the White Wagtail, *Motacilla alba* Linnaeus. Fourteen recoveries of birds banded previously are listed. A White Wagtail, banded 11 September 1947, was recovered in Turkey 13 October 1947. A Wood Sandpiper, *Tringa glareola* (Linnaeus), was banded 24 July 1947 as a juvenal and recovered in Italy 15 August 1947. A Godwit, *Limosa lapponica* (Linnaeus), banded as a juvenal 17 September 1946, was found dead in Spain 1 November 1946.—D. S. F.

2. Recovery in the Netherlands of Birds Banded in Foreign Countries. (Terugvondsten van in het buitenland geringde vogels, 21). C. G. B. ten Kate. 1948. *Limosa*, 21(1): 23-27. Fifty-two recoveries in the Netherlands of birds banded in other countries are recorded. Among the interesting records are those of a Mallard, *Anas platyrhynchos* Linnaeus, banded in Abbotsburg, Dorset, England as an adult 26 December 1938 and recovered at Biesbosch in fall of 1946; and five Teal, *Anas crecca* Linnaeus, banded in England in fall or winter and recovered in fall or winter in subsequent years in the Netherlands.—D. S. F.

3. Annual Report of the Ockenburgh (Netherlands) Banding Station for 1947. (Jaarverslag 1947 van het Ringstation "Ockenburgh.") M. J. Tekke. 1948. *Limosa*, 21(1): 19-21. During the year reports were received on 27 birds banded at this station and recovered elsewhere; four birds banded elsewhere in the Netherlands were trapped during the year. Banding activities resulted in the marking of 2100 individuals of 41 species. Those banded most abundantly were the Starling, *Sturnus vulgaris* Linnaeus, 727; the Chaffinch, *Fringilla coelebs* Linnaeus, 413; the Linnet, *Carduelis cannabina* (Linnaeus) 262; and the Siskin, *Carduelis spinus* (Linnaeus), 253.—D. S. F.

MIGRATION

(See also Numbers 1, 2, 3, 28, and 33.)

4. The Mean Times of Arrival of the Red-backed Shrike, Spotted Flycatcher, Golden Oriole, and Wheatear in their European Breeding Areas. (Die mittlere Erstankunft von *Lanius collurio, Muscicapa striata, Oriolus oriolus* und *Oenanthe oenanthe* im europäischen Brutraum.) E. Stresemann. 1948. *Vår Fågelvärld*, 7(1): 1-18. This paper is a series of tabulations of arrival dates for different localities in the European breeding areas of the species. The arrival dates for the Red-backed Shrike, Spotted Flycatcher, and Golden Oriole are very similar. "Because the arrivals of all three species at different localities are in general almost coincident, it seems justified to conclude that the times of the first arrivals of these species at a given locality do not depend on the length of the migratory route but rather only on the local climate." (p. 11.) Further support of this thesis comes from an examination of the migration of the Wheatear, which departs from the Mediterranean area in mid-March. An "Atlantic series" (British Islands, Europe, etc.) proceeds northward at a much more rapid rate than a "continental series." However, both are congruent with spring isotherms. "More significantly . . . this example [the Wheatear] appears to me to show that the migration and arrival dates can be determined by the isotherms for March, April, and May."—D. S. F.

5. The Fall Migration of the White Wagtail in the Region of Helsinki. (Über den Herbstzug der Bachstelze, *Motacilla a. alba* L., in der Gegend von Helsinki.) Jukka Koskimies. 1947. *Ornis Fennica*, 24(3/4): 61-79. Observations were made on the southwest point of Helsinki during 1943, 1945, and 1946 for a total of 210 hours in 63 mornings and augmented by briefer series of observations at other points. Autumn migration normally begins about 25-30 August. During the three most intense days of migration the intensities were 373, 365, and 358 birds per day. The early migrants in the season were always young birds; no adults were observed before 5 September in any of the years. In the latter part of September the adults become predominant. Altitude of flight varied from 15 meters to 55 meters being generally lower and more uniform over sea than over land. The general direction of fall migration of this species is SE—SSE as indicated by recoveries of banded birds. However, the observed directions of flight in migration varied considerably. *Reverse migration* in fall occurs quite prominently. The author feels that it is quite possible that the reverse migrants are young birds. On certain days reverse migration may be equal to, or even exceed, normal migration. In the morning, the first migrant was usually observed 15-20 minutes after sunrise and migrants were usually seen for 1½ - 3 hours. About 50 minutes after the maximum of normal migratory movements occurred the first reverse migrants appeared. The maximum of reverse migration occurred about one and one half hours after the maximum of normal migration. This difference in time indicates that the reverse migrants must have spent some time, perhaps a half hour, on the outer cliffs, 15-20 kilometers from shore. There is an involved discussion of the possible role of meteorologic factors in the migratory movements of this species.—D. S. F.

6. Some Observations of the Autumn Migration of the Red-throated Pipit in South Sweden. (Nyare observationes rörande höststräcket av rödstrupig piplärka (*Anthus cervinus* Pall.) över södra Sverige.) Gustaf Rudebeck. 1947. *Vår Fågelvärld*, 6(3/4):125-136. These observations and others indicate the possibility that a portion of the Scandinavian population of this species may have changed from the traditional southeasterly migration to a southwesterly migration.—D. S. F.

7. On the Migrations of *Merops apiaster* Linnaeus and *Merops superciliosus* Linnaeus in the Middle East and India. H. P. W. Hutson. 1947.

The Ibis, 89(2): 291-300. This paper is based on notes made during the author's tour of military duty in Egypt, Syria, Iraq, Persia and India during the years 1939-1945. Both the European Bee-eater, *Merops apiaster* Linnaeus, and the Blue-cheeked Bee-eater, *Merops superciliosus persicus* Pallas, pass through Egypt in spring migration, the latter appearing in Cairo about the fourth week in March, three weeks before the arrival of the former. "My impression was that there were two main routes through Egypt, one down the Nile Valley and the other along the eastern desert littoral and the Suez Canal. Both species use both routes." (p. 292.) Bee-eaters were first recorded in Palestine late in March although possibly there is an earlier movement; only the European Bee-eater was observed. In Syria bands of this species were seen throughout the latter half of April and the first half of May. "Its main route through Syria would seem to lie along the valley at the foot of the Lebanese Hills." (p. 294.) The route of the Blue-cheeked Bee-eater is not clear. "As a guess — I would say that *Merops superciliosus* comes by way of the Persian Gulf and spreads up the Tigris and the Euphrates through Iraq and into the north-eastern corner of Syria." (p. 294.) In Palestine fall migration of the European Bee-eater was in progress by mid-August. The fall migration of this species seems to follow the route used in spring. The Blue-cheeked Bee-eater moves south through Egypt from August to October; however, the author does not have information as to how the birds from Syria fit into this stream. Migration is usually in bands of about 20; however, sometimes there are flocks of more than 100. Flight is quite high so that birds are often heard before they are seen. Flight at night was noted "once or twice" at Cairo, also once in the Sinai Desert. Feeding on insects interrupted daytime flight.—D. S. F.

8. On the movements of the Swift, *Micropus a. apus* L., during the Breeding Season. Jukka Koskimies. 1947. *Ornis Fennica*, 24(3/4): 106-111. The author believes that the perplexing migration-like movements of swifts during the breeding season "are evidently weather-flight reactions, by means of which the birds avoid the center of approaching bad weather, temporarily moving to localities where the weather is more favorable." The majority of these movements are by young non-breeding birds. The fact that adults cannot resist hunger more than two or three days, whereas nestlings can withstand fasts of a week, gives a theoretical basis for assuming that breeding adults also participate in these movements.—D. S. F.

9. Daily Movements of Yellowhammers and Chaffinches in Early Spring. (Iakttagelser över gulsparvens och bofinkens dagliga flygrörelser våren 1945.) Bertel Klockars. 1947. *Ornis Fennica*, 24(3/4): 79-81. On the east coast of the Gulf of Bothnia single individuals of *Emberiza citrinella* Linnaeus and *Fringilla coelebs* Linnaeus were observed in April 1945 to fly regularly in the morning to small islands along the coast. During the day they occupied territories and then returned to the mainland to feed and spend the night.—D. S. F.

10. Physical Basis of Bird Navigation. Joseph Slepian. **Remarks on: "A Preliminary Study of a Physical Basis of Bird Navigation"** Russell H. Varian. **Remarks on: "The Physical Basis of Bird Navigation"** Leverett Davis, Jr. 1948 *Journal of Applied Physics*, 19(3): 306?308. These are three "Letters to the Editor" discussing Yeagley's recent paper (See *Bird-Banding*, 19(3): 78-79). Slepian does not disagree with Yeagley's hypothesis as stated but argues on physical grounds that it is not possible to detect variation in the earth's magnetic field due to motion, with which both Varian and Davis agree. The latter two writers do not believe that it is possible for a bird to be sensitive to the Coriolis force. They also make the suggestion, which will seem naïve to biologists, that avian orientation may be accomplished by observation of the sun or the stars. These letters should be read with Yealgey's paper.—R. O. Bender.

