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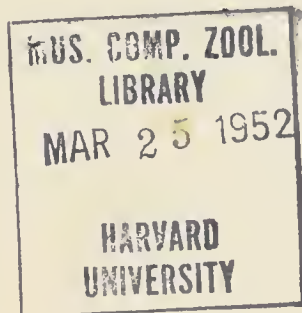
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A Quarterly Magazine
of
Ornithology

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Editor

KEITH R. KELSON
Associate Editor



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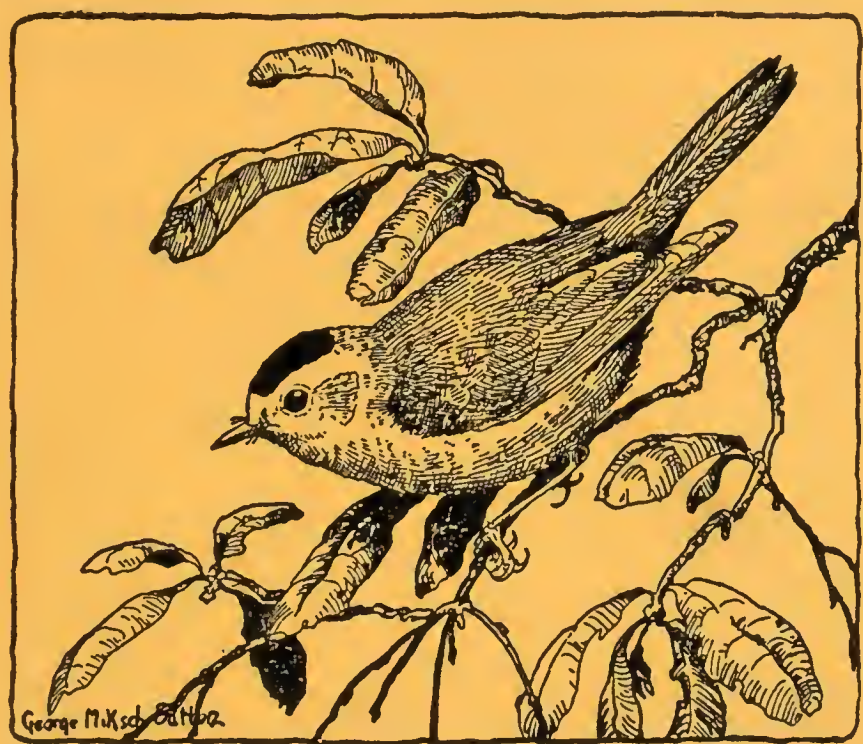
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THE WILSON ORNITHOLOGICAL CLUB

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Named after ALEXANDER WILSON, the first American ornithologist.

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THE WILSON BULLETIN

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All articles and communications for publication, books and publications for review should be addressed to the Editor. Exchanges should be addressed to The Wilson Ornithological Club Library, Museum of Zoology, Ann Arbor, Michigan.

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THE PRESIDENT'S PAGE

This letter is in the nature of hail and farewell. *The Wilson Bulletin* already has a new Editor and Associate Editor, and before the next issue appears the Club will have a new Secretary and a new President. It is scarcely necessary to say that those who are retiring wish these new officers well.

I cannot let the occasion pass without expressing, on behalf of the Club, our appreciation for the long and unselfish service which George M. Sutton as Editor, Andrew Berger as Assistant Editor, and Harold F. Mayfield as Secretary have given. During the five years of World War II, the Wilson Club held no general meetings. Following this trying period, George Sutton took over as President, and later as Editor. His work went far toward re-knitting our membership into a compact group. With Andy Berger's assistance, he maintained the high standards of *The Wilson Bulletin*. The generosity of many Club members has made possible the publishing of more color plates than in any similar period of the *Bulletin's* history.

To the Secretaryship, Harold Mayfield brought a wide business experience and a deep understanding of human values. He is one of the devoted amateurs in our ranks, and his work on Kirtland's Warbler has demonstrated an ability to match the professional in scientific competence. More than any other person, he is responsible for the excellent programs of our annual meetings during the last five years.

