

and should be pushed toward the opposite end by grasping it between the thumb and first finger of the free hand. One is tempted to let the second band push the first one along, but this is apt to cause the bands to spread unevenly. When the first twenty bands have been opened, they should be pushed from the spreader onto the storage rod, the pointed end of which fits into the concave end of the spreader. Although the bands bind somewhat on the spreader, they slide freely on the storage rod.

Since twenty bands are accommodated at a time on the plate, one knows at once if any are missing from an envelope (as sometimes happens) when the plate is not completely filled on the fifth round. Bands tend to assume similar orientation on a rod held horizontally, enabling one to check all of them for numbering with minimum inconvenience.

Banding operations. If adult Chimney Swifts in which age and sex are not distinguishable are being banded in large numbers, it is most convenient to empty the bands from the storage rod into a dish instead of taking them off individually, until only a few birds remain unbanded. Where sexes can be differentiated, as with bats, one series of bands can thus be used for the males and another for the females. When only a few bands are being used at a time, the storage rods can be stuck into the ground and the bands removed from the free end.

I am indebted to Mr. Fred Pye of the University of Western Ontario for suggestions and assistance in making this apparatus.—HAROLD B. HITCHCOCK, University of Western Ontario, London, Ontario.

RECENT LITERATURE

Reviews by Margaret M. Nice

BANDING

1. Ecological Study of European Ringing Results on the Lapwing. (Oecologische bewerking van de Europese ringgegevens van de Kievit (*Vanellus vanellus* (L.)).) W. K. Kraak, G. L. Rinkel and J. Hoogerheide. 1940. *Ardea*, 29: 151-174. Ireland, Spain and Portugal are the most important winter quarters of the European population of the Lapwing. Apparently not all of the first year birds breed. Charts are given to illustrate migration and mortality, but it would have been well to have had a table also for the latter subject. Retakes of 1333 birds banded as nestlings show a very constant mortality percentage. The number of birds of a certain age seems to be always 0.6 the number of birds that are one year younger. Old age plays no role; a Lapwing of 14 years is not old. Of a population of birds 40 per cent will be yearlings, 24 per cent 2 years old, etc. This corresponds exactly with my findings on the Song Sparrow (1937, Trans. Linn. Soc. N. Y. IV: 194) where in Table XXVIII birds with 60 per cent survival—Song Sparrows under favorable conditions and these Lapwings—showed an average length of life of 2.5 years, *i.e.* of those birds that survived to breeding age. The authors reckon that 100 Lapwings in 1938 might raise 70 fledged young that in 1939 would amount to 40 yearlings. A fine example of what can be learned through banding.

2. Data from a Bird-Banding Station at Elmhurst, Long Island. Marie V. Beals and J. T. Nichols. 1940. *Birds of Long Island*, No. 3: 57-76. For eleven years Mrs. Beals has banded large numbers of birds in Queens County, western Long Island. Adult Robins and young of the year were found to return to nesting locality, the young being "trapped birds not nestlings", suggesting that the return is made "to a locality established before migration." Bicknell's and

Grey-cheeked Thrushes (*Hylocichla minima minima* and *H. m. aliciae*) were differentiated by measurements; of 378 banded there was no returns nor recoveries; this is in line with the experience of other banders with transient species. One Starling (*Sturnus vulgaris*) reached the age of eight years. The suggestion as to a possible five day rhythm of "stop-over for Warblers"—"a normal stop-over limit, which might be doubled, or doubled again" is hardly convincing.

3. The Marking of Birds. Edward R. Ford. 1939. *Summer School Review*. Puerto Rico, 17 : 7-9. An excellent popular article designed to arouse interest in Puerto Rican readers.

4. Heligoland as Home of Seabirds and Resting Place for Migrants. (Helgoland als Heimat von Seevögeln und als Rastplatz von Zugvögeln.) R. Drost. 1940. *Kal. f. Haus U. Heimat; Jahrbuch d. Landesbauernschaft Sachsen-Anhalt*; 4 pp. A popular account of this famous station for observation on migration and banding with maps and pictures of an oiled Murre (*Uria aalge*) and of the garden where vast numbers of land birds are caught on migration. Some 6,000 Guillemots and thirty Razorbills (*Alca torda*) nest on the island; Kittiwakes (*Rissa tridactyla*) returned as breeders in 1938 after an absence of 138 years. As many as 420 species and subspecies have been recorded on Heligoland.

5. The Range of German Herring Gulls according to Banding Results. (Ueber den Lebensraum deutscher Silbermöwen, *Larus a. argentatus* Pontopp., auf Grund von Beringungsergebnissen.) R. Drost and L. Schilling. 1940. *Vogelzug*, 11 : 1-22. A study of the 424 retakes of this species show that there is no real migration, but an irregular wandering that may extend as far as 550 kilometers with young birds, but only 225 for fully adult birds. Perhaps 25 per cent of retakes of birds old enough to breed were of individuals that were apparently not breeding. As to age, thirteen Herring Gulls were from 10-26 years old; the average of the 414 retakes of birds ringed as nestlings was two years; of 76 birds ringed as adults six years. Nos. 18 and 53 also deal with this species.

6. The Migration of the European Wagtails. (Ueber den Zug der europäischen Bachstelzen (*Motacilla a. alba* L. und *M. a. yarelli* Gould.) .) R. Drost and E. Schüz. 1940. *Vogelzug*, 11 : 145-161. Another valuable summary of a vast amount of banding material. Maps are given showing recoveries of the White and Pied Wagtails in their winter and summer quarters and a bibliography of 45 titles is added. Of 134 Wagtails banded as young 64.9 per cent were reported dead in the first half year—24.6 in the first month and an average of 8 per cent for the next five months; from the 6th through the 11th month the mortality averaged 3 per cent per month—a total of 80 per cent up to one year of age. This agrees well with other studies that show from 74 to 83 per cent mortality of banded young in the first year (See Nice, Trans. Linn. Soc. N. Y. IV : 187).

7. Göteborg's Natural History Museum's Ringing of Birds in 1939. (Göteborgs Naturhistoriska Museums ringmärkning av flyttfaglar under 1939). L. A. Jägerskiöld. 1940. *Göteborgs Musei Arstryck* 1940 : 91-107. At the Göteborg station 9,109 birds of 120 species were ringed in 1939. There have been 3,667 retakes of the total of 108,841 ringed—3.4 per cent. Five Black-headed Gulls (*Larus ridibundus*) have reached the age of over nine to over eleven years, while two Common Gulls (*Larus canus*) were about eleven years and one over thirteen years.

Other papers that deal with banding are Nos. 11, 18, 25, 28, and 34.

HOMING

8. Orientation by Birds. (Orientatie by vogels.) W. H. van Dobben. 1940. *Vakblad voor Biologen*, 21 (13) : 225-240. The author until recently

Director of the Holland Station for Bird-Migration, gives a convenient survey of the literature on orientation of birds during migration. Concentrations of migrants along certain obstacles or on feeding grounds convinced authors like Brehm, Naumann, Palmen and Menzbier of the theory of fixed "highways of migration." Field observations by Kezzler, von Middendorf, Gätke, von Homeyer and others showed that, as a rule, migration does not follow certain "highways", but is diffuse and divided over the entire region between breeding and wintering grounds. Under the influence of obstacles, however, concentrations frequently occur. Geyr von Schweppenburg employed here the term "*Leitlinie*", guiding line. So we have to deal with the fact that many birds find a more or less direct route from the starting point to the goal of their migration. Optical orientation, though certainly important cannot explain the orientation of night migrants, oceanic birds and solitary young birds. Drost showed the importance of temperature gradients; this is primarily of significance from the viewpoint of evolution. Orientation through the direction of the wind seems in certain cases not unlikely.