PHYSIOLOGY

(See Numbers 8, 10, 15, and 27.)

FOOD HABITS

(See Numbers 23, 24, and 28.)

NIDIFICATION AND REPRODUCTION

(See also Numbers 27, 28, and 29.)

11. The Significance of Clutch-Size. Parts I & II. David Lack. 1947. *The Ibis*, 89(2): 302-352. Deriving data largely from regional ornithologies and other published sources the author demonstrates that there is a tendency for average clutch to increase northward and southward from the tropics in most species of passerine-birds, "near-passerines," owls, hawks, herons, terns, gallinules, various galliform species, some grebes, and a few limicoline species. This trend is apparently absent in gannets, petrels, pigeons and doves, loons, and thick-knees. There is a tendency also, towards increasing clutch-size from west to east in the same species which show a latitudinal increase; it is likewise lacking in those which show no latitudinal increase in clutch-size. The data suggest that "while there is probably a tendency for average clutch-size to be smaller on the Mediterranean islands than on the adjacent mainland, the difference is slight." Among passerine species with two and three clutches per year, the average clutch-size increases from early spring to about June and decreases thereafter. Seasonal variation is lacking in doves, and the repeat layings of ducks and geese, galliform species, and ralliform species tend to be smaller than the initial clutches. Annual variations in clutches are lacking or slight in most species of birds. However, the clutches of many species of hawks and owls increase in response to increased numbers among the prey species. Certain African passerine species and bustards show increased clutch-sizes in years of good rainfall.

The author rightfully points out that there has been much confusion in discussions about clutch-size because of failure to distinguish between "the ultimate factors affecting survival value and the proximate factors affecting physiological control." (p. 314.) The author assumes that, for many species, average clutch-size is genetically determined and has been evolved through natural selection. Presumably the selective factor is the available amount of food for the young. Hence, "*in nidicolous species, the average clutch-size is ultimately determined by the average maximum number of young which the parents can successfully raise in the region and at the season in question, i.e.* that natural selection eliminates a disproportionately large number of young in those clutches which are higher than the average, through the inability of the parents to get enough food for their young, so that some or all of the brood die before or soon after fledging, with the result that few or no descendants are left with their parents' propensity to lay a larger clutch." (p. 319.) In higher latitudes longer days allow more time for the parents to gather food, hence larger families and larger clutches. The problem of explaining the west-east increase in clutch-size is perplexing, since, despite slightly later nesting dates, the slight increase in day-length could hardly explain the increased clutch-size. The author suggests that compared to the British Isles there is more food available on the Continent, hence the higher clutch-size. There is scant evidence to support this suggestion, however. An important source of evidence in support of the author's theory of selection on the basis of available food comes from parasitic species. In both cowbirds and cuckoos the elimination of young or eggs of the host is such that the increase in weight from hatching to fledging among the parasitic young in the nest is equal to the would-be increase in weights from hatching to fledging of the eliminated

young or eggs. Asynchronous hatching in many hawks and owls may be adaptation which insures the survival of *some* young in periods of smaller food supply in which the last young hatched die allowing the survival of the first hatched. The author also suggests that, in addition to nidicolous species, clutch-size is limited by available food in parent-fed nidifugous species. "To conclude, the available evidence suggests that food for the brood limits clutch-size of gallinaceous and various limicoline birds, but in many northern Limicolae, the upper limit of c/4 (four eggs per clutch) is secondarily reinforced, if not originally determined, by requirements connected with incubation and with the mechanism of egg-laying." (p. 328.) This is a most interesting discussion and consideration of the available data. The theory of regulation of clutch-size by natural selection is ingenious; it fits a substantial number of the cases and appears quite plausible. However, before its final acceptance more precise data are needed for large numbers of species together with an examination of these data in terms of other possible explanations. This is a very important paper.—D. S. F.

12. The Significance of Clutch-size. Part III, Some Interspecific Comparisons. David Lack. 1947. *The Ibis*, 90(1): 25-45. Having discussed variations in clutch-size within the species (Parts I and II) the author turns to variations between species, genera, families and orders. He concludes that clutch-size is characteristic for each genus and, to a less marked extent, for each family of birds. Within the family the same trends toward increasing clutch-size with increasing latitude were observed as were noted within the species. The relationship between clutch-size and nestling period was examined for mid-European passerines excluding the Corvidae. It was found that large clutch-size is associated with a longer nestling period which can be explained on the basis that, given the same amount of food, it is possible to raise either a small family quickly or a large one more slowly. (p. 29.) Since the increased nestling time increases the exposure to predation and nest losses from other causes, these factors were investigated and the conclusion reached that all the mid-European passerines with large clutches have comparatively safe nesting sites. These conclusions are less certain and may not apply to many non-passerine birds.

This investigation should serve to stimulate purposeful observation of clutch-size, nest location, nesting success, the rate of gain in weight of the young, the frequency of feeding, and of the abundance of food, by field ornithologists throughout the world. This, in the opinion of the reviewer, constitutes the primary value of these papers since much direct evidence will be required before Lack's ideas can be considered to be soundly based, as he must have realized when he wrote "this view has much to recommend it *a priori* and in addition there is much circumstantial evidence in its favor." (Part I, p. 319.)

The relationship between food supply and survival has been stressed more and more in recent papers, including this one, but there are few instances in scientific writing of so much discussion on so little evidence. Thorough field studies of this relationship are sorely needed and would represent a major contribution to our present theories of speciation, adaptation, and survival. Attention should be paid to the possibility that small quantities (relative to the total food requirement) of essential nutritive elements might prove to be the controlling factor.—R. O. Bender.

13. The Significance of Clutch-size in the Alpine Swift. (Die Bedeutung der Gelegegrosse beim Alpensegler.) David Lack and Hans Arn. 1947. *Der Ornithologische Beobachter*, 44(5): 186-210. This paper presents the results of 16 years of observation by Arn of a breeding colony of Alpine Swifts, *Apus melba* Linnaeus, at Solothurn, Switzerland. Lack, proceeding from the assumption that the characteristics of a species are ultimately determined by natural selection, attempts to show how the theory applies to the determination of clutch-size for this species, using Arn's data. After determining the distribution pattern

for clutches of various sizes, the authors consider the problems which it presents. The principles of natural selection require that only the clutch-size which has maximum survival value should normally be found. If there are consistent variations in clutch-size, it should be possible to show that under the conditions existing the variant sizes rather than the normal possess the maximum survival value, *i.e.*, produce the most young per pair.

Arn's data show that of 1090 clutches observed, 710, or 66 percent, consisted of three; 325, or 30 percent, consisted of two; 29, or three percent, consisted, of one; and six, or 0.6 percent, consisted of four eggs. Several problems are immediately apparent. Since three is the most frequent clutch-size, the authors try to determine whether the data demonstrate that it has maximum survival value and conclude that it does. Their data show that an average of 0.98 young are raised per pair from a one-egg clutch, 1.7 young from two-egg clutches, 2.3 young from three-egg clutches, and approximately 2.4 young from four-egg clutches. The last figure is based on only a few observations (six out of 1090), but still represents too many to be considered an accidental mutation. Four-egg clutches require further observation. Since if the data given can be confirmed, the arguments presented elsewhere in the paper become invalid, it is suggested that a family size of three produces more young per pair because that is the largest number which can normally be supplied with food. The evidence presented consists principally of references to other papers and, while impressive, is not conclusive. It is shown that neither hatching success nor post-fledgling survival are related to clutch-size, but other factors such as exposure of the nest location, mortality due to disease or parasites, or the physical condition of the parents are not discussed. Clutches of one egg are attributed in part to young birds nesting for the first time although in an earlier paper Arn had expressed the belief, based on banding data, that these young birds laid mostly two-egg, occasionally three-egg clutches. They are also attributed in part to "accidents" not otherwise defined which interrupt what would have been a normal clutch. Normal action of the principles of natural selection would tend to eliminate any hereditary tendency to lay a clutch having such a low survival value, hence one-egg clutches cannot be governed by hereditary factors and must be due to something else, *i.e.*, "accidents."