No person may serve the Wilson Club without gaining a sense of the vigor of its membership. The Club is sixty-two years old, fairly venerable as such organizations go in this country. Yet it has not run out of ideas, nor of members to put these ideas into execution. Its early interest in life history and ecology has flowered and borne an abundant harvest. In a very real sense, it has helped in shaping the direction of ornithological work throughout the world.

Mark Twain, in "A Connecticut Yankee," has a wonderful statement as to his concepts of government and society. To paraphrase his ideas, officers come and go, but the Club is the enduring thing. All strength derives from it, and it will flourish just so long as its members share in the responsibility for its welfare. I am happy that at this year's Annual Meeting we seem likely to wipe out for all time the artificial barriers imposed by different classes of membership in the Club. There will no longer be an Associate grade; all members will be equal in their duties and their privileges. This is as it should be in a democracy.

One source of deep gratification lies in the close cooperation between the Wilson Club and its sister organizations, the American Ornithologists' Union and the Cooper Ornithological Club. Through some happy circumstance, each organization has found its sphere of usefulness, and no clashes of interest have arisen. This comity has made possible the service of Sewall Pettingill as President of the Wilson Club while he was also Secretary of the A. O. U., and has allowed Josselyn Van Tyne to maintain an active interest in Wilson Club affairs while he is President of the A. O. U. It is fortunate indeed that such relationships exist.

My personal thanks go to all who have so unselfishly given of their time and money during the past two years. This has made the President's lot a happy one. I'll see you in Gatlinburg.

MAURICE BROOKS



FLINT-BILLED WOODPECKER
(*Phloeoceastes guatemalensis regius*)

Adult male, life-size, sketched February 16, 1938, along the Río Corona, near the village of Güemes, Tamaulipas, México, by George Miksch Sutton. This is the second of a series of eight color plates honoring the memory of Dr. David Clark Hilton.

THE FLINT-BILLED WOODPECKER

BY GEORGE MIKSCH SUTTON

THE Flint-billed Woodpecker (*Phloeoceastes guatemalensis*) has been widely known as the Guatemalan Ivory-bill; but since it is neither very closely related to the true Ivory-bills of the genus *Campephilus*, nor by any means restricted to the republic of Guatemala, a new name seems to be needed. Wetmore has said of the species: "These are strong-muscled, robust birds with tough, thick skins, so that their preparation as specimens entails definite physical labor. A needle will scarcely penetrate the thickened skin of the back of the head" (1943. *Proc. U. S. Natl. Mus.*, 93:272). In one of my early notebooks appears a statement, not wholly in jest, to the effect that a good name for the bird would be Thick-skinned Woodpecker.

The Flint-bill ranges from Panamá northward throughout tropical Central America and México to southeastern Sonora in the west and to central Tamaulipas in the east. Along the Laredo-to-Mexico City highway I have seen it repeatedly as far north as Victoria and Guemes, Tamaulipas. I have never seen it on the Mesa de Llera proper, but in the well-wooded valleys below the mesa it is fairly common. In the northern part of its range it probably does not reach elevations above 2000 feet.

It is about 14½ inches long. Adult and immature birds of both sexes are crested. The adult male's entire head is red. In the female the pileum and throat are black, while the nostril feathers, fore part of the chin, and sides of the head are red. In nestling males the crest proper is red, but the front half of the crown and most of the head are dusky. In young females the upper part of the crest is black, the lower part red. As for the neck and body, these are largely black in all plumages; but a broad white line down each side of the neck connects with a narrow white shoulder stripe; the breast and belly are barred with light grayish buff; and the wing linings are pale yellow. This yellow seems especially bright when the sun's rays are nearly horizontal. In adults the bill is flinty gray at the base, grayish white toward the tip, the eyes pale yellow, the skin around the eyes dark gray.

For a long time I thought that the Flint-bill was voiceless; but on May 29, 1947, along the Río Sabinas in Tamaulipas, I happened upon a family group—a young female, well able to fly, and its parents. The adult birds gave a loud note of protest which I jotted down as *keck* or *kack* (Sutton, 1950. *Bird-Banding*, 21:49). The species' most characteristic "sound," however, is an incisive double-rap, a sort of abbreviated drumming, sometimes given in chorus. Such a chorus Mr. and Mrs. Robert J. Newman, Mr. and Mrs. Richard R. Graber, Charles Shaw, and I heard in the late afternoon on January 8,

1952, in the vicinity of Rancho Sabinal, west of Aquismon, San Luis Potosí. A single bird, a male, in a tree near the old hacienda in which we were living, continued to give the double-rap from one spot (about 30 feet from the ground) for about three-quarters of an hour, and we heard what seemed to be answering double-raps, but no *vocal* Flint-bill utterance, from a dozen directions during the same period.