There is no essential difference between the orientation of migrants and the "homing" of breeding birds or migrants that have reached the goal of their migration. Rivière believes that in the homing of domestic pigeons there is certainly some orientation that is not optic. Tame pigeons give rather poor results in homing in comparison with wild birds. The fine experiments of Watson and Lashley and other Americans were ignored in continental Europe until Rüppell did similar experiments in Germany. Many homing experiments cannot be explained in terms of optical orientation. Among the rather fantastic hypotheses two have to be considered seriously. One is based on a kinaesthetic sense, that registers all the changes of direction which the bird has made. It is hard to prove that this sense is without importance. Some experimenters have tried to eliminate it in their homing experiments by turning the birds frequently (Rüppell), or by narcosis during transport (Kluijver). The other possible basis for orientation is a magnetic sense, as proposed by Viguiet as early as 1882. Our compass gives just one component of the magnetic field on the earth. If we take into consideration the vertical component of the magnetic field, we may find that every spot has its own characteristic magnetic picture and orientation might be possible. As yet, however, direct proof of the magnetic theory has not been given. Moreover, homing experiments only give a possible explanation of migration of adults to places where they have been before. Experiments by Drost with *Accipiter* seem to show this difference between young and adults; only the adults were able to find their wintering grounds after being transported during migration.—J. J. TER PELKWYK.

WEIGHT AND SEX RATIO

9. The Sex Ratio in Nestling Eastern Red-Wings. J. Fred Williams. 1940. *Wilson Bulletin*, 52 : 267-277. A careful study in northern Ohio on *Agelaius phoeniceus*. Nestlings could be sexed by dissection from hatching. "With the age of nestlings known to the nearest day it proved possible to distinguish between the sexes by means of weights after the fifth day, and by means of tarsal lengths after the eighth day." The average weight of 25 females at ten days (fledging) was 30 grams, of 25 males 40 grams. The mean length of tarsus for ten day females was 25.68 mm., for males 29.15. The sex ratio was practically even—113 males to 121 females. From 67 nests containing 214 eggs, 156 hatched (73 per cent) and 105 were fledged (49 per cent).

10. Some Studies in Bill Measurements and Body Weights of American Woodcock (*Philohela minor*). R. W. Tufts. 1940. *Canadian Field Naturalist*, 54 : 132-134. The bills of 134 female Woodcocks averaged 72 mm., those of 121 males 63 mm.; the females averaged 219 grams in weight, the males 176 grams. Weight increased from October 1 to November 15, the average for the males in

the 3 two-week periods being 160 grams, 175 and 180; for the females 202, 216 and 226 grams. The females stayed longer in the fall than the males.

LIFE HISTORY

11. The Life Cycle of Wilson's Petrel *Oceanites oceanicus* (Kuhl). Brian Roberts. 1940. *British Graham Land Expedition 1934-37 Scientific Reports*, 1 (2) : 141-194. A colony of these birds at the Argentine Islands was visited every day during two seasons despite difficulties due to the weather; the birds had made 23 burrows in peat moss and the author cut out a piece directly above each nest, replacing each with a wooden peg. Of 27 breeding birds banded in December, 1935, 22 were recovered in February, 1937, all in the same burrows and twenty with the same mates—the mates of the other two not having been banded. The burrows of four of the five not recovered had been rendered unusable by sledge dogs. This is a return percentage of at least 81—the highest that I know of. No "marked chick was recovered"; it may be that the birds do not breed until two years old. Mates preened each other and grasped each other's bills in their mandibles. "Their courtship is essentially mutual", p. 161. The author's lattices of moss placed before the entrances were taken into the nests; sometimes nests were so enlarged "there was hardly room for the birds to get in" and Mr. Roberts had to remove some of the moss. Only one egg is laid and "this is not replaced if taken." p. 162. Average measurements are 33.4 x 24.2 mm. The parents incubate in about two day shifts. Incubation lasts 39-48 days, the "shortest probably nearest the true period." Chicks are covered with thick down and are not brooded during the daytime "except for the first day or two after hatching." They have temperature control at the age of two days! Temperature in the burrow remained around 5° C.

Fledging takes 52 days. Growth is irregular due to snows in March and April that cover the burrows and made it impossible for the parents to feed the chicks, although they would burrow through twenty cm. (eight inches) of snow. "It is remarkable that they should know with such precision where to dig when the whole appearance of the cliff face is changed." p. 168. One chick died on the 7th day, but others survived 3, 5, 11 and 20 days of starvation. (It is interesting that the bond to the young survived such a long break.) The average weight of ten adults was 34.3 grams; the heaviest chick at one time reached 70.5 grams. Four chicks averaged 56.5 grams at leaving the nest. Of twenty chicks only seven survived to leave the burrows; two died from exposure after a landslide and one was killed by the collapse of a rock; the others died of "starvation due to blocking of the burrows by snow." The very long incubation and fledging periods are not well adapted to the shortness of the season.

Apropos of the white bar at the base of the tail, the author suggests, "Possibly it acts as a 'releaser' eliciting a flying-in-pursuit reaction," p. 158. After nesting the petrels fly northwards throughout the Atlantic and Pacific—a migration of some 7,000 miles—returning in the Antarctic spring to the same burrow and same mate. When we think of such feats of orientation, it is "extraordinary that visual memory is still quoted as the most satisfactory explanation." An admirable study.

12. The Annals of *Gymnogyps* to 1900. Harry Harris. 1941. *Condor*, 43 : 3-54. A detailed account of the published records of the California Condor, the earliest being that of a Carmelite friar in 1602.

13. Observations on the Division of Labor in the Kestrel Pair during the Nesting Time. (Beobachtungen über die Arbeitsteilung des Turmfalken (*Falco tinnunculus* L.) während der Fortpflanzungszeit.) L. Tinbergen. 1940. *Ardea*, 29 : 63-98. A very fine study based on 780 hours of observation and illustrated with sketches of various attitudes of the birds. Like some other birds of

prey the female has a lower voice than the male. The pair has a nest territory and hunting territory; they drive off other Kestrels and nest competitors—hole nesters—as well as other birds of prey, herons, storks, crows. The male normally does all the hunting for his incubating mate and later for her and the young. Males of four pairs incubated while their mates were eating what they had brought; one male did not. One female disappeared when the young were 13 days old; the male took the food to the nest and divided it for the young. A vast amount of data are given on the identity (80 per cent mice) and quantity of prey; the supply for the female averages 5.6 animals a day in April, for her and the young 9.6 in May and 12.6 in June, the whole family consuming some 1200 animals during the three months. In general the number of meals brought by the male increases throughout the nesting period until the young are three weeks old when it decreases. This paper offers a wealth of careful observations on the nesting behavior of Kestrels.

14. Nesting Pigeon Hawks. John and Frank Craighead. 1940. *Wilson Bulletin*, 52 : 241-248. Both parent *Falco columbarius* in northern Minnesota hunted and both fed the young; at one nest three meals were brought in one day, another only one one day, two the next. A description is given of a falcon capturing a Tree Swallow.