Clutches of two eggs are discussed in several parts. Approximately 16 percent of the 30 percent representing the proportion of two-egg clutches in the total number are regarded as the first layings of young birds. This is not considered to be due to sexual immaturity on the part of the parents, but is rather an adaptive modification related to the greater difficulty which inexperienced parents may have in feeding a larger brood. Survival data for broods raised by young and old parents would clarify this point, but such data are not available due to the impossibility of recognizing young birds as such unless banded. Approximately four percent of the 30 percent consisted of clutches laid approximately two weeks later than the normal laying time. Some of these represent second layings of parents whose first clutch had been destroyed, others represent first layings of young birds. There were also some three-egg clutches laid during the late-nesting period. Average clutch-size for all of the late nesters was smaller and average nesting success was lower, which, it is suggested, represents the effect of an adaptive modification related to the greater difficulty involved in securing food in late summer. (Data to substantiate a greater difficulty of securing food in late July and August would be desirable.) However, although three-egg clutches still produced a greater number of young per pair than did two-egg clutches, they were laid proportionately earlier (but less than two weeks earlier) than those of two eggs which might account for their greater success. There remain about ten percent of the 30 percent to be explained in other ways. Concerning these, it is pointed out that since Solothurn is a growing colony, the conditions existing might favor a family size of three, whereas one of two might be more favorable in static populations.

The date when egg-laying commences (around the end of May), which varies from year to year, is shown to correlate with weather conditions at the time, but clutch-size is independent of either the date or the weather. Average clutch-size does, however, vary from year to year correlating with nesting success, *i.e.*, in years of larger clutches more young are raised per pair. This is thought to be due to an adaptive modification which influences the hereditary tendency to lay a smaller number of eggs, although the mechanism by which it functions is not known. (It is difficult to understand how unknown future events can modify hereditary tendencies to anticipate the subsequent effect of those events. On the other hand since the overall average clutch-size (2.4) is under that which gives the maximum number of young per pair, the observed increase in nesting success could be effect rather than cause.) Data are presented showing that some females tend to lay a clutch of three nearly every year, but others are inconsistent. One female alternated between a clutch of three and four and another between three and two.

This reviewer does not believe that the authors have presented a convincing argument for their beliefs that clutch-size in this species is governed by natural selection. Only one reason need be given. All of the evidence which they present indicates that clutches of two eggs or of one egg have markedly lower survival value under *all of the conditions* examined. This could not be the case if natural selection were controlling clutch-size. While the authors suggest some ingenious explanations for this state of affairs they are not convincing. This paper would be a valuable contribution if the evidence had been presented in a way which recognized the possibility of more than one controlling mechanism.—R. O. Bender.

14. The Significance of Clutch-size in the Partridge (*Perdix perdix*). David Lack. 1947. *The Journal of Animal Ecology*, 16(1): 19-25. The author's compilation of data shows the mean clutch-size for first layings to increase from south (14.6 in England) to north (17.6 in Finland and 16-18 in Norway) and from west (14.6 in England, 14-16 in Belgium) to east (16-20 or 15-20 in central Germany and in eastern Galicia). American clutches average about 17, similar to those from the regions from which the introductions were made. There are annual variations in the average size of first layings. Clutch-size is not limited by potential egg production since females may be induced to lay more than 50 eggs per season, nor do the data indicate that clutch-size is selected through the number of eggs which the incubating bird can cover. Through these considerations and others the author concludes that clutch size is probably determined by selection of brood-size on the basis of food availability.—D. S. F.

15. Incubation Temperatures of Canada Geese. Charles W. Kossack. 1947. *The Journal of Wildlife Management*, 11(2): 119-126. The average incubation temperature of the embryo was found to be 101.3° F.; the average shell temperature, 100.4° F.; the average breast temperature, 101.1° F. The incubator temperature of 99.5° F. was too low and lengthened the incubation period five days.—D. S. F.

16. Nest-building Habits of the Yellow-tailed Thornbill. K. A. Hindwood. 1947. *The Emu*, 46(5): 323-325. The nest of *Acanthiza chrysorrhoa* (Quoy and Gaimard) is normally double, the lower part being the actual nesting chamber and the upper, a cock-nest. In the author's observations of a single pair, apparently only the female incubated. The male never entered the egg chamber although he constantly added material to the cock-nest. In observations on other nests the author discovered that both sexes shared in the activities of nest building and feeding the young. The male did not use the cock-nest for roosting.—D. S. F.

17. Nesting Habits of the Kookaburra or Laughing Jackass (*Dacelo gigas*). K. A. Hindwood. 1947. *The Emu*, 47(2): 117-130. The species normally

nests in hollows of trees or in holes although unusual sites are sometimes employed in cities. Those studied by the author excavated a hollow in clay loam above the rock-face in an old quarry. Observations were made over three seasons, during each of which a single brood was recorded. Two months elapsed from the laying of the first egg to the departure of the young. "The parents continued to feed the young, with lessening interest, for at least six weeks after they had left the nest." Incubation period was 25-29 days. Young forcibly eject liquid feces beyond the entrance to the nest. Food consists of small snakes, lizards, mice, fish, frogs, chickens, nestlings, eggs of smaller species of birds, and many species of insects.—D. S. F.

BEHAVIOR

(See also Numbers 23, 26, 32, 39, and 50.)

18. The Behavior of the Black Woodpecker. (Het gedrag van de Zwarte Specht, *Dryocopus m. martius* (L.).) *Ardea*, 35(1/2): 1-44. This paper is based on observations in a woodland near Ede, Netherlands, 1932-1943. The average territory of a breeding pair was calculated to be about 850 hectares; comparative data are given for Germany (400 hectares), Bohemia (120-180 hectares), and Finland (800-1800 hectares, with one case of 3000 hectares). From August until March the birds wander through a still larger area. Territorial instinct is poorly developed; intruders of the same species are seldom chased and often half-finished nesting-holes were abandoned at slight provocation. Drumming period begins at the end of January and lasts until the young leave the nest. The males drum a maximum of 30 times per day; the females less. Drumming reaches a maximum in March. The calls are (1) the "quee-quee-quee" which occurs particularly in March and is primarily a call to the mate, (2) the "cliäh" which is uttered when the bird is disturbed, (3) the flight call which is used only in flight and only when disturbed, (4) the "Jackdaw" call which is used when the members of the pair are together and, (5) a "tuuk-tuuk" which "is exclusively heard in some stage of courtship." Three "instrumental sounds" are noted: (1) drumming, (2) knocking, and (3) "tokkeln." The first two have social function; whether "tokkeln" has a social function is not determined. These are thought to be derived from normal feeding activity. "The forms of display are, like the instrumental sounds, derived from other movements. 'Maatslaanz', which is a part of the courtship, is the ritualized derivate of the characteristic movements of smashing an ant-hill. The nest-hole is indicated to the partner by an incipient forward movement of the head, demonstrating of the intention to enter the hole; it is a ritualized Intentions-bewegung (Heinroth)." The female takes a leading part in courtship. Copulations begin the first part of March and last six weeks. The nesting hole is made in a beech tree and nest building lasts about one month. Incubation period is 12 days. The male incubates during the night and during much of the day. Young are fed by regurgitation from the crop of the adult. Male and female participate alike in the feeding. The male spends the nights with young in the nesting hole. The young leave the nest 27 days after hatching. —D. S. F.

19. Magpie Larks—A Study in Behaviour. Angus Robinson. 1947. *The Emu*, 46(4): 265-281, 46(5): 382-391, 47(1): 11-28, 47(2): 147-153. This paper is based on observations of two years on 560 acres in West Australia where Magpie Larks, *Grallina cyanoleuca* (Latham), have become increasingly common during the past 40 years. "With the first heavy rain, the urge to breed is manifested by the return to their former breeding grounds where, if the birds are not already mated, mating will commence. Mated birds will probably have the previous years territories to go back to, but unmated birds will have to search

for some area not already taken up where they will advertise their ownership by duets and display and, if there is no opposition, they will settle down to breed." (p. 266.) The species is strongly territorial during the breeding season; resident pairs will defend territory to a certain extent throughout the year. Nesting sites are usually near water. Both sexes are active in selection of the nesting site; agreement is necessary for a successful clutch. In general the sexes share alike in nest building. Eggs are usually laid between 7 A.M. and 9 A.M.; the normal clutch is three or four eggs. Forty eggs produced 21 young, of which 16 left the nest. The species is very susceptible to climatic conditions. Second broods sometimes occur. Ten vocalizations are recorded with suggestions as to their functions. Four "main types" of display are noted: (1) *territorial display* with raised wings and spread tail, (2) *courtship display* with lowering and flipping of tail, (3) *nest display* in which "the birds apparently use the old nest to stimulate each other to build," (4) *flight or plane song display* in which the bird while singing "planes or volplanes" to the ground. Two types of flock display were observed. In *eccentric flying*, the birds "dash madly through the trees weaving their way in and out in a miraculous fashion . . ." *Soaring flight* was observed only during the "mating season" and consisted of soaring "like miniature eagles round and around, criss-crossing each other at great height . . ." This is performed with intermittent descents by the flock to a tree.—D. S. F.

20. Notes on the Problem of Geographical Differences in Tameness in Birds. J. S. Huxley. 1947. *The Ibis*, 89(4): 539-552. This is an interesting discussion concerning differences in tameness within a number of species and even subspecies of birds. The author feels that there is reason to believe such differences to be genetic.—D. S. F.