The flight of the Flint-bill is undulatory, though usually not deeply so. The bird is energetic in its feeding. With its powerful bill it hacks away at the bark and dead wood.

The nest is excavated by both the female and the male. On March 1, 1938, while on a riverbank trail near Gómez Farías, Tamaulipas, I heard the dull *puck, puck*, of a woodpecker at work above me. When the bird finally backed out so that I could see it, I perceived that it was a female Flint-bill. A loud double-rap from her served to summon the male, who went to work promptly, though for some reason he did not wholly disappear within the cavity. Occasionally he backed out completely to toss a billful of chips into the air. In 1941, members of the Cornell University—Carleton College Expedition found two nests—one (partly finished) half-way up the mountain just west of the Río Sabinas, near Gómez Farías, about 1500 feet elevation, April 12; the other, finished but empty, about fifteen feet from the ground in a leaning dead tree very close to the river, April 30 (Sutton and Pettingill, 1942. *Auk*, 59:19). I have never seen the eggs.

UNIVERSITY OF MICHIGAN MUSEUM OF ZOOLOGY, ANN ARBOR, JANUARY 23.
1952

NOTES ON VARIATION IN THE CAROLINA CHICKADEE

BY WILLIAM A. LUNK

RECENTLY I undertook to identify an Oklahoma series of Carolina Chickadees (*Parus carolinensis*) in Dr. George M. Sutton's collection, and to clarify the limits of that portion of the species' range. Extended far beyond the scope of the original problem, the work finally entailed not only rather exhaustive comparison of material from Oklahoma and neighboring states, but also study of considerable series from the eastern part of the range. In all, well over 450 specimens of *P. carolinensis* and about 100 of *P. atricapillus* were examined. I assembled data which it seems desirable to present without further delay, outlining some tentative conclusions but fully recognizing the incompleteness of many parts of the study.

For the use of material I am indebted to Herbert Friedmann, John T. Zimmer, M. Dale Arvey, E. R. Hall, A. I. Ortenburger, Arthur C. Twomey, and others; special thanks are due J. L. Peters for examining some specimens for me and loaning others, Josselyn Van Tyne and R. W. Storer for suggestions both in the study and in preparation of this paper, Richard and Jean Graber for collecting a number of specimens, W. H. Brudon for assistance in preparation of the figures, and above all to Dr. Sutton for generously placing his series at my disposal and assisting throughout the work.

NORTHWESTERN RANGE OF THE SPECIES

The literature indicates no very clear understanding of the northwestern limits of the Carolina Chickadee's range. I find that the species occurs throughout Oklahoma, exclusive probably of the panhandle, westward at least to Lipscomb County in the northeastern corner of the Texas panhandle, and across southern Kansas from Meade County northeastward to Greenwood and Douglas counties.

Included in Dr. Sutton's fine series (mostly of breeding males) are birds from Ellis (Sutton, 1936:433), Roger Mills, Caddo, Payne, Noble, Oklahoma, and Murray counties, Oklahoma. Nice (1931:131) has given additional data on the species in Oklahoma, including the report of specimens from Woodward County. Material I have examined from other collections adds a number of other Oklahoma localities. The Lipscomb County, Texas, bird is an unsexed immature (U.S.N.M. No. 186735) taken in June. Most of the 31 Kansas specimens examined, taken by various collectors, are in the University of Kansas collection. Two from Douglas County, however, are at the University of Oklahoma; and the single one from Meade County, collected in the summer of 1950, by Graber, is in the Sutton collection.

I wish to point out that the northern limit of *P. carolinensis* in this region, as here outlined, very nearly coincides with the southern limit of *P. atricapillus*. I have made no attempt to locate all Kansas specimens of the latter species: but among those collected by Graber and now in the Sutton collection are examples from as far south as Hamilton, Meade, and Butler counties. The occurrence of *P. atricapillus* in Oklahoma has been reported (Nice, *loc. cit.*) but I have seen no specimen, or other published record of a specimen, of this species from the state.

