

raised and the parents, one or both, were observed many times carrying food to the young.

In October I secured the nest for close examination and still have it. This is the first time in the years the House Wrens have lived on my place that they have used the nest of any other bird or, in fact, built in any but one of my nesting boxes.—LAURENCE B. FLETCHER, Cohasset, Massachusetts.

Eastern Goldfinch Makes an 800-Mile Trip.—A male Goldfinch banded at Ardmore, Pa., by Horace Groskin on April 6, 1942, was found dead July, 1943, near St. Andrews, New Brunswick.—HORACE GROSKIN, 210 Glenn Road, Ardmore, Pennsylvania.

RECENT LITERATURE

Reviews by Donald S. Farner

BANDING

1. Migration of the Redhead from the Utah Breeding Grounds. Cecil Williams. 1944. *The Auk*, 61(2): 251-259. Of 2,332 young Redheads (*Nyroca americana* (Eyton)), banded in northern Utah in 1929, 1930 and 1931 there were 357 returns, all shot by sportsmen. The northward dispersion in fall is well illustrated by September and October returns from Montana, Wyoming, North Dakota, South Dakota and Idaho. Although migration may begin early, many young remain in the breeding grounds until October. The returns show the principal wintering grounds for the Utah birds to be the Salton Sea region of southern California and the lower coast of Texas from Corpus Christi to Mexico. Eighty-seven percent of the birds taken were less than one year old; 10.6 percent were second-year birds, and two percent were third year or older. This ratio prompts the author to assume logically that the first year is the critical one in the life of the bird insofar as shooting is concerned. His statement that there is a 13.3 per cent annual kill among first year birds is of course based on the assumption that all hunters turn in the bands from the banded birds in their bags. The importance of this rate is somewhat obscure unless the death rate due to other causes is known. In order to determine the degree of apparent selective shooting (larger percentage of young birds) a trapping program to determine the true average age-group composition of the Redhead population would be very valuable.

2. Report of the Bird-Ringing Committee. A. Landsborough Thomson. 1944. *British Birds*, 37(12): 227-231. This is a report on the management, finance, and banding activities for 1943. During this year 4,580 birds (660 trapped and 3,920 nestlings) were banded. This is similar to 1942 when 4,567 (1,301 trapped and 3,266 nestlings) were banded but because of the war far below 1939 when 55,817 were banded. Among the interesting recoveries are a Widgeon (*Mareca penelope* (L.)), banded as a young bird in Ross-shire and reported from near the Dardanelles.

MIGRATION

3. The Sensory Basis of Bird Navigation. Donald R. Griffin. 1944. *Quarterly Review of Biology*, 19(1): 15-31.

This review paper attempts to summarize the present state of knowledge on the long distance orientation of migratory birds and of homing birds. It may be divided into three sections, (1) the statement of the problem, (2) the presentation of the available data, and (3) interpretations and conclusions.

In the first section Griffin fortunately ignores the term "homing instinct," often so carelessly employed in the popular literature. However it seems to me that he has not brought out clearly enough the difference between homing urge and homing ability. It is the latter aspect of homing which is under discussion in the present paper. "The central problem is one of navigation: how does the bird know where to fly? Some receptor or receptors (sense organs of the bird) must be excited by an aspect of the bird's environment which is related to the direction of its goal. Visually perceived landmarks constitute one such aspect of the bird's environment, but there are many migrations in which some other type of orientation must be involved."

Part 2 is the backbone of Griffin's paper. It constitutes by far the best up-to-date summary of the widely scattered homing literature (based on 104 titles) and presents the data in a well classified manner, supported by tables and figures. "Migratory species have greater powers of homing than sedentary birds with restricted ranges." Remarkable is "the very poor homing from *short* distances which has been noted" by several workers with many different species. Curiously, the most puzzling of all homing experiments, that of Ruppell (1938) with hand-raised starlings, is barely mentioned.

In the final section Griffin discusses the three principal theories that have been advanced to account for the sensory basis of homing; "theories involving (1) vision; (2) kinaesthetic receptors; and (3) postulated magnetic or electrical receptors." The research in homing is one of many scientific fields in which most of the recent discoveries have been "negative." The modern experiments beginning with Watson and Lashley up to Ruppell and Griffin, have shown that most of the manifold theories on homing are highly improbable and this is particularly true for the kinaesthetic and magnetic theories, as Griffin again demonstrates rather convincingly.

To my mind this leaves only two plausible explanations. Either homing is due to a yet unknown sense or else it must be explained by a combination of random searching, memory, and visual orientation in familiar territory. The theory of an undiscovered sense organ is not attractive. To adopt such a theory is frankly an act of desperation. Griffin, however, perhaps errs somewhat in the other direction. In order to make the theory of random searching and use of environmental clues more tasteful, he tends to minimize the evidence against it. For example he asserts "The relationship between speed, percent returns and distance of shipment for Ruppell's starlings is consistent with the theory of exploration by radial scattering." To me, Ruppell's data seem to point exactly to the opposite conclusion. There is no appreciable decrease in the percentage of returns at the larger distances. In the swallow experiments birds that were released southwest of their home, thus near their normal migration route, came home no more efficiently than birds released an equal distance southeast.

The facts "(1) that in some cases birds seem to return from totally strange territory too rapidly to have deviated far from a straight line course and in too high percentages to be accounted for by radial scattering, and (2) that a few homing birds have been recovered en route fairly close to the straight course home," is considered by Griffin as the "principal evidence against exploration as the sole basis of homing." [I think, the feats of nocturnal migrants as well as of insular migrants, like the New Zealand cuckoos, should be quoted as additional evidence.]