LIFE HISTORY

(See also Numbers 8, 9, 16, 17, 18, 19, 47, 48, and 50.)

21. Observations on the Red-breasted Merganser at Schleimunde. (Etwas vom Mittelsäger. (Beobachtungen 1938 auf Schleimunde.)) Hans v. Torne. 1940. *Beiträge zur Fortpflanzungsbiologie der Vögel*, 16: 173-180. The author watched from a blind four nests of *Mergus serrator* Linnaeus; the behavior of all the birds was amazingly alike. On sunny days the females usually left the nest four times a day—from 5 to 6 A.M., a "short time" about 8 A.M., from 11 A.M. to 3 P.M., and finally from 6 to 7 P.M.; except for the short period, the males joined their mates on their outings. On rainy days the females left about 5 A.M. for half an hour, again at 9 A.M. for a half-hour, and for an hour at noon and 6 P.M., the males accompanying them each time. After the young hatched, their fathers left to molt. The ducklings fed themselves to some extent from the first but were also fed considerable amounts by their mothers. The young sometimes sat on their mothers' backs, but the author never saw them being hovered on land by their mothers.—M. M. Nice.

22. Ortstreue of the Eider, Velvet Scoter, and Goosander during the Breeding Season. (Über die Ortstreue von *Somateria m. mollissima* (L.), *Oidemia f. fusca* (L.) und *Mergus m. merganser* L.) Sven Nordberg. 1942. *Ornis Fennica*, 19(3): 73-80. This is a summary of observations made on the Åland Islands during the summer of 1939 by marking incubating females with eosin or methylene blue. Four eiders, two scoters, and two goosanders were thus marked. For the period of approximately two months after hatching the eiders were never observed as much as a thousand meters from the nest. In general the same was true for the scoters. The goosanders showed much more movement,

being frequently observed at 1500 to 2000 meters from the nesting site and often showing considerable movements from one day to the next.—D. S. F.

23. The Breeding Biology of *Aquila verreauxi*. Part I. E. G. Rowe. 1947. *The Ibis*, 89(3): 387-410. **Part II.** *The Ibis*, 89(4): 576-606. This paper records the results of an exhaustive study of a nest and nestlings of Verreaux's Eagle in 1943-44. Over 1000 hours were spent by the author and his native assistants in watching this nest. These are supplemented by 300 hours of observations in 1946. The observations were made near Nbulu, Tanganyika Territory. The eagles ranged over about 100 square miles although the hunting range was about one quarter of this. The previous year's offspring as well as buzzards, hawks, and ravens were combatted by both male and female. Pelecans, some of the vultures, and all small birds were tolerated. Both parents shared in the incubation of the two eggs. During the first month after hatching it was largely the female that attended the nest. Young were shaded by the parents for more than a month. After the first month the male no longer spent any time at the nest; the female spent about 66 percent of her time at the nest. After the second month the parents spent only four percent of their time at the nest; just enough to deliver food. The second chick was frequently maltreated by the first-hatched (three days older). The first chick received more food than the second. Five days after hatching the second young disappeared from the nest. "As to the causes of the younger chick's death, I would say maltreatment, starvation and exposure in conjunction." (p. 589.) "For the first six weeks or so of the fledging period the male was seen to bring the prey to the nest more often than the female, and even when the latter carried the food the male often accompanied her." (p. 589.) The first chick, hatched on 27 July, embarked on its maiden flight on 1 November during the absence of the parents. For three months thereafter the family remained as a unit. By the end of April the adults were driving off the offspring of the previous year. This fine study has a wealth of very important information, far more than can be noted in a brief review.—D. S. F.

24. Observations on Hawks in South Celebes. (Roofvogelwaarnemingen in Suid-Celebes.) L. Coomans de Ruiter. 1947. *Limosa*, 20(4): 213-228. These are notes from Makassar, Paré-Paré, Bodjo, and Bolong from 1942 to 1945 on 18 species. Included are observations on voice, food, ecology and migration.—D. S.F

25. The Hatching and Fledging Success of Some Coot. Ronald Alley and Hugh Boyd. 1947. *British Birds*, 40(7): 199-203. Fourteen pairs were watched during 1946 at Blagdon Reservoir, North Somerset; 121 eggs were laid, of which 42 (34.7 percent) hatched; 28 young were fledged (23.1 percent of the total of the eggs laid). Carrion Crows, *Corvus corone corone* Linnaeus, took 19 of the eggs and people ten, while parents buried ten through the addition of material during incubation. Adult Coots attack and may kill trespassing young, as the latter do not learn until three weeks old to stay within their own territories.—M. M. Nice.

26. The Behavior of the Ruffs Breeding on the Heath North of Turnhout, Belgium. (Comportement des Chevaliers combattants, nicheurs dans la bruyère au nord de Turnhout.) Aug. de Bont and A. F. de Bont. 1947. *Le Gerfaut*, 37(1): 14-21. This paper is based on observations of a breeding population of *Philomachus pugnax* (Linnaeus) during the course of several breeding seasons. Ruffs arrive later than other shore-birds and five days to three weeks later than in Holland. They occur in flocks of seven to twenty and spend most of the time seeking food. During the first days after arrival the Ruffs were observed to fly very little and to be very calm. Gradually the behavior changes as the gonads develop and courtship begins. They seek a special biotope, the damp heaths with a short and scattered vegetation. During this period flocks of

Ruffs, including males with slightly developed gonads, arrive and may frequent places where the breeding birds have their battles; the two groups do not intermingle. After copulation the females build nests and the males in general disappear from the area. During the latter part of June practically no males are seen. The females nest usually within a kilometer of the area where courtship occurred.—D. S. F.

27. On the Attainment of Breeding Age and the Whereabouts of Non-Breeding Birds, especially Shorebirds and Seabirds, during the Breeding Season. (Ueber den Eintritt der Geschlechtsreife und über den Aufenthalt nichtbrütender Vögel, inbesondere Strand- und Seevögel, zur Brutzeit.) Herbert Ringleben. 1940. *Beiträge zur Fortpflanzungsbiologie der Vögel*, 16(1): 10-23. A review article with 51 references. Many problems as to non-breeding populations are pointed out. The author thinks some of these remain south of their breeding grounds because of richer feeding facilities.—M. M. Nice.

28. Observations of a Breeding Colony of Swifts, *Apus apus apus* (Linnaeus) in Oltigen, Switzerland. (Am Neste des Mauerseglers, *Apus apus apus* (L.). Beobachtungen an einer Brutkolonie in Oltigen von 1934-1946.) E. Weitnauer. 1947. *Der Ornithologische Beobachter*, 44(Beihefte): 133-182. Herr Weitnauer, a school-teacher in Oltigen, first observed Swifts in that village in 1933, when he found two nests, apparently the only ones in the village. Beginning the next year the growing colony was studied carefully, using bands, for twelve years. It is on the data thus gathered that this treatise is based. In many ways it parallels the earlier thorough study on the Alpine Swift, *Apus melba melba* (Linnaeus), by Arn (*Schweizerisches Archiv für Ornithologie*, 2: 137-181. 1945). In 1934 two young Swifts were found in a nest containing four desiccated dead young House Sparrows. Also young Swifts were found in a Starling nest with dried Starling eggs. Swifts were observed to take another nest box from the Starlings; examination showed two young Swifts and five dead young Starlings. The first Swifts arrived in Oltigen in spring, on the average about 3 May. The earliest departure from the box in morning in warm clear weather was 3:10 A.M.; the latest arrival at night in midsummer on clear bright days was 9:00 P.M. The author's "Vogeluhr" showed not a single case of departure or arrival during the night. However, many times Swifts, particularly first-year birds and seldom breeding birds, would be absent for one to three days before returning. In three definite cases the male was known to choose the nest site. If both members of a pair return in spring the mating partnership of the previous season or seasons continues. The author has one record of duration of a pair for six seasons. Swifts become sexually mature the second year. Males and females both carry nesting material, which included straw, hay, moss, hair from seeds, chicken feathers, elm seeds, bud scales from beech, etc. On the average the first egg was laid about 18 May, approximately two weeks after the arrival of the birds. "Of 79 exactly controlled clutches, two contained four eggs, 53 clutches three eggs, 22 clutches two eggs, and two clutches one egg. There are females which begin with a two-egg clutch and in later years always lay three, while others without any rule lay sometimes two and sometimes three." (p. 181.) If the weather is favorable before the laying of the first egg and during the laying of the first clutch, the three eggs are laid in three to four days. The incubation period was found to be 20 days. Both the male and female incubated. "If shortly after the eggs are laid cold rainy weather with temperatures of 10°C. or less appears, it so occurs that the old birds remove and throw out one of the eggs or even the entire clutch." (p. 181.) In such cases another clutch of never more than two eggs is laid about 14 days later. This as a rule is too close to departure date to produce young which leave the nest. During the period of this study 79 clutches contained 213 eggs; from these 162 young were hatched and 141 left the nests. Both male and female feed the young; food is brought in balls

in the pharynx. On warm clear days the young were fed as many as 35 times. This was much reduced on cold days. Hence weather and temperature are reflected in growth rates. A young Swift weighed regularly during the summer of 1937 reached adult weight (about 45 grams) about 15 days after hatching and remained above adult weight (45 to 63 grams) almost continuously until leaving the nest. Thirty young were carefully measured at regular intervals; remiges and rectrices reached adult length at 40-42 days; bills attained adult dimensions at 20 days; head length was adult at 33 days and length of appendages at about 20 days. Often the adults left the colony one or two days before the young flew from the nest. First-year birds and adult males left first. On the average the first Swift departed about 1 August. During feeding the speed of flight was calculated at about 60 kilometers per hour; in rapid flight, about 200 kilometers per hour. There are fifteen excellent photographs. This is an important paper. —D. S. F.