15. The Life Equation of the Ringneck Pheasant. Pierce E. Randall. 1941. *Trans. 5th No. American Wildlife Conf.*; 300-320. On a study tract of 1,675 acres there were 950 pheasants in the fall of 1938; hunting and other losses reduced them to 300 in early December; there were 204 in March. With one cock to seven hens 94.1 per cent of the eggs were fertile. Only 25.4 per cent of 310 nests were successful; 49.8 were destroyed through mowing and 30.7 per cent by predators—chiefly skunks and crows. An early summer drought induced early mowing and destroyed "many nests that were within a few days of hatching." Through re-nesting, between 52-55 per cent of hens raised broods. Only 12.4 per cent of the "hatch failed to reach maturity." In September 1939 there were 850 pheasants on the area.

16. The 1939 Pheasant Nesting Study in Wood County, Ohio. Don H. Strode and Daniel L. Leedy. 1940. Ohio Wildlife Research Station, Release 135 : 1-20. An intensive nesting study on four sections. Of the 563 nests found 58.4 per cent were successful. The number of eggs varied from six to twelve, averaging 8.8; 91.4 per cent were fertile. "Of 210 nests destroyed in all types of cover, 75.2 per cent were destroyed by man; 12.4 per cent by bird predators; 5.7 per cent by mammalian predators, 1.9 per cent by livestock." In September 71.3 per cent of hen pheasants were observed accompanied by young. Much information is given on nesting in relation to cover types.

17. The 1940 September Pheasant Survey. L. E. Hicks and D. L. Leedy. 1940. Ohio Wildlife Research Station, Release 145 : 1-22. A prenesting survey in fourteen northwestern Ohio counties showed 29 per cent of adults were cocks; the average size of brood was 5.6 (below normal), while 75 per cent of hens were with young. "Of 3,096 birds, 80.6 per cent were young—an indication of average reproductive efficiency." "246 hawks of 7 species were seen (17.6 per county and 3.5 per man-day). 2.1 per man-day in 1938 and 2.0 in 1939." Crows also were seen in larger numbers than in the two previous years.

18. In the Life of the Herring Gull. N. Tinbergen. 1939. *Natural History*, 43 : 222-229. A popular account of studies made at Wasenaar. Two of seven banded pairs returned to the same territory for four years. Ten of eleven banded gulls nesting in this colony had been hatched there; 14 of 15 nesting on Texel had been hatched at Texel. A pair chased strangers from their own and their neighbors' territories. During experiments they seemed to prefer an egg

eight times as large as their own, although they fell off when trying to brood it. A gull doesn't recognize its own eggs, but "knows exactly where to look for them." They learn to know their own young.

19. The Birds of the Seychelles. II. The Sea-Birds—more particularly those of Aride Island. F. N. Betts. 1940. *Ibis*, 14th Ser., 4 : 489-503. The Common Noddy (*Anous stolidus pileatus*) nests in colonies; eggs and young are to be found "in all stages," but "in each separate colony breeding was in the same stage among all its members." The White Tern (*Gygis alba monte*) lays its single egg in all sorts of places; the young are greatly attached to the nest site and "remain motionless on the exact spot where they are hatched until after they can fly." One bird would not move an inch towards its parents. Another could fly and "if unduly disturbed" would "make a small circle, returning to the identical spot as soon as the danger was past." They seem to be fed only twice a day.

20. Observations on the Elegant and Blue-winged Parrots. (Beobachtungen bei Schmuck-und Feinsittichen, *Neophema elegans* und *chrysostomus*.) Helmut Hampe. 1940. *Journ. f. Ornithologie*, 88 : 587-599. Both sexes in *Neophema elegans* sing; a female started to sing at 31 days and a male at 36 days. They are peaceable birds; sometimes the male of a pair is dominant, sometimes the female. Incubation lasts 18½ to 19 days, fledging 32 to 34 days.

21. Breeding Ecology of Silvery-cheeked Hornbill. R. E. and W. M. Moreau. 1941. *Auk*, 58 : 13-27. A thorough and very interesting study based on 600 hours of observation, mostly by Africans, in Tanganyika Territory. The male *Bycanistes cristatus* is as large as a Muscovy Duck, but the female is smaller. "All the actual plastering is done by the female, sitting inside the hole and using material produced by the male in the form of regurgitated pellets of soil." p. 13. Egg laying is confined to about three weeks in the year. In five years at one nest only one young was certainly raised, in three years at another nest three young. Twice it seemed as if the "breeding impulse was not strong enough to carry the pair through the labor of building." A table is given of all day observations made once a week. "Males' visits to the nest with cargoes of fruit vary between 9 and 27 in the day"; the number "increases a fortnight after the eggs have hatched," decreasing a "fortnight before the family emerges, i.e. when the male has been working for over thirteen weeks, and he shows other signs of slackness and impatience. A working male will not allow another male to settle anywhere in the nest-tree." "The mother, after over one hundred days of inactivity, and the young, at the first attempt, both flew well." The nest was found to be "sanitary and almost odorless; 438 insects were recovered from it. . . . They were probably beneficial scavengers." p. 27.

22. Nesting of the Gray Flycatcher. H. N. Russell, Jr. and A. M. Woodbury. 1941, *Auk*, 58 : 28-37. *Empidonax wrighti* is common in the juniper and pinyon forests of northeastern Arizona and southeastern Utah. Two broods are raised, each taking 7 weeks. The female lays three eggs, which she incubates for 14 days; both parents feed the young in the nest for 16 days and out of it for about two weeks. A nest was watched during incubation on July 7 from 8-12.17; the female left once for eleven minutes. It was watched on July 10 from 1.15-6.10; the female left five times "for periods ranging from 9 to 17 minutes, with an average of 15." p. 32. When the young were a week old they were fed 30 times from 8-12. A kind of "injury-feigning" or "feigned weakness" was exhibited towards human intruders during incubation and while the young were in the nest; the bird flopped to the ground with wings drooping and head held low. If not followed, it returned and tried over again to lead the observer from the nest.

23. Feeding of Nestling Bank Swallows. D. and L. C. Stoner. 1941. *Auk*, 58 : 52-55. Observations of feeding at eight nests of *Riparia r. riparia* for seven hours a day gave totals of 56 to 170, two of the lowest counts—56 and 99—

being with birds 2-4 days old. The average number of trips per hour was 17.1; this is lower than the figures reported by the Moreaus (*Brit. Birds*, 33 : 95-97, 1939) where "the number of feeds brought was nearly always between 25 and 43."

24. Bird of First Brood of Swallow Assisting to Feed Second Brood. W. W. White. 1941. *British Birds*, 34 : 79. Only one young was raised in the first brood of a pair of *Hirundo r. rustica*; the parents then reared a second brood. "The young Swallow, sole survivor of the former brood, continued to roost with its parents in the garage from the day of its first flight and helped in the feeding of its juniors, fairly regularly, I think, until they in turn left the nest." Similar cases have been reported for the House-Martin (*Delichon u. urbica*), Handbook of British Birds, II, p. 236, 1938.