Griffin finally suggests that we reexamine the environmental clues that are available to birds rather than to search for unknown sense organs. Perhaps "birds have approximately the same sensory equipment as ourselves . . . and merely make better use of the clues that are available to birds and men alike." As such possible clues he quotes: (1) celestial landmarks (direction of sunrise and sunset related to local geography), (2) atmospheric conditions (movements of air masses with characteristic soaring conditions, passage of warm and cold fronts), (3) ecological clues (knowledge of distribution of biotic areas). It is suggested in each case

how to test in future experiments the possible significance of such clues. Whether or not one shares Griffin's apparent optimism that these factors really account for the successful cases of homing, one must agree with him that a systematic investigation of these factors is more promising than a search for an unknown homing sense.—E. MAYR.

ECOLOGY AND POPULATION STUDIES

4. The Index of Heron Population, 1943. W. B. Alexander. 1944. *British Birds*, 37(11): 205-206. This is the author's annual report on the heronries of Britain. In the 77 heronries whose populations were ascertained in both 1942 and 1943, the 1943 count was 1,354 nests, an increase of 12 percent over 1942. Although increases were noted in all areas the Irish heronries showed increases greater than those of other areas. Of those in the 1943 census 60 were also included in the 1928 census; in these the count for 1943 was 82% of that of 1928. According to the author's calculations the 1943 heronry populations were 18% less than that of the "normal years."

5. Ornithological Extracts from an Ecological Survey of the University Bay Region, Spring, 1943. H. Peter Thomsen. 1944. *The Passenger Pigeon*, 6(1): 3-13. This interesting paper consists mainly of notes on birds observed in a disappearing marsh in the University Bay Region, Madison, Wisconsin, from February 18, 1943, to June 9, 1944. Although there are observations on many species, including migratory notes, the bulk of notes concern the nesting, courtship, and territorial behavior of Redwings (*Agelaius phoeniceus* (L.)). A map shows the locations of the nests, song trees, and the three Redwing territories in the marsh. The size of the marsh accommodating these three territories is one and one-half acres.

6. Birds and the West Tennessee River Lake. Clarence Cottam. 1944. *The Migrant*, 15(1): 1-3. This artificial lake, to be known as the Gilbertsville or Kentucky Reservoir, will have a shore line of approximately 2,000 miles. The author suggests changes in the avifauna which may occur following its formation. It is expected that grebes, cormorants, herons, egrets, bitterns, rails, coots, gulls, terns, plovers, sandpipers, and other shore birds now relatively little known in Tennessee will increase in abundance. Also the vast expanses of shallow water which will exist in this reservoir may become wintering habitats for geese and ducks. A map shows the areas which are to be refuges and those which are to be public shooting grounds.

7. Interdependence in Plant and Animal Evolution. Alfred Gunderson and George T. Hastings. 1944. *The Scientific Monthly*, 49(1): 63-72. Among the evolutionary relationships between plants and animals discussed by this interesting non-technical paper is that of angiosperms and birds. Emphasis is placed on the morphological modification in birds according to the type of plant food used and the role played by birds in the dispersal of the seeds of angiosperms. A justifiable objection may be raised to the statement describing the Australian duck-bill as "intermediate between birds and mammals." Despite its non-technical language this paper can be read with profit by any biologist.

8. Germination of Seeds after Ingestion by Ring-necked Pheasants. Wendell G. Swank. 1944. *The Journal of Wildlife Management*, 8(3): 223-231. The percentage of the seeds of any species digested in passing through the digestive tract of the Ring-necked Pheasant (*Phasianus colchicus* (L.)), varies inversely with the hardness of the cover of the seed. However a few of even the softest seeds such as those of alfalfa, nightshade, millet, and flax pass through

undigested. "Seeds that have passed through the digestive tract of the pheasant germinate more quickly than those not exposed to such treatment." The hardest seeds such as those of wild grape are 75% digested. This paper contributes important data concerning the role of birds in the dissemination of plants.

9. How Birds Spend Their Winter Nights—II. A Symposium by Members of the Tennessee Ornithological Society. 1944. *The Migrant*, 15(1): 9-14. Further notes on the winter roosting habits of birds in Tennessee. This and the previous installment constitute an important collection of this type of data.

LIFE HISTORY

10. The White-faced Storm Petrel or Takahi-kare-moana. Part II. *Trans. Soc. New Zealand*, 73(3): 217-232. A continuation of the scholarly study reviewed in the July issue of *Bird-Banding*, devoted to the feeding, growth and measurements of the chick of *Pelagodroma marina maoriana*. Tables and graphs show morning and evening weights of 16 birds that were followed from 22 to 63 days. In 1941-42, chicks were not fed on 29 percent of the night, but occasionally seem to have been fed by both parents. The amount of food received by the young averaged 2.79 grams in the first 4 days, ranged from 5-8.33 grams from 5-52 days, and dropped to 3.94 and 5.33 grams from 53-60 days. The total amount of food received, including the nights unfed, "is remarkably uniform. In 1941-42, all the eleven chicks averaged between four and five grams per night," p. 221. Average weekly weights and measurements are given of 10 chicks; weight increased from 11 grams the first day to 55 at 4 weeks and 65 at 7 weeks, dropping to 61 at 8 weeks. Parents tend to stay away from Whero during moonlight and severe storms. This paper is a model of careful and conscientious field work.—M. M. NICE.

11. Further Notes on the Stubble Quail in Victoria. R. S. Miller. 1944. *The Emu*, 43(4): 270-273. Examination of the stomach contents of 32 specimens of this species (*Coturnix pectoralis* (Gould)), confirms the author's previous contention that the food consists almost wholly of seeds. Three banding returns are cited which support an earlier observation that this species is non-migratory and non-nomadic. The author points out an interesting fact that may be the cause of erroneous conclusions about the sex ratio in this and other species. Males are the first birds flushed in a group. For instance, of 87 birds shot from flushed coveys of two or more 63 times the bird obtained was the first to flush and 53 of these were males. Of the 24 birds obtained other than the first flushed 19 were females. The author feels that this habit explains the "apparent extreme abnormality" in regard to sex ratio in this species.