29. In the Territory of the Black Woodpecker. (Im Revier des Schwarzspechtes.) Ludwig Gebhardt. 1940. *Beiträge zur Fortpflanzungsbiologie der Vögel,* 16: 52-60. Observations on the nesting and roosting habits of *Dryocopus martius* (Linnaeus). At one nest male and female took turns at incubating, the male staying on the nest at night; during the latter part of the nestling period, only the female fed, and she raised two of the three young; it seems probable that the male had been killed. The Stock Dove, *Columba oenas* Linnaeus, nests in old holes of this large Woodpecker; the author saw Black Woodpeckers carrying out two sets of the Dove's eggs.—M. M. Nice.

30. Notes on the Red-Billed Leiothrix in Hawaii. Harvey I. Fisher and Paul H. Baldwin. 1947. *Pacific Science,* 1(1): 45-51. *Leiothrix lutea* (Scopoli) has been introduced into Hawaii no less than 41 times since 1911; at least 1,037 have been introduced. The species is now established and increasing its range on Hawaii, Oahu, Molokai, Kauai, and Maui. A cover of close dense vegetation is apparently the major habitat requirement. On Hawaii it is most abundant in the forests from 1,000 to 5,000 feet with 40 or more inches of rain per year. Descriptions of nests, eggs, and young are given. The proportion of animal food including Hymenoptera, Diptera, Lepidoptera, and Mollusca, to plant food including various fruits and stems, varied from all plant to all animal food although the usual proportion was from 40:60 to 60:40.—D. S. F.

31. Bigamy in a Black Redstart. (Bigamie beim Hausrotschwanz.) Oskar Hoehl. 1941. *Beiträge zur Fortpflanzungsbiologie der Vögel,* 17: 30-31. A male *Phoenicurus ochrurus gibraltariensis* Gmelin, banded while nesting on a factory in 1937, was found in 1940 nesting in the same place, but with another mate also in a nest 100 meters distant on the other side of the building. The male fed the young in both nests alternately; second nests were started at the same time by both females and again the male fed both broods.—M. M. Nice.

32. House Sparrow Feeding Young Serins. (Haussperling als Girlitzamme.) Oskar Hoehl. 1940. *Beiträge zur Fortpflanzungsbiologie der Vögel,* 16: 64-65. A female *Passer domesticus* Linnaeus busied herself helping feed four nearly fledged *Serinus canarius serinus* (Linnaeus) despite the objections of the parents; she even brooded them one night. The next afternoon in six hours, the male Serin fed four times, the female every once in 30 to 60 minutes, the House Sparrow every 15 minutes. Serins feed seeds by regurgitation, and the insects brought by the Sparrow either fell out of the nestlings' mouths or were spit out. "At least 10 times she picked the food up from the nest and stuffed it into the bills of the shrieking young."—M. M. Nice.

33. The Biology of the Pine Grosbeak. (Taviokuurnan, *Pinicola e. enucleator* L., biologiasta.) Pekka Grenquist. 1947. *Ornis Fennica,* 24(1): 1-10.

This paper is based on data collected during the period 1935-1945 in Kemi (65° 44′N), Finland. Data include observations during spring migration, fall migration, and winter residence. During the winters such as 1939-1940 and 1942-1943, following a season of prolific production of mountain-ash berries the birds were abundant. In 1943-1944, when there was a complete lack of mountain-ash berries, the birds appeared only in spring and fall migration. Further indication of the dependence of the species on the berries comes from the data of the winter of 1943-1944. As the supply of berries dwindled the birds became less frequent; they disappeared in January when the supply of berries was exhausted. During the winter maximum activity occurred during the morning and evening hours. Pronounced activity and restlessness is apparently stimulated by any sharp change in weather conditions. If there is a marked increase in temperature (up to 0° C.) in late winter when the birds are in flocks, spring migration will begin.—D. S. F.

34. Field Notes on some Madagascar Birds. Vernon D. van Someren. 1947. *The Ibis*, 89(2): 235-267. This is a very valuable set of field notes made by the author during his tour of military duty in Madagascar from November 1942 to April 1944. The notes concern 90 species and subspecies.—D. S. F.

CENSUSES AND POPULATIONS

(See also Numbers 18, 28, and 50.)

35. A Comparison between the Census-area and Linear Methods in the Quantitative Estimation of Bird Densities. (Ein Vergleich zwischen Probflächenmethode und Linienstaxierungs-bestandes.) Sven Nordberg. 1947. *Ornis Fennica*, 24(3/4): 87-92. The author compares the results of the application of these two methods in an open coniferous forest as they apply to 23 species of birds. Four linear censuses were made through one census plot and two through lack of the other three. In the linear censuses all birds within a distance of 25 meters on each side of the line were recorded. For a single linear count it was found necessary to increase the density by 50 percent to make the estimate comparable to that obtained from the plot count if two linear censuses were made, the necessary increase was found to be 15 percent. In terms of dominance (percentage occurrence of each species in total count) the results were remarkably similar. The greatest difference occurred in the Chickadee, *Parus atricapillus* Linnaeus, where the linear counts gave a dominance of 8.9 and the plot counts a dominance of 3.6. Nineteen species were recorded in the linear counts as compared to sixteen in plot counts.—D. S. F.

36. One Year's Census and Study of Birds in 2½ Acres of Albany Bushveld. (Part 2.) April, 1945, to March, 1946. C. J. Skead. 1947. *The Ostrich*, 38(2): 155-165. The year 1945-1946 was a year of severe drought in South Africa and the census data gathered are of great interest when compared with those of the previous year. The density per acre dropped from 11.5 in 1944-1945 to 8.3 in 1945-1946. The species seen in the greatest number of censuses both years was the Sombre Bulbul, *Andropadus importunuus importunuus* (Vieillot), (103 out of 120 censuses, 1945-1946); the species seen in the greatest number both years was the Speckled Coly, *Rhabdocolius striatus striatus* (Gmelin), (517 seen in 70 censuses in 1945-1946.)—D. S. F.

37. The Bird Population of 110 Acres in the Transkei. J. M. Winterbottom. 1947. *The Ostrich*, 18(2): 175-178. Three censuses taken in open grassland near Umtata in October and November 1945 gave an unusually low density, 142 per 100 acres. Of interest are the citations, from the literature and unpublished sources, of densities (birds per 100 acres) from other censuses from Africa: tropical grassland, Tanganyika, 4,000 (unusually high because of the

presence of a Weaver-Finch colony); damp grassland, North Rhodesia, 1,569; dense scrub bushfeld, East Cape Province, 1,150; island, Lake Victoria, 570; woodland, bush, and grassland, Zululand, 540; woodland and cultivation, North Rhodesia, 517; grassland and old cultivation, North Rhodesia, 349; scrub-bush, East Cape Province, 335; scrub-bush, North Rhodesia, 310; various habitats, Tanganyika, 300; dry grassland, North Rhodesia, 299; *Brachystegia* woods, North Rhodesia, 261; Dambo and scrub, North Rhodesia, 240; Karoo, West Cape Colony, 200; grassland, Transkei, 142; grassland North Rhodesia, 128; savannah, Tanganyika, 96; open thornbush veld, East Cape Province, 84; open grassveld, East Cape Province, 65; school campus, North Rhodesia, 62.—D. S. F.

ECOLOGY

(See also Numbers 11, 12, 13, 14, 18, 23, 24, 30, 33, 36, 37, 40, 43, and 44.)