25. Nesting of the Chough. (Beitrag zur Naturgeschichte der Alpenkrähe, *Pyrhocorax pyrrhocorax erythrorhamphus* (Vieillot).) A. Schifferli and E. M. Lang. 1940. *Journ. f. Ornithologie*, 88 : 550-575. The Chough breeds in only two localities in Switzerland. A pair that nest in the castle of Tarasp first came in 1927; in 1936 the male was found dead and his mate raised the three young alone; she returned the following year with a new mate that has a crippled foot. Intensive observations were made on the nest in 1938. Eggs were laid 30 hours apart. The female incubated and was fed by her mate. Incubation lasted 21 days. On the day that the first egg hatched the female regurgitated food into the nest and gave the food call at 10 A.M.; it was not until an hour and three-quarters later that the egg was pipped and seven more hours before it was hatched. Peeping could be heard as soon as the eggs were pipped. Very small young gaped best to the food call of the parents and to its imitation by the observers; other sounds were ineffective; sometimes they gaped spontaneously. They gaped vertically for 18 days at which time they began to orient to the parents. The eyes began to open at 8-9 days. When a parent touched the young on the head or back the young begged. The mother nibbled at the down and feathers of the young. Feeding took place 20-28 times a day. On the 17th day the young first stretched their wings up, on the 27th they stretched both wings down; later they stretched sidewise. On the 22nd day they stood on their feet; on the 35th they slept with their bills in their scapulars. Wing fanning was seen on the 24th day; they left the nest at 40-41 days. The male seemed unwilling to feed them after the 46th day, but the female once fed as late as the 96th day. The adults dove at Carrion Crows (*Corvus corone*), Kestrels and Buzzards (*Buteo buteo*), driving them off with loud cries.

26. Breeding Habits of the Birds of Paradise: *Macgregoria* and *Diphyllodes*. Results of the Archbold Expeditions, No. 26. A. L. Rand, 1940. *American Museum Novitates*, No. 1073 : 1-14. In Macgregor's Bird of Paradise (*Macgregoria pulchra*), both sexes are velvety black with orange band in the wing and orange eye wattles; the male is noticeably larger. They are common in the New Guinea forests above 2,900 meters. They are usually seen in pairs; their flight is noisy. The female builds, incubates and broods, while the male accompanies her; he feeds the young more often than she does. "There appears to be no territory. The display consists of a 'chase' which is usually conducted in couples though three or four couples may be chasing in the same area; both males and females take part." p. 7.

In the Magnificent Bird of Paradise (*Diphyllodes magnificus*) there is great sexual dimorphism. The male makes a "court" by cleaning twigs and leaves off of the ground and picking leaves off shrubs, thus allowing the light to shine on his court. He calls a great deal from near his court. Three forms of display are described and pictured. A male attacked a mounted male once; ignored a mounted female. He did not drive off birds of other species.

27. Some Notes on the Scottish Crested Tit. Stuart Smith. 1941. *British Birds*, 34 : 166-171. Forty nests were found of *Parus cristatus scoticus*. The nuptial display is described. The female excavates the nesting hole; in only

one case was a male seen helping with building. Incubation lasts 14 days (± 1 day); fledging 18 (± 2 days). Both parents feed, but only the female carries off excreta.

28. The Natural History of the Wren. (De levenswijze van den Winterkoning, *Troglodytes tr. troglodytes* (L.)) H. N. Kluijver, J. Ligetvoet, C. van den Ouwelant and F. Zegwaard. 1940. *Limosa*, 13 : 1-51. An excellent study on the European Wren, a close relative of our Winter Wren. In a garden at Stein 8 to 12 males had their territories; the birds were trapped in the nests and marked with colored bands. Four kinds of song are distinguished: (a) complete—the advertising song; (b) interrupted—half song, in territory quarrels; (c) interrupted and soft—upon arrival of female, the pairing song; (d) still shorter and lower—when the female approaches and returns the display. The female never sings and seldom “ticks”; the male “ticks” when disturbed.

Nest building starts in March and ends in June. In 1937 ten males built 58 nests; in 1938 seven males built 57 nests; in 1939 eight males built 40 nests. Male No. 42 built 12 nests in 1936, 10 in 1937, 9 in 1938 and 9 in 1939; twice he had two mates, twice three mates at the same time. The male sings before a nest, displays and creeps into it upon the arrival of a female. The female lines it with feathers and wool. Incubation lasts 14-20 days; the longest periods occur early in the season. Females were found on the nest 54 per cent of the times visited during the first brood, 80 per cent during the second. The average incubation period in April lasted 17.5 days, in May 16.3 days, in June 15.3 and in July 14.5 days. Insects are scarce and small early in the season so the female has to spend more time searching for her food; the air temperature is higher later in the season. During incubation the male pays little attention to his mate; he does not call her off the nest, nor defend the nest; he makes more cock nests and gets more mates. Many males do not help feed the young in the nest. Fledging takes 15-20 days. Both parents accompany the young 7 to 18 days; some males feed the young; they constantly “tick,” and at night lead them into cock nests or other shelters for the night.

Territory is defended all year except in August during the molt and during the coldest winter weather. It is defended by song and posturing; no fights were seen. The male sings all the year; he is not aggressive against males leading young. Young males take up territory in autumn or the following spring. They hold the same territories from one year to another. The female shows no knowledge of her mate's territory and often goes to another male's territory for her second brood. Fifty per cent of the males were polygamous; three times a male had three mates at once. Some males, however, were unpaired. The most zealous builders were most successful in getting mates. It may have been the quality of the cock nests that influenced the females; those that seemed best to human observers were those taken by the Wrens.

“The male wren is a nestbuilding specialist; he constructs a domed nest and makes many of them. This specialization is combined with a poor development of brooding instincts. This may have given rise to the polygamous habit. The female is able to take the care of the brood without the help of her mate by means of the good shelter furnished by the domed nest.” p. 49.

29. Observations on the Willow and Wood Warbler and Chiffchaff in the Rhineland. (Beobachtungen über Fitis-, Weiden- und Waldlaub-sänger im Rhineland.) H. Mildenerger. 1940. *Journ. f. Ornithologie*, 88 : 537-549. A comparison of the habitats and biology of *Phylloscopus trochilus*, *sibilatrix* and *collybita*. Size of territories is influenced by the size of the population. Incubation lasts 13-14 days, fledging 14-19 days. Average size of the first set is six eggs, for the second 4-5. Wood mice are an important enemy of these ground nesters; in 1937 when there was a high population of these rodents, 19 of 26 nests of the Wood Warbler were destroyed by these animals.

30. The Biology and Psychology of the Chiffchaff. (Zur Biologie und

Psychologie des Weidenlaubsängers (*Phylloscopus collybita*.) H. v. Treuenfels. 1940. *Journ. f. Ornithologie*, 88 : 509-536. The male Chiffchaff often does not help feed the young, but he did in two cases watched by the author. The parents got food from opposite parts of the territory; the male defended his borders against members of his species and warned against nest enemies. The male did not seem to like to meet his mate at the nest. Detailed observations are given on leaving the nest, the behavior of young and adults. *Phylloscopi* differentiate — (a) ground enemies in the territory; (b) flying enemies in the territory; (c) nest enemies. (a) Man or dog are ground enemies; the parents call loudly at their approach during the nesting season, but ignore them at other times. (b) Dangerous flying enemies—Falcon or a diving Buzzard; occasionally Jay, Nightjar, Cuckoo; the warblers freeze until the danger is past. Harmless flying birds are ignored or elicit a brief warning. (c) Everything that approaches the nest is a nest enemy; they drive off other birds and attacked a shrew. During the last days in the nest the young distinguish between the call and alarm notes of the adults. They freeze when they see a flying enemy. Data are given on gaping, but the age of the birds is not told.

31. The Buccal Food-carrying Pouches of the Rosy Finch. Alden H. Miller. 1941. *Condor*, 43 : 72-73. A female *Leucosticte tephrocotis littoralis* was found to have two gular sacs, a sketch of which is given. Nests are placed in alpine cliffs far from feeding places; they are visited about once every 45 minutes and "as many as twenty-five deliveries of food to the group of young" may "be made by a leucosticte on one visit to the nest."