METHODS AND SCOPE OF STUDY

In studying the specimens, I first considered variation in size and color, temporarily disregarding present subspecific distinctions. Size data I have treated statistically and graphically; but only direct comparisons were employed for color, with no attempt at precise quantitative treatment.

Measurements were made with dividers, and wing-measurements are of the chord; tail-lengths were taken by visually placing one tip of the divider at the point where the middle rectrices meet the skin, and measuring to the tip of the longest feather (unless this obviously was loosened and extended beyond its normal position in the tail).

Juvenile chickadees are recognizable by texture of body plumage, dullness of coloration, and other features, and were not considered in any of the tabulations. Recognition of first-winter and one-year-old birds presents more of a problem. Few series included enough accurately aged specimens to be of use in this connection (a notable exception being the large series of *P. a. septentrionalis* collected by Wetmore at Lawrence, Douglas County, Kansas). There are probably enough differences so that a technique for age-determination could be perfected; but thus far I do not feel I can make accurate and clear-cut distinctions. Finding, furthermore, no demonstrable difference in size or color between comparable series of adults and known immatures, I eliminated only a few clearly labelled immatures of *P. carolinensis*, and treated the remainder of the samples as composed for all practical purposes of adult birds.

As I shall show later, size disparity is so great in chickadees that proper determination of sex is of prime importance. Any birds with sex questioned or not indicated were eliminated from the tabulations. Even so, it is probable that a certain amount of error was introduced by incorrectly sexed specimens.

In color comparisons, birds were carefully separated on a seasonal basis. In treating measurements, however, the undoubted discrepancies caused by differing amounts of (normal) wear were considered impractical to eliminate. The distributional picture, furthermore, may be confused somewhat by seasonal movements of the birds. Chickadees are comparatively sedentary; but

there is ample evidence of some migratory movement, which in some cases might be considerable.

Individual and seasonal variation is striking in series from any given locality. Study skins of chickadees are made difficult to work with by the marked effects of poor preparation, dirty plumage, wear, fading, and foxing and discoloration of some older specimens. I would stress the need not only for more, but for better, material: namely, clean, well made skins, particularly in fresh fall plumage, with as much detailed ecological data as possible.