38. Notes on the Bird Life of the Porangahau District, New Zealand. John M. Cunningham and Kazimierz A. Wodzicki. 1948. *The Emu*, 47(3): 177-198. This is an invaluable set of biologic observations concerning 58 species made during four visits to the area in 1945-1946. Comparisons are made to the observations of Guthrie-Smith in 1910. Of the 48 species recorded, 18 are exotic introductions. Three species have become extinct in the area in relatively recent times. They are the Brown Duck, *Anas aucklandica* (G. R. Gray); the New Zealand Scaup, *Aythya novaeseelandiae* (Gmelin); and the Buff-banded Rail, *Hypotaenidea philippensis* (Linnaeus). The most striking changes have occurred in the "countryside" where only ten of the 25 species are native. Because the Wanstead swamp and the Porangahau estuary are the "last oasis" for many of the native species the authors urge that they be made into sanctuaries.—D. S. F.

39. Does the Merlin Sometimes Play a Role as a Protector of Fieldfare Colonies? (Spiller dvergfalken i enkalte tilfeller en rolle som beskytter av gråtrostkolonier i fjellat?) Yngvar Hagen. 1947. *Vår Fågelvärld*, 6(3/4): 137-141. Merlins, *Falco columbarius aesalon* Tunstall, often take over the old nests of Hooded Crows, *Corvus corone cornix* Linnaeus, in the midst of nesting colonies of Fieldfares, *Turdus pilaris* Linnaeus. In so doing, the Merlins drive crows and other enemies away. During early phases of feeding the young, the Merlins capture smaller birds; later they will take Fieldfares, but by this time the Fieldfares and their young have left the colony. In the author's opinion this is often a definitely beneficial arrangement for the Fieldfares.—D. S. F.

WILDLIFE MANAGEMENT AND METHODS

(See 18, 35, and 43.)

CONSERVATION

(See Numbers 38, 40, 41, 43, and 44.)

AVIFAUNAL DYNAMICS

(See also Number 38.)

40. The Roller in Sweden. (Blåkråkan (*Coracias g. garrulus* L.) i Sverige.) S. Durango. 1946. *Vår Fågelvärld*, 5(4): 145-189. This is a thorough analysis of the available records of the Roller as a basis for studying changes of range of this species in Sweden since the 18th century. During the 18th century the Roller was a reasonably common breeding species in southern Sweden. For the first decades after 1800 there was an increase in numbers. However, after 1850

a reduction in breeding area and breeding population began and continued until in 1925 there were only three breeding localities. The author, in agreement with Lönnberg, disagrees with the suggestion that this decrease is due to competition by Jackdaws, but rather attributes the change to the maritimization of the climate, which has made the summers cooler and damper. Since the Roller appears to require a more continental climate with hot, dry summers, this suggestion seem, to be logical. The author also suggests that the northern movement of this species in Russia and the Baltic states is due to population pressure caused by eastward movement of the population of western Europe.—D. S. F.

41. Species of Birds Exterminated by Man and the Causes of their Extermination. (Om utrotade fågelarter och orsakerna till deras utdöende.) Pontus Palmgren. 1944. *Ornis Fennica.* 21(1): 15-25. Of the species which have become extinct at the hands of man, about 50 were insular species ; one was Australian; four were North American; and one, the Great Auk, *Pinguinus impennis* (Linnaeus) was a North Atlantic littoral species. "That more North American birds with continental distribution have been exterminated while the Eurasiatic continental avifauna has not suffered a corresponding loss, is in principle not surprising, since it is well known that the North American biocoenoses display a significant number of representatives of the primitive Tertiary biota of the northern hemisphere, while the corresponding element in the western Eurasiatic, because of the east-west mountain-ranges and the seas (Mediterranean, Black, Caspian) could not escape the Pleistocene glaciation and was therefore widely deciminated. It is also to be assumed that in the North American species there are preserved relatively less adapted inherited tendencies." (p. 24-25.) There is a discussion of the individual histories of the extinct North American species, pointing out the salient factors in their extermination.—D. S. F.

SYSTEMATICS

42. The Two Phases of *Astur novae-hollandiae* (Gm.) in Australia. H. N. Southern and D. L. Serventy. 1947. *The Emu,* 46(5):331-347. The status of the white and gray goshawks in Australia has long been a matter of discussion. A careful scrutiny of the facts reveals that the concept of a simple north-south gradient, with increase in the white phase to the exclusion of the gray in Australia, as had been previously supposed, does not hold. Actually it appears that the heaviest proportion of gray phase occurs from Cairns to Queensland with white phase increasing northward and northwestward as well as southward from this area. The complete lack of intermediate specimens suggests that the mechanism is unifactoral. It cannot be said with certainty whether gray or white is dominant, but the evidence favors the former. There does not appear to be selective mating although the evidence is not extensive.—D. S. F.

BOOKS AND MONOGRAPHS

43. Our Plundered Planet. Fairfield Osborn. 1948. Boston. Little, Brown. 217 pp. $2.50. A noteworthy book. A clear picture of the devastation man has caused within historical times in every continent by over-grazing with sheep, goats, and cattle, by deforestation, drainage, and ruinous methods of farming. As he is destroying his means of living, at the same time "the population of the earth has increased almost five times within the last three centuries and doubled even within the last century . . . *now* . . . there are no fresh lands anywhere." (p. 35.) The facts are irrefutable; man, unless he speedily begins to use biology, ecology, common sense, and co-operation, is headed straight for misery. Mr. Osborn gives us a grim warning, but fails to point out a clear and dynamic program for our salvation.—M. M. Nice.

44. Road to Survival. William Vogt. 1948. William Sloane Associates, New York. xvi + 335 pp. $4.00. It is impossible to exaggerate the importance of this book. With unanswerable logic we are shown how everywhere man is destroying his only means of livelihood—the natural resources of the earth—and at the same time increasing his population at an insane rate. Man's situation is this: all the energy with which he refuels himself—food, hydroelectric power, coal, petroleum, even atomic forces—come from the sun; his "bodily energy can reach him only through the slender channels of millions of green plants." (p. 18.) Man has not understood his dependence on the soil and the living web of forests, grass, birds, and animals; in the past with axe and goat he has made fruitful lands into deserts; today with vastly increased power he is doing the same thing, but much faster.

"Except on a few, small Old World areas, forests are not being used on a sustained-yield basis; they are being inexorably wiped out. Grasslands are nearly everywhere being overgrazed; our own ranges have been critically hurt, and the 'Cow Bloc,' as a *Collier's* author called it, is doing everything in its power to give them the *coup de grace*—to get rich quick. Water tables are falling, and more rivers are getting out of hand." (p. 79.) Cattlemen are trying to take over the "small amount of grazing land within our national parks, although the total area of these is only 71/100 of 1 percent of the United States," (p. 31.), while the government subsidizes soil erosion by its floor under wool prices and protective tariff on wool. Yet most of the other continents are in far worse shape than ours, for in this country we have made a beginning in conservation.

Man believes he lives in a vacuum and fancies the answer to his difficulties lies in industrialization—"the Great Illusion." Industrial communities live only as parasites upon rich lands, and up till now, by extracting their riches. "The American standard of living was bought by permanent destruction of . . . one-third of our top-soil." (p. 67.)

Thanks to the "dangerous doctor," sanitation has decreased death rates and prolonged life with the result that in many lands more people live in greater misery. "American nutritionists calculate that 2.5 acres [of arable land] are required [per person] for an adequate standard of living," (p. 194); there are only 2,600,000,000 acres of such land in the world to support two billion and a quarter people, and each day there is a *net* increase of 50,000 in the population. "The ten [countries] with the highest rate of increase are China, India, Formosa, Mexico, Egypt, Puerto Rico, U.S.S.R., Chile, Philippines and Albania—all over-crowded countries with extremely low standards of living." (p. 74.) Yet almost all countries, including our own, are over-populated; some experts think we should be far better off with 100 million people instead of 140 million.

The book is a scholarly treatise, authoritative, convincing, and thoroughly documented with nine pages of references, four pages of annotated reading list and 32 pages of the best index I ever met, yet it is absorbing reading, incisive, clear, and brilliant. It is not a gloomy book; it is a spirited call to action.

Mr. Vogt shows us the terrible ecological dilemma into which we have got ourselves; he tells us what to do to be saved. We must adopt scientific thinking. We must make the catastrophic situation clear to all the world. We must concentrate upon research and education in conservation and zealously practice it. We must do the same with birth control. Unless we control populations and restore resources, "unless, in short, man readjusts his way of living, in its fullest sense, to the imperatives imposed by the *limited* resources of his environment—we may as well give up all hope of continuing civilized life. Like Gadarene swine, we shall rush down a war-torn slope to a barbarian existence in the blackened rubble." (p. 288.)—M. M. Nice.

45. The Flame Birds. Robert P. Allen. 1947. Dodd, Mead & Co., New York. 333 pp. $5.00. Perhaps no North American bird holds more glamor for the amateur ornithologists than the Roseate Spoonbill, *Ajaia ajaja* (Linnaeus).