32. Notes on Macgillivray's Seaside Sparrow. Ivan R. Tompkins. 1941. *Auk*, 58 : 38-51. *Ammospiza maritima macgillivrayi* lives in salt-marsh meadows of South Carolina and Georgia; it nests in thick grass, feeding perhaps 200 yards away on the wet banks of the salt creek. The feeding grounds are covered by the tides. Only females show incubation patches. There is a "lack of territorial jealousy in the species." The song does not "appear to be a declaration warning other birds away." p. 46. These birds have "developed a semi-colonial nesting habit with feeding grounds within commuting distance."

BIRD BEHAVIOR

33. The Breeding Behaviour of Penguins with Special Reference to *Pygoscelis papua* (Forster). Brian Roberts. 1940. *British Graham Land Expedition 1934-37 Scientific Reports*, 1 (3) : 195-254. An exceedingly interesting discussion on the behavior of the Gentoo and other Penguins. Penguins are favorable subjects, since they have no fear of man. In the present study, the birds observed were collected, so as to determine their sex. "As the snow disappears, the nest sites provide circumscribed areas of great emotional valency and display becomes confined almost entirely to these areas", p. 201. "In the early stages the initiative in courtship may be taken by birds of either sex. The behaviour of an individual bird gives no indication of its sex, for the activities are interchangeable. . . . There are two typical series of actions—one of initiation, the other of response. The bird occupying a nest scoop appears to be always the responding one; regardless of its sex. Presumably the sight of a bird sitting or standing in a scoop at this time releases an instinctive reaction in the way suggested by Lorenz (1935, 1937). . . . One bird bringing material evidently releases a behaviour mechanism in the other to arrange it in the nest." p. 203.

Like sexes and opposite sexes fought with each other; the females were less aggressive than the males. "Out of hundreds of fights watched, there were remarkably few in which it would have been possible to say definitely that one or the other of the birds was the victor. It is usual for these fights to stop as suddenly as they have begun; just as if the combatants had suddenly lost interest in each other; but a territory-owning bird will often drive away intruders for some distance." p. 204. "I do not believe that sexual fighting in *P. papua* or any

other penguin brings about the regrouping of pairs (sexual selection in the Darwinian sense). . . . The fights are between neighbours with adjoining territories, or with trespassers which come too near the nest. Any bird, of either sex, which comes too near will excite a territory-defending reaction."

Later only males were seen offering nest material. "It seems probable that the birds had not learned to distinguish the sexes as such, but that the birds of a pair, originally established by trial and error, had come to recognize each other personally." p. 209. The author points out that "the neutral type in birds" is "outwardly much nearer to the male than to the female." As to sex recognition, "Display before a female Gentoo with unenlarged ovary fails to produce any result." "The essential difference in the behaviour of the sexes is that during the breeding season a male always tries to dominate weaker birds, while a female loses this dominating urge during the short period when fertilization must take place." p. 213. Nest relief ceremonies may be appeasing ceremonies.

Both sexes incubate in long periods, a male for 153 hours, a female 183. With the Rockhopper Penguin (*Eudyptes cristatus*) two females incubated for 10 days at a stretch, four for 9 days, nine for 6 and two for 4; one male incubated for 3 days, another for 4 days.

A suggestive table of exteroceptive factors is given on p. 235. "It is evident that the phases within the cycle are brought into relation with seasonal environmental changes largely by exteroceptive stimuli among which must be included equally with the physical factors of the environment the psychical ones provided by the presence of another individual or the attitudes struck by a companion." p. 229. "The concept of 'releasers' put forward by Lorenz (1935, 1937) marks a very important advance in our understanding of bird behaviour. Evidence continues to accumulate which shows that comparatively complicated sets of reactions may be released by a simple combination of stimuli, and that a bird responds only to a small but characteristic combination of stimuli." p. 238.

34. Studies of the Nesting Behavior of the Black-crowned Night Heron. R. P. Allen and F. P. Mangels. 1940. *Proc. Linnæan Soc. of N. Y.* 1938-39, nos. 50-51: 1-28. An exceedingly interesting paper presenting the results of three seasons of study of a colony of *Nycticorax nycticorax hoacili* on Long Island. Behavior "upon arrival at the herony depends to a considerable extent upon temperature." There is "an elaborate courtship display in which, we believe, (a) a change in the color of the legs, (b) the plumes, and (c) the song play important parts as constituents of rather complicated releasers." p. 27. "The male ceased singing as soon as a female with red legs approached and entered the next stage of the cycle: mutual caressing and copulation. We never observed this if the approaching female had yellow legs." p. 13. The authors believe that the "stimulating function of the flock organization very likely is *essential* to reproduction in that species."

"The construction of the nest is an integral part of the courtship and the nest forms a very powerful bond between the members of a pair." Experiments showed that the "Black-crown is unable to recognize its eggs and will accept almost any object of comparable size in their place. It also seems unable to differentiate between its own young and the young of other Black-crowns." "We find no evidence of peck order or of dominance and believe that they are strictly cage-bird phenomena." Sketches by Peterson add much to the value of this thought-provoking paper.

35. The Behavior of the Lapwing during the Nesting Time. (Waarnemingen over het gedrag van de Kievit (*Vanellus vanellus* (L.)) gedurende de broedtijd.) G. L. Rinkel. 1940. *Ardea*, 29: 108-147. A very fine paper, based on field study and illustrated with photographs and sketches. I will quote from the English summary. Each male by "means of 'aerial display', 'ground display' and 'fights' . . . marks out a territory, where it tolerates no other male." "As a number of territories are always found together, I will speak of 'colonies.'"

Especially the 'ground fights' of the ♂♂ and their 'aerial combats' ('border clashes') make the impression of plays only, which the birds seem to need; this also points to the love of 'social' breeding. The most important demand the Lapwing makes with regard to its breeding place, is that it should have low vegetation, *i.e.* so low as to enable the incubating bird to look around freely." . . . "The most important link in pair-forming is a sort of chain-reaction, that is to say that the reaction of the one bird is always a 'signal' for its mate. For the ♀ reacts to the 'copulation-flight' of the ♂ with an attitude of refusal or by displaying readiness to pair. . . . As a ♂ displays a copulation-flight for nearly every ♀ visiting his territory, the possibility of bigamy is created; bigamy is of common occurrence and even a case of trigamy has been observed by me." "An increase of the Lapwing-population might possibly be promoted by: (1) enlarging suitable breeding grounds; (2) creating factors that promote bigamy. A. o. this is possible when on a territory a hen has the opportunity to incubate her eggs quietly and the cock can court other hens."

36. Nesting Behaviour of the Galapagos Mockingbird. L. S. V. Venables. 1940. *Ibis*: 629-639. Much individuality was found in the behavior of different pairs of *Nesomimus melanotis*; Pair 50 were quiet birds; Pair 200 were excitable; they built seven nests before laying any eggs; Pair 350 were "constantly in contact with another pair and indulged in a great deal of aggressive territorialism." These birds never "mocked." They laid 2-3 eggs; no infertility was found in a score of nests. Both birds build and feed; the female incubates, while the male drives off birds of any species that venture near the nest. Pair 50 were not aggressive until the young hatched, when their behavior suddenly changed; the young were destroyed probably by the introduced black rat. A description is given of "posture dances." The "original dancers seemed always to start it over territorialism (as opposed to courtship), and the other birds were merely attracted by the spreading excitement and by their natural curiosity. . . . The birds stand facing each other, jerking up and down, and flicking their wings and tails. Frequently a harsh, scraping cry will be given." p. 636. "The end of these dances was always tame—the birds grew less and less excited, until posturing ceased altogether, and they would feed back into their own territories." Both sexes danced, the females less than the males.