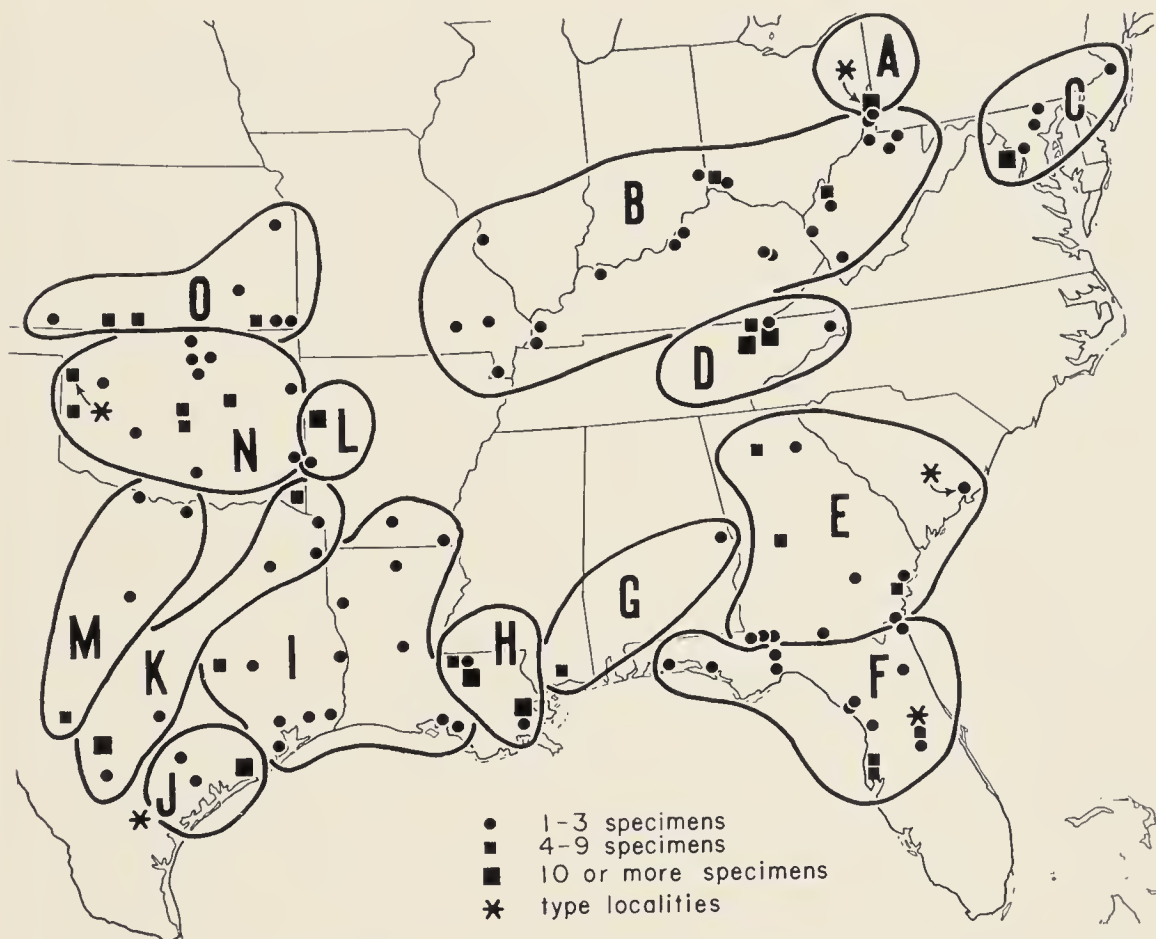


FIG. 1. Locations and grouping of samples of *P. carolinensis* treated. Lettered areas A-O, outlined in bold black: arbitrary groupings of specimens used, for statistical purposes. Species range is virtually continuous; only its southern and northwestern limits are approximately suggested by the black lines; blank areas within the range denote merely regions from which no specimens were used in this study.

GEOGRAPHIC VARIATION

For comparative treatment I found it necessary to group in some way the scattered samples used. Figure 1 shows the arrangement of my 15 groups, arrived at after consideration of geographic separation, size of samples, and differences shown, and after elimination of unsuitable specimens as explained

above. Solid outlines and bold-face letters (A-O) indicate merely these arbitrary groupings; and for the sake of brevity the samples will be referred to usually by the letter designations only. Actual boundaries of the specific and subspecific ranges are not intended to be indicated on the map. It will be seen that the alphabetical series of samples run generally from northeast to southeast, then west and southwest, and then north. The samples cover, in a scattering fashion, the greater part of the range of the Carolina Chickadee.

Size

Variations in wing and tail measurements have been most useful. These values lend themselves well to statistical treatment, the results of which are given in Table 1. I assembled only a small part of the material available from eastern states, and many of the samples both there and in the west are admittedly small. Samples of less than ten individuals, I did not analyze beyond the calculation of a simple mean. However, the trends in size are unmistakable; I believe the figures will be useful not only in connection with the present remarks but as a basis for comparison in further studies.

Keeping in mind the generally clockwise geographical progression of the samples, we see in Table 1 a steady decrease in mean dimensions of *P. carolinensis* from the northeast to the southeast of the species' range (A-F), then relatively little change across its southern portions (F-J), and a marked increase again to the northwest (J-O). Even the smallest samples give means that fit in well with this pattern. The trends are closely similar for wing-length and tail-length, and for the two sexes. I have used most of the wing-length figures, which tend to show less variability, to illustrate in somewhat clearer fashion the nature of the variation, making use of the so-called Dice squares (Fig. 2). Figure 2 shows what appears to be a smooth clinal gradation from northern West Virginia, Ohio, and neighboring states (A-B), where the wing-length of males averages close to 64 mm., to Georgia and Florida (E-F), where it averages about 60 mm. There is little change in size through the states to the west along the Gulf, until we come to coastal Texas and western Louisiana (I-J), where the mean wing-length of males appears to be something under 61.5 mm. Then passing north and west into the higher elevations of central and north-central Texas (K-M) we find indications of a very marked increase in size, until over a wide area through Oklahoma and Kansas (N-O) males seem to have a wing-length averaging well over 65 mm. The general direction of size increase then seems to be from south to north, or somewhat from southeast to northwest. The magnitude of the change is apparent from Table 1 and Figure 2.