12. Wilson's Plover in its Summer Home. Ivan R. Tomkins. 1944. *The Auk*, 61(2): 259-269. The information in this paper is derived from observations by the author on 105 nests of Wilson's Plover (*Pagolla wilsonia wilsonia* (Ord.)), mostly along the lower Savannah River. From the middle of March to the first of April the migration consists of birds enroute through to more northern breeding grounds. Local birds arrive about the first of April. The first flocks in spring contain birds of both sexes. Nesting occurs in May and June with a few nests in July. The most desirable nesting habitat appears to be in areas with high salinity although the precise factor or factors involved in this desirability are not known. The author believes that there has been considerable increase in population since 1900 resulting in an inland extension of the breeding area since the individual plover territory apparently does not decrease in size with increasing population pressure. Fiddler crabs of the genus *Uca* are apparently an important item of food. The interesting account of the behavior of this species shows that it is generally similar with other members of the Charadriidae.

13. The White-breasted Sea-Eagle along the Murray Valley. Norman Favalaro. 1944. *The Emu*, 43(4): 233-242. This paper consists of a series of random notes on the White-breasted Sea-Eagle (*Haliaeetus leucogaster* (Gmelin)), from observations made over a period of ten years along the Murray River which forms the boundary between Victoria and New South Wales. Eight nests were observed. These were at distances of 20 to 80 feet above the ground or the surface of the water. In some cases the nest of the previous year was used. In the case of at least one nest it was enlarged during each successive season of use. Most of the nests were in gum trees. Courting activity apparently begins in late March or early April. A young hatched in July was noted to leave its parents during the following February. The author believes that it is possible that Sea-Eagles have developed the habit of attacking a fish near the surface by "coming in with the sun" thus reducing the chances of frightening the fish. The building of dams on the Murray River in recent years, by backing the water up in the valley as well as into the tributary streams, has increased the area of the feeding grounds of this species and has resulted in a marked increase in its numbers.

REPRODUCTION

14. Notes on a Pair of Moorhens. R. H. Brown. 1944. *British Birds*, 37(11): 202-204. In three seasons (1941-3) this pair of Moorhens (*Gallinula chloropus chloropus* (L.)), observed in a small roadside pond in Cumberland, produced eight clutches containing a total of 52 eggs. One clutch of eight eggs was robbed. From the remaining 44 eggs, 43 young were hatched and 31 were reared. Among the many interesting notes are the observations of the feeding of the second-brood young by juvenile birds of the first brood.

15. Studies of Habitats, Locations and Structural Materials of Nests of the Robin. Walter P. Nickell. 1944. *Jack-Pine Warbler*, 22: 48-64. A summary of observations on 398 nests of *Turdus migratorius* mostly in Michigan, with 11 tables. Height above the ground ranged from 14 inches to 62 feet, averaging 9.66 feet. Eighty-three nests (17 percent) were built on artificial sites. The weight of 23 clay-walled nests averaged 242 grams, that of 22 nests with muck walls 202 grams. "Extravagance in the use of some materials appears to be influenced by surpluses close at hand."—M. M. NICE.

16. Nest-construction by Birds. B. H. Ryves. 1944. *British Birds*, 37(10): 182-188 and 37(11): 207-209. The author suggests that most birds fall into one of the following four categories based on nest-construction: (1) Species in which both sexes build including those in which both sexes share equally and those in which the male build so-called "cocks' nests." (2) Species in which the female alone builds and the male alone provides the materials. (3) Species in which the female alone builds. (4) Species in which the female alone builds and both sexes consistently provide materials.

FOOD HABITS

17. Food Habits of Hawks and Owls in Maine. Howard L. Mendall. 1944. *Journal of Wildlife Management*, 8(3): 198-208. This paper is the result of a compilation of the data recorded by the late Walter Clayton, fur buyer, taxidermist, and naturalist, of Lincoln, Maine. All material except that of the Snowy Owl (*Nyctea scandiaca* (L.)), was collected within 25 miles of Lincoln. Stomach contents of nearly 600 specimens of fourteen species were carefully recorded. These data constitute a very important source of information on the feeding habits of the species studied. Only the Goshawk (*Astur atricapillus* (Wilson)); the Sharp-Shinned Hawk (*Accipiter velox* (Wilson)); and the Great Horned Owl

(*Bubo virginianus* (Gmelin)), are regarded as economically detrimental. The data not only have intrinsic value but also demonstrate the necessity of a local consideration in most cases of the role of predacious species.

18. The Food of Cormorants and Other Fish-eating Birds. Keith C. McKeown. 1944. *The Emu*, 43(4): 259-269. In this paper the author has tabulated the results of the investigation of certain species of birds suspected by sportsmen as detrimental because of alleged destruction of game and edible fish. In the case of the Little Black Cormorant (*Phalacrocorax sulcirostris* (Brandt)), 45 stomachs were found to contain 382 fish of which only ten belonged to edible species. Forty-eight stomachs of the Little Pied Cormorant, (*Microcarbo melanoleucus* (Vieillot)), contained 309 fish of which only four were of edible species. Fragmentary observations are recorded for the Large Black Cormorant (*Phalacrocorax carbo* (L.)); Pied Cormorant (*Phalacrocorax varius* (Gmelin)); Australian Darter (*Anhinga novae-hollandiae* (Gould)); and the Black Bittern (*Dupetor flavicollis* (Latham)). All results are tabulated according to the scientific names of the fish taken from the stomachs.