37. The Establishment and Maintenance of Territories by the Yellow-headed Blackbird in Utah. Reed W. Fautin. 1940. *The Great Basin Naturalist*, 1: 75-91. At a colony of *Xanthocephalus xanthocephalus*, one-third of an acre in size, there were 12 males and 40 females; there were three territories with 4 females, six with 3, two with 2 and one with one. No first year male was observed within the nesting area. The birds usually fed outside the territories. "Although very intolerant of each other within the confines of their personal territories, the males were very cooperative in times of danger." All responded to the alarm call and would "enter into the combat." They appear to be incompatible with the Red-winged Blackbird; the latter nested outside of the Yellow-headed colony. "Females exercise dominion over a small area immediately surrounding their nests, but give no evidence of recognizing the boundaries of the males' territories." "The purpose of territory in this species seems to be: (a) To insure adequate nesting sites. (b) To aid the females in obtaining mates. (c) To afford protection from various interferences during nesting season."

38. Territorialism in the Furnariidae. (La Manifestacion de Localismo en los Furnariidae.) David E. Davis. 1940. *El Hornero*, 7: 366-369. A brief paper discussing the subject of territorialism, and describing its occurrence in five species of the Furnariidae in South America, one from each sub-family: *Schoeniophylax phryganophila* (here both sexes sing), *Furnarius r. rufus* (Ovenbird, one of the most zealous defenders of its little local area), *Coryphistera a. alaudina*, *Synallaxis s. spixi*, and *Pseudoseisura lophotes*.

39. The Development of the Song in Young Chaffinches. M. D. Lister. 1940. *British Birds*, 34 : 156-158. Three main stages are distinguished in young *Fringilla coelebs gengleri*. 1. In juvenile or partly juvenile plumage several males will warble in concert. 2. From mid-August to the end of September balance and rhythm appear with some attempt at the specific song. 3. In February songs are still incomplete and some warbling is heard.

40. "Courtship Feeding in Birds." David Lack and Others. 1941. *Auk*, 58 : 56-60. Additional references on this behavior with instances from petrels, grebes, bittern, Calliope Hummingbird, Kingfisher, Tree Swallow, etc.

41. "Anting" by Summer Tanager. Ruth H. Thomas. 1941. *Auk*, 58 : 102. *Piranga r. rubra* "anted" on a feeding shelf in Arkansas.

42. A Note on the "Begging" of Nestling Flickers. D. S. Lehrman and O. K. Stephenson, Jr. 1940. *Proc. Linnaean Soc. of N. Y.* 1938-1939, nos. 50, 51 : 36-37. An experiment showing that young *Colaptes auratus luteus* were stimulated to gape when the hole was darkened.

43. Observations on the Behaviour of a Young Cedar Waxwing. M. M. Nice. 1941. *Condor*, 43 : 58-64. The social responses of a young *Bombycilla cedrorum*, kept in a room for six weeks are described; there was a marked bond between it and a young Song Sparrow that was its companion. Fruit passed through its digestive system in 16, 24, 28 and 40 minutes.

44. Comparative Behavior Studies. (Vergleichende Verhaltensforschung.) Konrad Lorenz. 1939. 1940. *Zool. Anzeiger, Suppl. (Verhandl. deutsch. zool. Ges.* 41) 12 : 69-102. This paper is a comprehensive review of the author's ideas on various aspects of animal behavior.

Innate behavior-patterns should be studied from a phylogenetic as well as an ontogenetic point of view. The principles of homology, adaptation and selection are just as valid for evolved behavior patterns as they are for evolved morphological patterns.

Innate behavior-patterns are of two kinds: instinct and taxis. Instincts are all behavior patterns that are coordinated in the central nervous system, and the form of which is thus independent of external stimuli. They are released, but not guided during their performance, by external stimuli. Taxes are all innate movement-patterns which are both released and continuously directed by external stimuli. Characteristics of instinctive acts are: lowering of the release-threshold after "non-use"; decrease of stimulus-specificity necessary for release in proportion to the time elapsed since the last performance; and performance of the instinct without demonstrable external stimuli, after very long non-use. These characteristics indicate an accumulation of energy specific for the instinctive act in question, in the central nervous system. The process is probably identical with Sherrington's "spinal contrast." Most reaction-patterns consist of intermingled instincts and taxes; topotaxes also have two components: locomotor movements, which are instincts, and turning toward a stimulus, which is a taxis. Some taxes serve to bring the organism into such relation to an object that it can perform an instinctive act with respect to that object; such taxes become effective only when energy specific for the instinct in question has accumulated to a certain high level, and they are identical with what are customarily called "drives." An instinctive act may thus be the goal of an instinct taxis combination, or it may be part of the means of reaching a goal. The taxis preliminary to an instinctive act is a type of appetitive behavior. The higher the organism psychologically, the farther removed from the eventual instinctive performance can be the beginning of the behavior appetitive to it.

Lorenz impressively illustrates his ideas on the evolution of instinct by analyzing the evolution of several instinctive acts within the Anatidae. These observations cannot be summarized here, but should certainly be read.

Innate receptor patterns, acting as selectors for the stimuli for the release of instincts and taxes, consist of simplified combinations of individual stimuli coming from the biologically appropriate object of the act in question. Innate patterns are specific for innate acts, not for the object of the acts, since different stimuli from the same object may evoke different reactions (as when a mother bird of a precocial species will feed or brood her young, depending partly on their behavior). The innate pattern releasing the instinctive component, and that directing the taxis components, of the same act, may be quite different (see Tinbergen and Kuenen, 1939, on gaping in thrushes, review in *Bird-Banding*, 10 : 174). The highest differentiation of innate patterns is seen when a member of the same species is the object of the act, since in such cases, the same evolutionary mechanism can further the simultaneous development of both the releaser and the innate behavior pattern. Instinctive acts themselves can be releasers of other instinctive acts in other members of the same species, and can evolve from intention-movements (abortive instinctive acts) that become formalized, or from substituted movements (instinctive acts substituted for acts inhibited in certain ways). Many releasers involved in courtship have been evolved through Darwinian sexual selection. When an innate pattern includes more than one characteristic of the object, the effect of the different elements is usually additive, not Gestalt-like. (That is, the characteristics do not have to be organized in certain ways to be effective at all, but are effective by themselves, and the effectiveness of a group of characters in eliciting given behavior is roughly the sum of their individual effectivenesses.) Movements are generally stronger releasers than morphological characters of the releaser.

This is certainly one of the most important comprehensive papers on animal behavior that is known to the present reviewer. Whatever may be the eventual status of the individual aspects of Lorenz's theories, he has provided both a theoretical attitude and a methodological approach that bids fair to become essential for the investigation and understanding of behavior.

There is at least one respect, however, in which the sweeping nature of Lorenz's conclusions hardly seems justified by the evidence. He attempts to analyze instinctive behavior in terms of a certain kind of process in the central nervous system. Now, the physiological evidence presented for this kind of process is drawn mainly from the work of von Holst and Sherrington on fishes. The present reviewer doubts whether, in view of the great differences in organization of the nervous system at different evolutionary levels and for different types of behavior, principles experimentally elucidated from the study, for example, of the swimming movements of fishes can justifiably be applied directly to the explanation of, for example, egg-rolling movements in birds.