In this, his popular version of three years of research for the National Audubon Society, Mr. Allen has painted an intriguing picture of windswept keys, and dank mangrove swamps and their fascinating avian inhabitants. Entirely aside from its strictly ornithological value the book is worth reading for its depiction of the atmosphere and the animate composition of the spoonbill habitats of Florida and Texas.

The first section of the book (96 pages) deals with the early gropings of the researcher in the Florida Keys for a solution to the problem of the present scarcity of the bird as a nesting species. The second section of 60 pages contains a wealth of observations on the pairing and nesting behavior of spoonbills, particularly as it was observed from blinds in a Texas colony. The background of experience gained through detailed studies of the Black-crowned Night Heron stood Mr. Allen in good stead in analyzing and interpreting what he saw. The birds pair while in flocks and apparently at the nesting site. "Up flights" involving the entire assemblage are the first indication of sexual activity, accompanied or followed by a peculiar raising of the heads which is termed "sky gazing". Sticks are carried and presented with bobbings of the head and rubbing of the bills as the pairing bond is formed. The female selects the nesting site, remaining near it while the male defends a small territory (twenty feet in diameter at first and later decreasing in size) against intruders. The male brings sticks for the nest while the female does the actual construction. The first eggs are laid six days after copulation. Clutch-size varies from 1.9 to 3.3 in different colonies and in different years, a compensation effect being suggested. Mortality in the colony under special study was 98 percent. The cause proved to be a combination of factors: a heavy infestation of mites first weakened the nestlings, mass desertion by the parents followed, and finally a series of predatory raids by grackles destroyed the birds.

The final section of 76 pages describes adventures encountered in cruising the bays and inlets of southwest Florida for clues to the meaning of a rather large non-breeding summer population of spoonbills. Plumage studies showed these birds to be non-breeding individuals in their first and second years. Their source, possibly in Cuba, remains an unanswered question. The hope that spoonbills may again be restored as a common breeding species in Florida suggests the desirability of further research and of cooperative conservation measures on an international level.

Digressions on the instinctive and emotional nature of bird behavior (pp. 129-130) and on the meaning of survival from the biologist's and the conservationist's points of view (pp. 145-148) are outstanding features of the book. The sugar coating for popular consumption is well flavored with sound ecological thinking and well applied. A map or two and some of the sketches to be found in the more comprehensive research report (National Audubon Society, research report no. 2) would have been valuable additions.—John T. Emlen, Jr.

46. Field Guide to Birds of the West Indies. James Bond. 1947. The Macmillan Company, New York. 257 pp. $3.75. This volume serves very well the purpose for which it was intended. Its size (5 inches x 7½ inches) and weight are well suited for a field guide, and the information it contains, while concise, is in sufficient detail to make possible the identification of the birds seen in the West Indies. Both transients and endemic species are treated at equal length, there being short paragraphs on the appearance and habits of the bird concerned, and its range in the West Indies. In the case of transients, extreme dates of occurrence are given. The illustrations include a colored frontispiece of the Cuban Tody and 211 line drawings by Earl L. Poole, and there is a detailed map at the front of the book showing the geographic position and location of the numerous islands falling within the scope of this field guide. There is likewise a full-page diagram of a bird in the introduction, in which the parts mentioned in the descriptions found throughout the book are shown in detail

Having had occasion to use this guide during the course of almost two months of field work in Cuba, I soon found that it proved valuable in identifying for me the various species seen for the first time. One omission, however, that is immediately apparent, is the absence of trinomials. It is true that the casual observer will have little interest in geographic races, but there will unquestionably be others like myself who will be interested in the relationships of individuals of such species as the Mockingbird and the Meadowlark to those occurring in North America. An index of West Indian subspecies, now recognized by taxonomists, would in my opinion be a valuable addition to any future editions of this field guide. In all other respects it is a good reference book and can be recommended without reservation to those wishing to become acquainted with the bird life of the West Indies.—Thos. D. Burleigh.

47. The Feeding and Related Behavior of Hummingbirds with Special Reference to the Black-chin, *Archilochus alexandri* (Bourcier and Mulsant). Frank Bené. 1946. *Memoirs of the Boston Society of Natural History*, 9(3): 403-478. A detailed account of observations in Phoenix, Arizona, from 1939 to 1942. The Black-chinned Hummingbird "prefers the Transition zone, but it can adapt itself to the low, hot, irrigated valleys of the Southwest, where it rears a brood in spring, then departs in June or July for cooler areas, leaving behind its fledged young who remain until September when they depart for the winter range." Rather disappointing text, but remarkable photographs of hummingbirds and their favorite flowers.—M. M. Nice.

48. The Shallow Sea, Country of Eternal Change. (Das Wattenmeer, Landschaft ewigen Wandels.) Rolf Dircksen. 1942. F. Bruckmann. Munich. 220 pp. A fascinating book on the life of the North Sea coast—the landscape, the tides, the islands, the fishermen and coast-guards, seals and the phosphorescent protozoa *Noctiluca*, the rich invertebrate life of the sea coast, with two chapters on birds—breeding birds and fall migration. Herring Gulls have increased very greatly and do much damage to terns and sandpipers; some specialize on robbing eggs and young of their own kind. Excellent text and remarkable photographs. —M. M. Nice.

49. Ruffed Grouse. John Alden Knight. 1947. Alfred A. Knopf, New York. xii + 271 pp. $4.50. This is a book on the Ruffed Grouse, *Bonasa umbellus* (Linnaeus), written by a hunter with ready admission that it is not a scientific treatise. In general this premise is maintained. Together with this admission in the *Acknowledgement* and *Foreword* is a list of a half dozen of the country's prominent wildlife biologists who supplied much needed information. What each specifically contributed is not stated. In the fifteen chapters that follow there are conspicuous points denoting keen understanding and ecological insight and there are other points that give the opposite impression. The style for the most part is simple and direct with some bits of involvement. The lay hunter, for whom the book is written, will be perplexed by several paragraphs; for example, in the chapter on *Population Cycles* one reads, "The link between population fluctuations among Ruffed Grouse and solar cycles may very well resolve itself into a catalyzer in the form of terrestrial magnetic fluctuations, which in their turn affect the intensity of animal behavior." (p. 89.) The first nine chapters deal primarily with the bird itself, covering such phases as taxonomy, food habits, cover preference, cycles, pen rearing, predators, ecology, and management. It is in this section that the technical discussions are lacking in documentation. The most flagrant of these discussions on game biology is the writer's treatment of longevity and breeding stock. (p. 136.) When speaking of the "ten percent" of the grouse population that remains on the range after a "cyclic crash" he says, "It has been rather conclusively established that only those birds that have been hatched four, five, or six years before these cyclic declines have the stamina to survive and furnish seed stock for the new generations of birds to

come." If we can estimate from longevity in other Gallinae, I would say that very few Ruffed Grouse ever live to the age of five or six years. That they constitute the bulk of the population during a cyclic low is, to say the least, not "conclusively established."

Mr. Knight is on shaky ground when he groups the Snowy Owl with the Great Horned Owl as a "nocturnal" marauder (p. 47); and he errs in reporting that the drumming sound of the male grouse is made by beating its wings against the body. (p. 32.) Similar misstatements are frequently so concealed in Knight's interesting presentation that they almost escape notice. On the other hand the author's opinions and deductions on refuges (p. 97), pen-reared stock (p. 147), and predator control (p. 77, p. 133) are worthy of the most advanced game manager.

In the opening sentence of his chapter on *Clothing and Incidental Equipment* (p. 162), he writes, "Probably no two grouse hunters will ever quite agree on the design of hunting clothes and incidental equipment." This statement could also apply to the chapters on *Grouse Dogs, Guns, Loads* and *Leads* and *Hunting Methods* in which he also discusses these subjects at length. Mr. Knight's experiences under these captions are interesting and informative. The chapter on *Hunting Methods* is particularly good. Some readers may be alienated by the writer's tendency to emphasize his shooting prowess, for example (p. 109), "Then the grouse made the fatal error of giving me an open shot at him as he sailed through the timber and I folded him up." Also (p. 154) "a ringneck [pheasant] is a big bird and pitifully easy to hit" — and — "I've killed thirty-three straight in ring-neck shooting", etc. Why he concluded his book in a poor anticlimax (Chapter XV, *Poachers and Law Breakers*), I do not know. A chapter on conservation ideas expressed by a hunter would have been a better choice.

The book is illustrated with sixteen photographs and five color plates painted by Dr. Edgar Burke. The photographs by Staber Reese of the Wisconsin Conservation Department are very good. Some of the others could well have been omitted. That which faces page 115 is somewhat shocking. The top photo is lacking in contrast, the head and neck region of the bird is completely blurred, and the bottom photo labeled "Grouse in Tree" is a grouse, but it is a *Sharptail, Pedioecetes phasianellus, not* a Ruffed Grouse.