19. Winter Foods of the Ruffed Grouse in Ohio. Merrill C. Gilfillan and Hubert Bezdek. 1944. *The Journal of Wildlife Management*, 8(3): 208-210. Rated according to frequency of occurrence in stomach contents the six most important foods of the Ruffed Grouse (*Bonasa umbellus* (L.)), in northeastern Ohio during the winter (1942-3) were found to be witch-hazel, greenbrier, grape, blue beech, avens, and hawthorn. In southeastern Ohio the six most important winter foods were found to be greenbrier, sumach, dogwood, grape, bromegrass, and bittersweet.

PHYSIOLOGY

20. Avian Spare Yolk and its Assimilation. Alexis L. Romanoff. 1944. *The Auk*, 61(2): 235-241. Spare yolk is the unassimilated yolk which the bird retains at the time of its hatching. This yolk is contained in the yolk sac, a diverticulum of the intestine, which becomes enclosed in the abdominal cavity before hatching. The spare yolk is absorbed from the yolk sac directly into the blood stream and is able to supply the developing chick with nutrient which allows it to survive for a limited period after hatching without taking food. Data on thirteen species of galliform and anseriform species show that the percentage weight of spare yolk at the time of hatching varies from 9.9 percent in the Bobwhite (*Colinus virginianus* (L.)), to 21.5 percent in Emden Geese indicating that the percentage of spare yolk is smallest among those species which lay the smallest eggs and largest in those laying the largest eggs. The percentage weight of the spare yolk at hatching is increased by incubating temperatures above or below optimum indicating abnormal metabolism in both instances. Assimilation of the spare yolk requires from four to six days and although there is considerable individual variation is not affected materially by starvation. "Physical and chemical studies of spare yolk during assimilation show some changes in fats, indicating their preferential absorption." This paper is important not only as a contribution to avian physiology and embryology but also in demonstrating a common field of interest to ornithology and poultry science.

21. The Pigment of the Scarlet Facial Areas of *Phasianus colchicus* L., a Contribution to the Knowledge of an Animal Pigment. (Das Pigment der "Rosen" des Jagdfasans, ein Beitrag zur Erforschungsgeschichte eines tierischen Farbstoffen.) Otto Voelker. 1943. *Zoologischer Anzeiger*, 142(9/10): 206-211. The eye of *Phasianus colchicus* L. is surrounded by a scarlet area which appears to be enhanced during the courtship period. The pigment is identified as astacin, an animal carotinoid. It is suggested that this pigment is derived from a plant carotinoid taken in food.

22. Sexual Dimorphism in the Falconiformes. Norman P. Hill. 1944. *The Auk*, 61(2): 229-234. The author records as percentages the sexual dimorphism of wing, tail, tarsus, and bill measurements in 49 falconiform species, based on the measurement of more than 2,300 study skins. The degree of sexual dimorphism varies from the Cathartidae in which the male is practically of the same size as the female, to the Falconinae and the Accipitriinae in which the male may be as small as two thirds the size of the female. Environment and life history seem to show no correlation with degree of dimorphism. The author points out that as a rule the size of the tarsus of the male is more apt to approach the female size more than any of the other male measurements. The data do not indicate in any way the range of dimorphism within a species either by the extremes of measurements or by standard deviation of the measurements. Little use is made of European literature on the subject of dimorphism in this order. Nevertheless this paper contributes an interesting and important group of data.

23. Winter Protein Requirements of Bob-white Quail. Ralph B. Nestler, Woodrow W. Bailey, Leonard M. Llewellyn, and M. J. Rensberger. 1944. *The Journal of Wildlife Management*, 8(3): 219-222. Experiments with 714 Bob-whites (*Colinus virginianus* (L.)), lead the authors to conclude that the winter maintenance requirement is 11-12 percent crude protein. This gives the maximum egg production and fertility.

BEHAVIOR

24. The Use of Animate Perches by the Carmine Bee-eater and other African Species. M. E. W. North. 1944. *The Ibis*, 86: 171-176. The author reports two interesting records from Brava, southern Italian Somaliland. A carmine Bee-eater (*Merops nubicus* (Gmelin)), was observed perched on an Ostrich (*Struthio camelus*, probably *molybdophanes* (Reichenow)). Another of the same species was observed perched on a grazing sheep. The author is convinced that the use of animate perches is habitual rather than accidental.

25. Nesting of the Turkey Vulture in Ohio Caves. Victor Coles. 1944. *The Auk*, 61(2): 219-228. The observations recorded in this paper are based on studies of nesting Turkey Vultures (*Cathartes aura septentrionalis* (Wied)), in the Sugar Grove Region of central Ohio. This is a region of deep ravines with a total relief of 200 to 400 feet. Although some data are given concerning types of caves used as nesting sites, conditions in the caves during nesting, nest making, eggs, and incubation, the most important observations are those on nesting territories. "Regardless of the length of the valley, not more than one nest on any one side of a valley was ever discovered. Should the valley be U-shaped or should it be large and contain several apparently ideal sites, it is then possible that one nest may be found on each side of the valley or one at one side and one at one end."

26. The Robins of Interpont. Margaret M. Nice. 1944. *Audubon Bull., Ill. Aud. Soc.*, no. 50: 1-5. Male Robins drove six other species from the nesting tree or feeding shelf within the territory. One season a color-banded pair raised three broods in two nests; young were fed by the male until one month old. A color-banded male and female mated three years in succession. English Sparrow eggs placed in two Robin nests were accepted, but the young were not fed. Cowbird eggs were rejected by two Robins, accepted by two; one Cowbird that hatched the same day as two Robins could not compete with its large nest-mates and three days later was dead.—M. M. Nice.

27. Naked Pigeons. Leon J. Cole and Ray D. Owen. 1944. *Journ. Heredity*, 35: 3-7. Two pairs of featherless pigeons, the progeny of a single pair of normally feathered homers, were mated to normal pigeons, but all eggs were infertile.