However, it is a great virtue of the principles summarized here that they are powerful tools to help us investigate behavior, entirely aside from the question of whether they actually have the physiological basis that Lorenz ascribes to them. And that in itself is a fruitful subject for investigation.

Finally, it should be pointed out that knowledge of these analyses will enable the field observer of bird behavior to obtain an insight into the causes of the behavior he sees that will be, I think, superior and more fruitful than any that can be obtained otherwise.—DANIEL S. LEHRMAN,¹

HORMONES AND BEHAVIOR

45. The Effect of Hormones on the Breeding of the Laughing Gull. G. K. Noble and M. Wurm. 1940. *Anat. Record*, 78 (Suppl) : 50-51. Male and female *Larus atricilla* "develop black head feathering and red coloring of the beak and eye margins and legs during the breeding season." Gonadectomized birds showed no response to estrogens, but testosterone propionate induced calls

¹ Mr. Lehrman has translated this important paper and has extra copies available for temporary loan. His address is 136 W. 168th Street, New York, N. Y.

and postures of both sexes and of the male. "Pairing-up will not follow treatment with testosterone propionate alone until female behavior has been induced in one bird of a courting pair by estrogens. Estrogen injections into either sex will stimulate a gull to respond to the 'sex call' of a male and to 'food beg' with lowered head, a posture necessary for coition. Hence while an androgen is necessary to induce the breeding calls and postures in both sexes coition does not follow unless one bird has been made sexually subordinate by estrogens."

46. The Effect of Testosterone Propionate on the Black-crowned Night Heron. G. K. Noble and M. Wurm. 1940. *Endocrinology*, 26 : 837-850. "Testosterone propionate will induce male sexual behavior in adult females or in immature birds of both sexes. Even in month-old chicks it will make the voice more guttural and will induce territory defense, nest building, all male courtship ceremonies, copulation and, later, brooding. Differences between the sexual behavior of the adults seem regulated only by differences in the amounts of male hormone normally found in these birds. Estrogens alone fail to stimulate any breeding behavior in either sex."

47. The Effect of Thyroxin on the Social Order in Flocks of Hens. W. C. Allee, N. E. Collias and E. Beeman. 1940. *Endocrinology*, 27 : 827-835. "In this series of reports, we have presented evidence that epinephrine has no effect upon social status in flocks of hens; that testosterone propionate strongly increases successful social aggressiveness; that estradiol does not produce such striking results but tends to act, perhaps indirectly, in the opposite direction, and the same results has just been reported for the larger doses of thyroxin."

48. The Effect of Sex Hormones on the Social Hierarchy of *Xiphophorus helleri*. G. K. Noble and Ray Borne. 1940. *Anat. Record*, 78 (Suppl): 147. "Testosterone propionate will induce female Sword-tail fishes to rise in the 'pecking-order' ." Probably this comes about through a reversal of sex.

ECOLOGY

49. Report on the Effect of the Severe Winter of 1939-40 on Bird-Life in the British Isles. N. F. Ticehurst and H. F. Witherby. 1940-41. *British Birds*, 34 : 118-132; 142-155. Details given on winter mortality and decrease of breeding population by many observers from different localities. "In 1940 the general effects, though far more serious than in 1929, were not so disastrous as in 1917."

50. The Results of the Severe Winter 1939-40 for the Birds. (Von den Folgen des harten Winters 1939-40 für die Vogelwelt.) R. Drost and E. Schüz. 1940. *Vogelzug*, 11 : 161-191. A summary of losses by families and species. The general picture is much the same as in 1929--heavy losses of Wrens, Kinglets, Goldfinches, Buzzards, Owls, Coots, Bitterns, Herons, Oystercatchers, certain Woodpeckers, Kingfishers, etc. There is little that man can do in such emergencies except to supply food for game birds and small birds at feeding stations. Of great importance is the preservation of breeding conditions for the birds.

51. The Effect of Land-Use Adjustments on Wildlife Populations in the Ohio Valley Region. Charles A. Dambach. 1941. *Trans. 5th No. American Wildlife Conference* : 331-337. Eighteen per cent of present cropland in the United States should be retired from cultivation to permanent vegetative cover. "Should such retirement actually take place it would place an additional seventy-six million acres under permanent vegetative cover." About 800 farms comprising 1,100,000 acres in the Ohio Valley region have been replanned for soil conservation. In Butler County, Ohio, contour strip-cropping about doubled the breeding population of birds. The number of breeding pairs per mile accord-

ing to character of field borders in Montgomery County, Ohio was as follows: blue grass, 2; bluegrass with occasional vines, 5.2; bluegrass with occasional shrubs, 8.7; unclipped osage orange hedge, 19.2; dense shrubby growth, 23.3. Seven censuses of breeding birds in grazed and protected woods from Canada, New York and Ohio ranged from 95.3 to 225.4 pairs per 100 acres, averaging 149.6 in protected woods; and from 24 to 111, averaging 68.5 in grazed woods. The number of species ranged from 7 to 24, averaging 17.4 in protected woods and from 2 to 21, averaging 10.5 in grazed woods.

52. The Mormon Cricket as Food for Birds. Ira L. Rivers. 1941. *Condor*, 43 : 65-69. A long list of birds that feed upon this long-horned grasshopper (*Anabrus simplex*), the Brewer Blackbird, Western Meadowlark and Sage Thrasher destroying more of these insects in the northern Nevada cricket fields than all the other species. The different techniques of the hawks and other birds with the crickets are described.

53. Measures for Combatting Herring Gulls in Holland. (Massnahmen zur Bekämpfung der Silbermöwen in Holland.) R. Drost. *Naturschutz*, 21(2): 1-3. Herring Gulls have increased enormously and do so much damage to other birds that their numbers are being reduced by shaking the eggs usually 2 in each clutch of 3), and poisoning of the adults on a large scale—6,000 at Terschelling.

Many valuable papers on "Values of Non-Game Species", "Wildlife Management on Agricultural Lands", "Waterfowl Habitat Management" and "Introduced Species" are given in the Transactions of Fifth North American Wildlife Conference, 1940, American Wildlife Institute, Investment Building, Washington, D. C. \$1.00.

BOOKS

54. The Birds of Lammi, their Regional Distribution and Dependence on Ecological Factors. (Die Vogelfauna von Lammi, ihre regionale Verbreitung und Abhängigkeit von den ökologischen Faktoren.) Jotma Soveri. 1940. *Acta Zool. Fenn.* 27 : 1-176. An impressive ecological and population study carried on from 1934-1939; it has a seven page bibliography and many tables, maps and charts. In 1933 the author published a plant geography of this same parish in southern Finland, which has an area of 545 square kilometers. The present volume treats (1) the distribution of birds in relation to plant habitats; (2) numbers of birds in typical biotopes throughout the year; (3) recent changes in quality and quantity of bird life. Two test areas of 50 hectares each (124 acres) were chosen from each main habitat. In the breeding season singing males were counted, each being counted as a pair. Birds were listed both by abundance and frequency. The birds are divided into woods, water, shore and marsh, and farm and town birds; each of these divisions is further divided into different types of vegetation. Many diagrams are given showing the numbers of birds in different habitats during the four seasons; also very interesting tables giving the same information for the different species for April, May, June, August, and December-January, arranged according to permanent residents, summer species, accidental and migrants, again arranged according to habitats. This affords many censuses of breeding birds: 546 and 717 pairs per 100 hectares in deciduous forests, 506 in mixed forest, 236 in spruce forests, 108 in mixed coniferous forest, and 60 in pine forests. There are also illuminating tables showing the dominance percentage of each species.