There is a three-page index which is good as far as it goes; but it is incomplete. Dr. A. A. Allen and a person named "Joe" are listed but others, including Logan J. Bennett and Ralph T. King, are omitted. The latter apparently gave freely of his important and interesting Ruffed Grouse census data. (p. 94.)

Despite its accumulation of minor errors, I enjoyed reading the book and would recommend it as a first step in understanding Ruffed Grouse rather than as a final word on the subject.—Robert A. McCabe.

50. Bird Life in Cornwall. B. H. Ryves. 1948. Collins. 14 St. James Place, London. 256 pp. 10s. 6 d. For 27 years Col. Ryves has been studying the birds in Cornwall, and in 1931 he founded the Cornwall Bird Watching and Preservation Society, which is doing admirable work in conservation. Part II of this excellent book "gives the present-day status and distribution in Cornwall of 245 species which make up its normal population, brief identification details of the less well-known birds being given." Part I is devoted to a sympathetic account of five of "the County's grander birds", and here we find much of universal ornithological interest. The Chough, *Pyrrhocorax pyrrhocorax pyrrhocorax* (Linnaeus), began to decrease in numbers during the latter part of the 19th century; now it breeds in England only in Cornwall, for the last 20 years maintaining a level of a few pairs only. Choughs pair early in life, but fail to breed for a year or two; occasionally fully adult birds will miss a year in nesting. Incubation, which is by the female only, lasts 17 days, and the young leave the nest at the age of 38 days. Colonel Ryves considers the gin trap, set for the multitudinous rabbits, as the greatest enemy of these fine birds, but he also finds evidence of

disease and lack of vigor, for sometimes he notes lame birds or unseasonable loss of feathers. As to Ravens, *Corvus corax corax* Linnaeus, here again the gin trap is a menace, as well as gunners and egg-thieves; a dramatic account is given of a nesting pair that had been robbed one year and were being watched the following year by the Ryves; although perfectly tolerant of these observers, they reacted with the greatest fury upon the arrival of two men intent on taking their eggs. There appears to be "mutual understanding" between pairs of Ravens. The female is fed entirely by her mate while she incubates. In one case a male was killed, probably by rat poison, while caring for feathering young; for three days the hen carried on alone and then was joined by a new mate that took over the duties of the dead father.

As to the Peregrine Falcon, *Falco peregrinus peregrinus* Tunstall, "Cornwall has undoubtedly provided one of the great British nurseries from which this grandest and noblest of our birds of prey—nay, the grandest of all British birds—has replenished its stock in other parts of our land. In pre-war days, it is estimated that, in favourable seasons, there has been upwards of a score of tenanted 'eyries.'" During the War, "protection was removed from the bird and a campaign of destruction was organized which resulted in the virtual extinction of the breeding stock of birds in Cornwall. This drastic action was apparently deemed necessary because of the employment of Pigeons on aircraft, for it is a well-known fact that Peregrines hunt and kill Pigeons . . . When the War ended, the order was rescinded and the Peregrine happily is now again on the scheduled and protected list." In 1946 Peregrines began to re-occupy old eyries. Both parents incubate, the female doing the larger part; young leave at about six weeks, and apparently "learn to kill by practising on the young Jackdaws," *Corvus monedula spermologus* Vieillot. Interesting detailed accounts are given of Montagu's Harrier, *Circus pygargus* (Linnaeus), and the Common Buzzard, *Buteo buteo buteo* (Linnaeus), both of which have increased of late years, the latter perhaps thanks to "game-preservation"! "Today rabbits are a menace to man. Game-preservation has so reduced or almost exterminated some of the natural foes of rabbits—stoat, weasel, polecat, marten, hawks,—that rabbits were enabled mightily to multiply," and Buzzards find an ample supply of food in the rabbits and also in other animals, caught by the gins.

There are four pages of references to Cornwall ornithology and an index, besides 16 attractive pen-and-ink drawings by R. A. Richardson.—M. M. Nice.

51. Birds of the West. Ernest Sheldon Booth. 1948. Published by the author. Walla Walla College, Washington. 397 pp. $5.00. Here is another handbook for the identification of western birds. It is not a reference book with information on natural history and behavior; rather it features the "key" system of learning birds in the field. The book was written "to teach the beginner the names of the birds in a way which will be self-explanatory, in a way which will require a minimum of effort, and no help at all from someone else."

In an introductory section, in addition to the usual acknowledgments, sources of information, statement of purposes, the appeal of bird study and methods of observation, there is an explanation of how to use the keys, a short table of comparative sizes of birds, a drawing showing the topography of a typical bird and a brief résumé of the six life zones of the western states. The comment is made that habitat is preferable to zones. The subspecies question is next discussed along with the allied problem of names. The course followed is to use the most general common name for cases where there are several subspecies and then the subspecies are listed with their ranges under the heading Distribution of the species. The general name is used under the picture.

The main section of the book from page 15 to 364 is composed of keys to all the birds of the western states, taking in the area from the western edge of the Great Plains to the Pacific Ocean, and from Canada to northern México. First comes a general key to the orders and families referred to by general names

and with page references to the treatment beyond. The second part of the keys, making up the greater bulk of the book, takes up each order and family separately. Before each big group of birds like the orders and families, a short descriptive account is given. Upon keying down a particular bird, one finds a brief description with a black and white drawing nearby. (The illustrations are by Harry Baerg and Carl Petterson.) The nest of the bird is described. Finally there is a statement of distribution or range based on the 4th edition (1931) of the American Ornithologists' Union Check-List. At the end of this is the common name followed by the scientific name. Thus if the description checks and the range fits, you arrive at the name of the bird.

An appendix deals with nests and eggs, bird photography, feeding tables and nesting boxes, bird-banding (not indicated in the table of contents), bird societies and journals, magazines of interest, and an annotated section on reference books and check-lists, the latter incomplete for the various states of the area covered. Finally there is an index to scientific names and a separate index to common names. The book is, then, essentially an illustrated key to the birds of the West, and had it been so titled prospective buyers would have a better indication of the contents.

In espousing the key system, the author states that this method has been used by botanists in identification of flowering plants and trees for many years, but it has only recently been put to use by zoologists. Keys for the identification of birds have been in use among ornithologists for several decades going back to Elliott Coues and Robert Ridgway, to mention just two. Frank M. Chapman and Florence Merriam Bailey used keys most successfully in their handbooks of an earlier generation, although their keys were subordinate to a systematic arrangement. Booth's keys follow for the most part a dichotomous arrangement with opposite statements. The first separation is into water birds or land birds, and the latter are further divided into those considered as song birds or those not considered as song birds. To a beginner this last must be a vague distinction. Considerable attention is paid to size. Habitat is frequently mentioned. The usual features of bill, foot type, and coloration constitute the principal key characters. The keys are very workable, and if one occasionally goes astray, he can identify frequently by elimination aided by the pictures. Where several subspecies occur, as in the case of Horned Larks and Song Sparrows, a map show the breeding ranges of the various geographic races, so identification of subspecies rests on the basis of geographic location.

The author himself points out several limitations to the keys. Only male birds in adult plumage can be identified accurately. With few exceptions only summer plumages are used in the keys. The keys are not extensive enough to give detailed information about the birds. This is intentional, however, so the name of the bird can be found with the least possible reading. The descriptions do not stress field characters which are often obscured in the general description. Little attention is paid to voice.

Keeping in mind the purpose for which the book was written, it seems to fill a need. This reviewer has not had opportunity of testing it out on beginning students, but it is his impression that by using this book, such people would be better able to identify unknown birds than they would by using certain other books which seem to require some prior knowledge of birds at least to the extent of being able to place them in their order and family. The illustrations are particularly helpful and wisely placed alongside the descriptions. There are, unfortunately, no colored plates but then the cost is already high for a book of this nature.—William H. Behle.

CORRESPONDENCE

To the Editor of Bird-Banding,
Dear Sir:

I wonder whether James Hodges has not misinterpreted what he reported in "A Case of Polygamy in the American Redstart," *Bird-Banding*, 19(2): 74-75, April, 1948. There was only one nest and "four nestlings"; are there any cases on record where two females build one nest and each lays only half the usual clutch? Mr. Hodges does not tell us how he ascertained that the "other female" was not *a male in immature plumage*. On the second visit, eleven days later, "the male redstart" is mentioned for the first time, but his role is not clear; he "left though I did see him previously pay attention to both females." He might have been a visiting neighbor.

The explanation of the presence of the young Cowbird in the nest on the second visit, namely, that it had been raised elsewhere and "had deserted its foster home and in wandering around came upon this nest containing a nestling, merely moved in" is most astonishing. Is it not simpler to assume under the circumstances that it was one of the four nestlings present on the first visit?

When a person comes upon a state of affairs as exceptional as Mr. Hodges believed this to be, it behooves him to study the case with the greatest care and to report his findings in full detail.

Very truly yours,
Margaret M. Nice