By means of artificial insemination, four young of one naked male were obtained; these were all feathered; when mated together one pair had four naked (all males) and thirteen normal offspring—"clear indication that naked is inherited as a simple recessive." The behavior of these extraordinary-looking, completely featherless birds is instructive. The instinctive nature of flight is clearly shown: "Although their wings are almost useless organs, these birds seem unable to learn to regard them as such. Placed on a table, they will hopefully take off into space, beating their wings vigorously, as though confident of a controlled landing which, however, ends in a 'crash' . . . Inadequate attire produces no inferiority complex in them; they strut and coo, puff and bow as if arrayed in the finest of raiment." I inquired of Prof. Owen how normal pigeons could be induced to accept such strange looking mates; he replied: "The prospective mates are isolated from other birds, in adjacent cages, and put together more or less 'gradually' under observation until it is sure they are not incompatible, and from then on kept as a pair in an individual breeding cage. The birds therefore have no choice between mates; their alternatives are (1) the selected mate and (2) no mate at all. Mostly they choose the first alternative."—M. M. Nice.

28. Early References to Territory in Bird Life. David Lack. 1944. *The Condor*, 46(3): 108-111. The author discusses a number of historical references to territory in bird life not recorded by Nice (*American Midland Naturalist* 26: 441-487). Among these are Aristotle (300 B. C.), Zeno of Citium (200 B. C.), Gesner (1555), Olina (1622), and Buffon and Montbeillard (1771-1783). Montagu (1802) correctly described pair formation and the part it plays in song.

29. The Broken-Wing Behavior of the Killdeer. C. D. Deane. 1944. *The Auk*, 61: 243-247. Good photographs of distraction and threat display in *Oxyechus vociferus*, but the text lacks clarity. Phases I and II may be classified as distraction (injury-feigning), III as threat, IV as threat and attack, and V as probably a substitute activity. The author attempts to demolish the theory, which he considers held by "many observers," that the "broken-wing trick is . . . a reflex action that automatically functions when an enemy enters the breeding territory." (I know of no one that holds such an opinion.) He believes that "great intelligence" is involved in producing different displays "best suited to the characteristics of the approaching enemy." But even a protozoan responds differently to different stimuli. Nest-protective displays are not reflex, but instinctive activities and they do not function automatically, but are influenced by the stage of the nesting cycle, by the physiological state of the bird, its temperament and experience, and by the identity and behavior of the enemy. As with other instinctive acts, learning may play a part in deciding whether and with what intensity the act is performed.—M. M. Nice.

HISTOLOGY

30. Histological Studies on Argentine Hummingbirds. (Estudio histológico de los Trochilidae realizado en las especies argentinas.) Tomas Negri and Juan Carlos Radice. 1942. *El Hornero*, 8(2): 190-217. Descriptions of the normal histology and microanatomy of lungs, gall bladder, heart, skeletal muscle, esophagus, small intestine, pancreas, kidney, gonads, adrenal glands, liver, and stomach. Species studied were *Chlorostilbon aureoventris* (d'Orb. & Lafr.), *Hylocharis chrysura* (Shaw), *Colibri serrirostris* (Vieill.) and *Sappho sappho* (Less.). Among the more interesting points in this investigation is the observation that a gall bladder is present in all species studied contrary to the statements of some previous investigators. The lungs are not covered by pleura in the strict sense of the term but rather by reticular connective tissue without elastic fibres. The surface of the mucosa of the esophagus is stratified squamous epithelium with mucous

glands, a common situation in birds. Alpha, beta, and gamma cells (Bensley) as well as cells similar to the cells of Bloom were identified in the pancreas. The relatively large quantities of glycogen in the liver is correlated with the carbohydrate diet of the birds. There are some observations on vitamin deficiencies in Hummingbirds. The authors also point out that Hummingbirds are good experimental animals which, with proper methods, can be maintained in captivity for considerable periods of time.

PALEONTOLOGY

31. A New Terrestrial Vulture from the Upper Eocene Deposits of Wyoming. Alexander Wetmore. 1944. *Annals of the Carnegie Museum*, 30: 57-69. The partially complete skeleton of *Eocathartes grallator* Wetmore 1944 was secured for the Carnegie Museum by Dr. John Clark in Sweetwater County, southeastern Wyoming. The skeleton is sufficiently complete to allow a very accurate designation of the systematic position of this species. It was found in fine, fairly soft sandstone in the upper part of the Washakie formation of the upper Eocene. The author characterizes the species as follows: "A bird of the suborder Cathartae, with degenerate wings, heavy pelvis, long legs, and large skull with large orbits, large narial aperture and strong premaxilla and mandible; longitudinal axis of mandible nearly straight, not decurved; lachrymal fused with the frontal; narial region open, and the olfactory cavity relatively large; palate exhibiting the arrangement of indirect demognathism that marks the Cathartae as a group; processes for muscular attachment on the cervical vertebrae large and strong; pectoral girdle weak, with coracoid relatively small and non-pneumatic; tibio-tarsus long and heavy; tarso-metatarsus long and slender; anterior toes relatively long and strong; hallux weak, and apparently with a slightly elevated attachment on the shaft of the metatarsus."

Systematically *Eocathartes grallator* is the only known species and *Eocarthartes* the only known genus in the family *Eocarthartidae* which is placed as the only family in the superfamily Eocathartatoidea of the suborder Cathartae. *Eocathartes* occupied an ecological niche completely different than that of any of the modern members of the suborder Cathartae. Its terrestrial habits are to the vultures (Cathartae) as are the terrestrial habits of the secretary-birds (Sagittariidae) to the hawks and falcons (Falcones). This is a very significant contribution both to ornithology and to avian paleontology.