Many birds have disappeared of late, some affected by drainage, others (Raptors) by persecution. Ptarmigan are much reduced partly because of their conspicuous garb in the recent snowless falls, partly because the Finns no longer believe them magic birds that should not be shot. The present openings and mixed hard woods, due to clearing and burning, support a larger population of

birds than the pure stands of spruce; when the woods reach their climax again, the author believes that the breeding population of Lammi will drop to some 55,000 pairs instead of some 75,000 pairs as now. A list is given of eighteen important passerine species with their present population and estimated future population; only six are expected to increase.

A remarkable study and a model for an ecological investigation of the birds of a region.

55. Birds of Oregon. Ira N. Gabrielson and Stanley G. Jewett. 1940. Oregon State College, Corvallis, Oregon. 650 pp. \$4.25. This volume, based on 40 years of study, has 20 maps and nearly 200 illustrations. It starts with a check-list of the birds of Oregon which serves as a table of contents and then devotes 17 pages to "Something about Birds as a Group", the most interesting part of which is the section on "Bird-banding a factor in plotting routes" with a table and a map showing that ducks banded in Oregon were recovered from Akaska to Missouri to British Honduras. There are then four important chapters on Oregon ornithology—Topography and Life Zones, Federal Refuges; History of Oregon ornithology, and a List of birds originally described from Oregon. In the annotated list a description is given of each bird, its nest and eggs, and a statement made as to its distribution in general and in Oregon; the discussion largely concerns matters of its occurrence in the state. The book ends with a Hypothetical List, a Bibliography and Index, but nowhere does there seem to be a summing up of the number of forms credited to the state and their division into residents, summer residents, etc. Some notes are given on life history matters, for instance that a crow hung about a colony of Bank Swallows "evidently retrieving the birds knocked down by speeding cars," p. 408. The Red-eyed Vireo and Catbird have increased of late years. Even though only three Cowbird eggs appear to have been recorded from Oregon, we meet once more the erroneous statement that the incubation period is only ten days. There is much of interest given on the offshore bird population. "Cormorants of all kinds on the Oregon coast are subjected generally to a continued persecution on the part of sportsmen and commercial fishermen who assert that the birds are terrific destroyers of commercial and gamefish. No evidence has ever been produced to substantiate this accusation against any of our three species." p. 100-101. The same is true of Treganza's Heron, the Osprey and the Kingfisher. Hawks, too, are "relentlessly persecuted by farmers and sportsmen." pp. 188, 199. Let us hope that this carefully compiled volume will encourage a greater interest in the birds of this state and a more intelligent attitude among those that kill them.

56. A Field Key to Our Common Birds. Irene T. Rorimer. 1940. Illustrated by Roger T. Peterson. Pocket Natural History No. 8, Cleveland Museum of Natural History, Cleveland, Ohio. 160 pp. \$1.50. This little book, written primarily for the region that "includes Lake Erie and adjoining territory, with special emphasis on northern Ohio," is arranged primarily by habitats and secondarily by size. The design of the book is well carried out. It seems open to question, however, whether such an arrangement of birds is wise; if any one is interested enough in birds to buy a guide, would it not be better to pay somewhat more and get Peterson's "Guide"? With a moderate amount of study it is possible to familiarize oneself with the distinguishing features of each bird family.

57. The Truth about the Cuckoo. Edgar P. Chance. 1940. Country Life, London. Scribner's, N. Y. 207 pp. \$4.00. Mr. Chance has done notable work in the study of *Cuculus canorus*; his book "The Cuckoo's Secret", 1922, and his film of the same name made ornithological history. The present book repeats the history of Cuckoo A and her five seasons, telling of the first cinematographs and her "world's record of twenty-five eggs"; it also carries on the history with Cuckoo S and others, with various successors to A, and other Cuckoos. Pictures are given of Cuckoo A laying in the nest of the Meadow Pipit, and of her carrying

off an egg of her host. There are also eight general chapters that discuss Cuckoo behavior. Although Mr. Chance convincingly proved with his film that the Cuckoo lays directly into the nest of her fosterer, there is still a label in the Natural History Museum at South Kensington which states that she lays it on the ground and "carries it in her beak previous to depositing it in the nest of another species." Cuckoos adhere closely to one species of fosterer, only laying in other nests when forced to do so by accident to the nest for which the egg was "intended." (Female Cuckoos watch for several hours the nest-building of their intended victims; 5 to 6 days later the Cuckoo is ready to lay.) Mr. Chance thinks it probable that Cuckoos are monogamous and may even mate for life, although many observers disagree (see W. Makatsch, 1937, *Der Brutparasitismus der Kuckucksvögel*. Leipzig.).

58. Wildlife Conservation. Ira N. Gabrielson. 1941. Macmillan, New York. 250 pp. \$3.50. "Three concepts are considered to form the basis of the conservation movement: (1) That soil, water, forest, and wildlife conservation are only parts of one inseparable program; (2) that wildlife must have an environment suited to its needs if it is to survive; and (3) that any use that is made of any living resource must be limited to not more than the annual increase if the essential seed stock is to be continually available." Some of the chapter headings in this excellent book are: Soil Erosion and Wildlife; Water Conservation; Forest Conservation; Grassland Conservation and its Relation to Wildlife; Some Basic Facts in Wildlife Conservation; Migratory Birds, Fur Animals; Rare and Vanishing Species; Predator Relationships; Wildlife Refuges and their Place in Conservation. The only criticism which the reviewer has to offer is the lack of references to further information on the countless subjects dealt with, for the treatment, although admirable, has, of necessity, to be brief. Dr. Gabrielson emphasizes the need "for an alert, intelligent conservation group in every community"; for "more of the population to understand conservation", for "more and more research", and for persistence in the good work. "The most uncertain factor is not management itself but public support for a suitable and effective program that may be neither a spectacular program nor a crusade. . . . The conservation battle cannot be a short, sharp engagement, but must be grim, tenacious warfare". p. 246. This sane and sound book deserves the widest circulation.

59. The Birds of Lucas County. Louis W. Campbell. 1940. *Toledo Museum of Science Bull.*, 1 (1). 225 pp. A list of the birds of Lucas County occupying an area of approximately 340 square miles (including the City of Toledo) in northern Ohio. The most interesting feature, from an ornithological standpoint, is the "Oak Openings," a belt of dunes of glacial origin extending completely across the center of the county from northeast to southwest, characterized by a sandy soil deficient in essential chemical elements, resulting in a peculiar type of forest cover. Other spots of particular interest are the marshes at the southwestern end of Lake Erie and Little Cedar Point, a "trap" for spring migrants arriving at the south shore of the lake who swing westward to pass around the lake instead of crossing it.

While the annotated portion of the list of a comparatively small region is naturally of more local than of general interest, certain items are worthy of comment. For instance, the ranges of the Blue-winged and Golden-winged Warblers meet in the oak openings, the former occupying the southwestern, the latter a characteristic species of the northeastern end of the belt. This proximity results in a large number of the hybrid forms; since 1929, 28 examples of Brewer's Warbler have been found and four of Lawrence's. Of interest also are the maximum daily counts of both resident and migrant species of birds.

J. L. P.