GEOGRAPHIC DISTRIBUTION

32. Southeastern Limits of the Spotted Sandpiper's Breeding Range. Henry M. Stevenson, Jr. 1944. *The Auk*, 61(2): 247-250. A critical examination of the breeding records of the Spotted Sandpiper (*Actitis macularia* (L.)) leads the author to conclude that the breeding range of this species does not include southern Louisiana and northern South Carolina and that it does not extend south to central Alabama. "Until more definite breeding evidence is presented . . . the southeastern breeding limits of this species should be described as middle(?) and eastern Tennessee and western North Carolina, casually to western Mississippi."

33. Some East African Birds of Prey. M. E. W. North. 1944. *The Ibis*, 86: 117-138. This paper contains numerous notes on the distribution, habits and nomenclature of 15 species of East African birds of prey. The observations were made in Kenya Colony, North Tanganyika Territory, Uganda and Italian Somaliland from 1938 to 1941. The species included are: *Gyps rüppellii* (Brehm), *Pseudogyps africanus* (Salvadori), *Torgos tracheliotus* (Forster), *Trigonoceps occipitalis* (Burchell), *Neophron percnopterus* (L.), *Necrosyrtes monachus* (Tem-

minck), *Milvus migrans* (Boddaert), *Aquila verreauxi* (Lesson), *Aquila nipalensis* (Hodgson), *Aquila rapax* (Temminck), *Circus pectoralis* (Smith), *Gypohierax angolensis* (Gmelin), *Gypaetus barbatus* (L.), *Buteo rufofuscus augur* (Rüppell), and *Melierax poliopterus* (Cabanis).

34. Notes on the Palaearctic Migrant and Resident Duck and Geese of Abyssinia. H. M. Woodman. 1944. *The Ibis*, 86: 151-166. This is an excellent set of notes on 24 species. Arrival dates of migrant ducks in Abyssinia, insofar as known, are in October and November; departure dates are from April to June. There is an interesting summary of distribution according to habitats.

35. The Birds of Southeastern Tibet. F. Ludlow. 1944. *The Ibis*, 86: 43-86 and 176-208. This paper is based on collections and observations made in the course of expeditions into the Assam Himalaya and the Tsangpo Valley in 1936 and 1938. Mostly it is devoted to an annotated list. It will be an important source of information for this area and emphasizes further the biological similarities of the Himalayas and the mountains of southwestern China.

36. The Red-kneed Dotterel in Coastal Southeastern Australia. A. R. McGill. 1944. *The Emu*, 43(4): 225-228. This is the "first known occurrence" of this species, *Erythrogonys cinctus* Gould, in coastal southeastern Australia (County of Cumberland, Sydney District, New South Wales). Normally it is a species of the inland country in New South Wales and Victoria.

37. Birds of Perth. E. H. Sedgwick. 1944. *The Emu*, 43(4): 229-233. Brief notes on 114 species of birds observed in the city of Perth, West Australia.

38. Land Birds Washed Up on a Sydney Beach. D. L. Serventy. 1944. *The Emu*, 43(3): 249-251. The author emphasizes the usefulness of this kind of data as supplementary evidence concerning the random movements of birds which occasionally lead to the establishment of species on previously unoccupied islands. He lists specimens of eleven species recovered on a beach in Sydney.

39. Notes on Some Rarer Waders. D. L. Serventy. 1944. *The Emu*, 43(4): 274-280. Notes on records of the Wandering Tattler (*Tringa incana* (Gm.)); Grey-tailed Tattler (*Tringa brevipes* (Vieill.)); Great Knot (*Calidris tenuirostris* (Horsfield)); and Broad-billed Sandpiper (*Limicola falcinellus* (Pon-toppidan)) from Australia.

SYSTEMATIC ORNITHOLOGY

40. An Attempted Simplification of the Mathematical Method of Subspecific Differentiation and Identification. R. S. Miller. 1944. *The Emu*, 43(4): 253-258. The author presents a simplified and practical approach to the mathematical treatment of measurements when such measurements are used in the separation of subspecies. Simple measurements (length of tarsus, culmen, etc.) should give a symmetric (normal frequency) curve unless there is: "(a) Too small a number of specimens of one subspecies to obtain a graph truly representative of the subspecies, or, (b) a mixed selection from two or more closely related subspecies which may tend to give a multiple humped effect if the . . . [particular measurement] is one of the distinguishing factors between the subspecies." The frequency curves for the same measurement in two populations may differ in one of three ways: (a) Difference in the mean value about which the variation occurs. (b) Same mean but with difference in degree of dispersion. (c) "There may be a combination of (a) and (b), or, in other words, different means with differing dispersion; this is, of course, the normal happening." The author points out that it is dangerous to use the extreme measurements in a series for indicating

the degree of dispersion. "The danger in using this measure [highest and lowest measurements in each series] is the fact that the real upper and lower limits are rarely known, as very small or very large measurements are always possible but only infrequent, so that only the possession in the hand of every known specimen of a species could give the correct dispersion; whilst if only a small number of samples is at hand the range is subject to meaningless fluctuations of considerable magnitude according as values of greater or less infrequency happen to have been actually observed. A measure subject to erratic alterations by casual influences in this way is not of much use for purposes of comparison and, moreover, the measure takes no account of the form of the distribution with the limits of its range." Particular emphasis should be directed toward this last point.

"The quantity usually selected best to provide the quality of reasonable stability for any series so that no single observation can have an unduly preponderant effect on its magnitude, whilst at the same time being truly based on every observation made, is that known as standard deviation." It is pointed out that standard deviation not only shows the shape of the frequency curve (distribution of measurements about the mean) but also shows more accurately the actual extremes since according to the theory of the normal frequency curve a range of six times the standard deviation includes 99 per cent of the observations so that once the standard deviation of a reasonable number of specimens has been obtained the *normal limits of variation for the whole population are known*. This paper should be carefully studied by ornithologists who use measurements in systematic work as one of the criteria for separating races or subspecies. It shows clearly how statistics can be used properly, not as an end in themselves but as a tool to insure the most scientific utilization of the available data. The author does not consider the problem of the testing of the significance of the differences between means. Once the value of the use of standard deviation in the expression of data on measurements becomes apparent the testing of the significance of means becomes the next logical step.

41. A Revision of the Family Nectariniidae (Sunbirds). Jean Delacour. 1944. *Zoologica*, 29(1): 17-38. The Nectariniidae, the sunbirds, are an old-world family of passerine birds showing adaptations for feeding on the nectar of flowers and the insects which are attracted to flowers. Superficially they show many adaptations which are comparable to those of the Trochilidae, the humming birds. Phylogenetically the Nectariniidae are most closely related to the flower-peckers, the Dicaeidae, but also show affinities to the *Remiz* group of the titmice and to the Zosteropidae, the white-eyes. This important revision is based not only on an examination of many study skins but also on extensive field observations and avicultural experience with this family. Five genera are recognized: *Anthreptes* (16 species), *Nectarinia* (5 subgenera and 66 species), *Neodrepanis* (2 species), *Aethopyga* (13 species), and *Arachnothera* (9 species). This revision is important because it reviews critically the entire family throughout its geographic range, thereby eliminating the confusion resulting from previous studies of more limited scope. The author lists 48 synonyms of the five recognized generic names. This is the type of study which should be applied to many groups of birds.

42. Notes on the Steller Jays (*Cyanocitta stelleri*) of Southern Mexico. John W. Aldrich. 1944. *Proceedings of the Biological Society of Washington*, 57: 23-24. Because of the original description of *coronata* Swainson whose type is not in existence, the author concludes that the type locality must be somewhere in the mountainous regions south or southeast of Mexico City and agrees with the selection by W. B. Davis (in manuscript) of Cofre de Perote, Vera Cruz, as the restricted type locality of this race. Specimens from Michoacán are deeper colored, more purplish on the breast, back and crest than "*azteca*" from the high mountains in the vicinity of Mexico City, and very much darker and

more purplish than *coronata*; these are referred to *Cyanocitta stelleri purpurea* Aldrich which is described in this paper.

43. A Review of the Forms of *Colinus leucopogon* (Lesson). Herbert Friedmann. 1944. *Proceedings of the Biological Society of Washington*, 57: 15-16. In revising this species the author recognizes the following: *Colinus leucopogon leucopogon* (Lesson), *Colinus leucopogon hypoleucus* (Gould), *Colinus leucopogon incanus* Friedmann 1944, *Colinus leucopogon leylandi* (Moore), *Colinus leucopogon sclateri* (Bonaparte), and *Colinus leucopogon dickeyi* (Conover). This adheres more closely to the older treatment by Peters and rejects the placement by Hellmayr and Conover of these forms in *Colinus cristatus*.

44. Systematic Notes on East African Birds. C. W. Mackworth-Praed and C. H. B. Grant. 1944. *The Ibis*, 86: 166-171. The authors present evidence which indicates that the type locality of *Guttera edouardi* (Hartlaub) is Durban, Natal, and that this name is correct for the Natal species. *Guttera verreauxi* (Elliot) is the correct name for the West Africa species and its type locality is fixed as French Guinea.

BOOKS AND MONOGRAPHS

45. Bibliography, Ornithology and Mammalogy, 1914-1943. Jean Delacour. 1944. Published privately. 24 pp. The author has prepared in this attractive booklet a list of more than five hundred of his zoological publications. These papers have been devoted to field and avicultural observations as well as systematic studies. It should prove to be a useful reference bibliography.

46. The Illustrated Encyclopedia of American Birds. Leon Augustus Hausman. 1944. Garden City Publishing Company, New York. xix + 541 pp. \$1.98. This compilation is designed to give basic and essential information on each species and subspecies of North American birds. There are brief descriptions of the male (breeding plumage) and female, length measurements, notes on distribution, and general notes for each species and subspecies. Although both common names (according to the A. O. U. check-list) and scientific names are given the arrangement in the book is alphabetical according to the common names. There are also notes on the families represented in the North American avifauna. The information in this encyclopedia has been selected on the basis of the author's experience in elementary ornithology and the function of the book is not that of a field guide but rather a source of information about the bird once it has been identified. There is a systematic section in which the North American birds are classified according to families and orders with scientific names (including authors), common names, and A. O. U. numbers. There is also a compilation of alternative common names. As a single, compact, usable and inexpensive source of information on the birds of this continent this encyclopedia should be a popular and useful tool for the lay student of ornithology.

47. The Bobwhite Quail in Eastern Maryland. Kenneth A. Wilson and Ernest A. Vaughn. 1944. The Game and Inland Fish Commission of Maryland, Baltimore, Maryland. 138 pp. Like all resettlement game projects this one was conducted to increase game rather than knowledge. Evidence of this is that the mortality was measured during only one winter out of seven and also that there were no investigations based on banding. The most remarkable technical finding is the unusually light winter mortality (seven per cent) during the single winter for which data were obtained. Unlike most similar ventures, the game (Bobwhite in this case) actually increased during the study period. The authors maintain that drainage was essential to both game management and forestry in this site, an exception to accepted principles of land use. The authors have a sane

attitude toward predation; their findings indicate that predator control would not have increased the quail population. The principal deficit in the over-all research job is that many factors were manipulated simultaneously, not an uncommon error in wildlife research. It is commendable that a Resettlement Administration Research project was taken over by the State and carried to conclusion. Many such ventures have been completely lost to posterity despite the large sums spent. The presentation of this report is lucid, simple, and free of highbrowism.—ALDO LEOPOLD.

48. Talk about Wildlife for Hunters, Fishermen, and Nature Lovers. Ross O. Stevens. 1944. North Carolina State College Wildlife Club, State College Station, Raleigh, North Carolina. 229 pp. \$3.50 (Student Edition, \$2.25). In this unique treatise the author discusses the problems of the development of a sound management program and policy from the viewpoints of the land-owner, the sportsman and the technical. There is a matter-of-fact, analytical presentation of the political and administrative problems involved in State management programs, citing actual situations in various States. Critical attention is given to the problems of effective programs of enforcement, education and research. Emphasis is placed on the desirability of the non-partisan staggered conservation commission. There is an emphatic affirmation of the theory that the ownership of wildlife rests with State governments, with those governments holding it "in trust for all the people." Nevertheless proper recognition is given to the importance and success of federal regulation and restoration of migratory wildlife. Emphasis is placed on the inevitable ill effect of a system based on the philosophy of "ownership" of wildlife by the individual land owner. Particularly interesting is a discussion concerning the artificial propagation of game species based on the replies of various States to a questionnaire submitted by the author. Noticeable is the great variability and lack of integrated planning in the various artificial propagation programs. "Thirty-nine of the forty-three States had to admit that they had not done the necessary research." The two States which had completed a fair amount of research on the survival of released captivity-raised game birds stated that they were ready to abandon artificial propagation. Recognition, however, is given to the success in the artificial propagation of the Ring-necked Pheasant, particularly in the North Central States. There is a chapter devoted to the complexities of the management of predators and rodents, emphasizing the need of more information concerning the relationships between these groups and the random manner in which the problem has been approached up to the present time. There is an enlightened discussion of fish management, including, among other things, the problems of food supply, pollution, regulation of number and kind of fish, regulation of harvest, and stocking policy, pointing out the obvious limitations of stocking as a management measure. This little book is recommended to any person interested in an integrated treatise of the entire problem of wildlife conservation and management from its scientific, social and political aspects. It is the type of treatise that can go far to perpetuate a well-balanced conservation philosophy. Perhaps the only worthwhile criticism that can be suggested is that the book does not go far enough, but this would not be possible without increasing it in size. The author might well consider the possibility of an expanded revision.

49. The Canvasback on a Prairie Marsh. H. Albert Hochbaum. 1944. American Wildlife Institute, Washington, D. C., XII & 201 pp.—Probably no group of wild birds in North America are of as great interest to as large or varied a group of people as the waterfowl. Despite this, until recently the biology of our wild ducks has been very incompletely known. The observations of Albert Hochbaum, summarized in his book, "The Canvasback on a Prairie Marsh" (the title a masterpiece in understatement of subject-matter), have gone a long way toward

relieving this deficiency. Yet Mr. Hochbaum is the first to point out how many questions relating to the lives of wild ducks he is still unable to answer.

The successful presentation of scientific data in a popular manner is one of the most difficult of literary achievements. Mr. Hochbaum has been remarkably successful in accomplishing this. He seems to have captured the atmosphere of a great waterfowl marsh without sacrificing the value of his data. One is able to visualize the varied activities of the ducks in relation to their biotic and physical environment through the concise, well written word pictures (almost to hearing the gurgling of redwings and the rattle of marsh wrens) without losing the feeling that this is authentic information based on intelligent interpretation of a considerable quantity of data.

We are transported to the south end of Lake Manitoba, in south-central Manitoba, where a wave-formed, sandy barrier produces a marsh nineteen miles long by five miles wide. Here we witness the goings and comings of the wild ducks from their arrival before the bays are clear of ice until they are forced to leave by the autumn freeze. Our appreciation of the concisely and orderly arranged presentation of the complicated behavior of the waterfowl is enhanced by the artistic and pleasingly life-like colored frontispiece and black-and-white sketches in the text all drawn by the author. There is none of the tedious, diary style of hour-by-hour reports of observations so common in writings on bird behavior. Instead, the interestingly written descriptions are based on the boiling down of a large number of relevant observations. The ducks are considered in relation to other animals and plants, rather than as subjects apart from their environment. A list of the plants and animals comprising the community is appended. A table giving preferred nesting habitats for the different species is illuminating. The breeding territory is selected by the hen; it must have open water for loafing areas and a nearby, although not necessarily contiguous, area with suitable nesting cover. The importance of the loafing area is stressed as the center for territorial activities. Surface-feeding ducks require a mud bar or log in the loafing area to sit on; diving ducks do not. The territory is defended by the drake only against other ducks (male or female) of his species that are in breeding condition. He defends the territory only until incubation begins when he abandons the female and territory. The author concludes that the primary purpose of territory in ducks is to insure isolation of pairs during the fertilization part of the reproductive cycle. Most species have a preponderance of males. This is especially true of canvasbacks and redheads, and is an important fact for consideration in any game management program. The reasons for these unequal sex ratios are still not thoroughly understood. Similarity and difference of courtship flight and pursuit in defense of territory has led to confusing the two. Territory defense ends in one male separating from the group and slanting back to his territory after a relatively short pursuit.

In a summary of important points for consideration by game managers the author points out among other things that the young of surface-feeding ducks are on the wing much earlier in the summer than are diving ducks, thus exposing them to fewer hazards and making them less vulnerable to unfavorable late summer climatic conditions. He also warns that late spring and summer appraisals of populations on a marsh may be misleading unless due consideration is taken of post-breeding movement from one marsh to another.

Throughout the book full use seems to have been made of published works of other investigators. Sixty-nine titles are included in a list of literature cited. Also the author seems to have been particularly successful or fortunate in enlisting the aid of a large number of cooperators. This reviewer finished the book with the feeling that Mr. Hochbaum's investigations have contributed much to the understanding of the biology of our inland breeding waterfowl.—John W. Aldrich.