I have not fully treated the measurements of bill and tarsus. Some of the

TABLE 1

MEASUREMENTS OF SAMPLES OF *P. carolinensis*. (See map, Figure 1 for localities.)

Locality	WING					TAIL					
	No.	Range	Mean	σ	V	No.	Range	Mean	σ	V	
MALES											
A	10	62 -66	64.0±.38	1.2	1.9	10	54 -58	55.9±.40	1.3	2.3	
B	21	59.5-67	63.4±.39	1.8	2.8	21	53 -62	55.5±.52	2.4	4.3	
C	11	60 -64.5	62.9±.36	1.2	1.9	11	52 -57.5	54.2±.51	1.7	3.1	
D	24	59 -67	62.6±.43	2.1	3.4	24	50.5-58	53.9±.37	1.8	3.4	
E	19	56.5-65	60.2±.45	2.0	3.3	19	48 -54.5	52.0±.42	1.8	3.5	
F	23	56 -63	59.9±.35	1.7	2.8	24	48.5-55	51.0±.32	1.6	3.0	
G	5	59 -63	61.0 —	—	—	4	48.5-53	50.3 —	—	—	
H	34	56 -63	59.7±.32	1.8	3.1	34	48.5-55	50.8±.26	1.5	3.0	
I	15	59 -66	61.4±.44	1.7	2.8	15	47.5-56.5	52.7±.64	2.5	4.7	
J	21	58.5-64.5	61.0±.32	1.5	2.4	21	50 -56	53.1±.31	1.4	2.6	
K	14	60.5-68	63.1±.45	1.7	2.7	14	50 -59	54.6±.51	1.9	3.5	
L	10	60.5-67	63.8±.63	2.0	3.1	10	52 -59	55.8±.65	2.0	3.7	
M	7	62 -65	63.6 —	—	—	7	55 -59	56.7 —	—	—	
N	32	62 -69	65.5±.33	1.9	2.9	32	54.5-62	57.8±.33	1.9	3.2	
O	15	62 -67.5	65.1±.36	1.4	2.1	15	54 -63.5	58.7±.57	2.2	3.7	
IJ	36	58.5-66	61.2±.27	1.6	2.6	36	47.5-56.5	52.9±.32	1.9	3.6	
MNO	54	62 -69	65.2±.24	1.8	2.7	54	54 -63.5	57.9±.27	2.0	3.5	
FEMALES											
A	16	57 -64	61.2±.44	1.8	2.9	16	52 -58	54.7±.39	1.5	2.8	
B	18	58 -65	61.2±.38	1.6	2.7	18	48.5-57.5	53.8±.63	2.7	5.0	
C	9	58.5-62	60.3 —	—	—	9	50.5-54.5	52.5 —	—	—	
D	13	56 -65	60.1±.67	2.4	4.0	13	50 -58	52.6±.64	2.3	4.4	
E	10	57 -62	58.4±.49	1.6	2.7	10	47.5-52.5	49.8±.63	2.0	4.0	
F	14	54 -59	57.0±.34	1.3	2.2	14	46 -51	48.8±.35	1.3	2.6	
G	5	56.5-61.5	58.5 —	—	—	5	46.5-51.5	49.3 —	—	—	
H	17	55 -61.5	57.7±.35	1.5	2.5	17	47.5-52.5	49.4±.37	1.5	3.1	
I	8	56 -59	57.8 —	—	—	8	47 -52.5	49.8 —	—	—	
J	22	57 -62	59.3±.32	1.5	2.6	22	48 -55.5	51.2±.38	1.8	3.5	
K	10	58 -62	60.4±.32	1.0	1.7	10	48.5-54.5	51.7±.53	1.7	3.3	
L	7	57.5-65	61.1 —	—	—	7	52.5-58.5	55.0 —	—	—	
M	3	60.5-63	61.5 —	—	—	3	51 -57	54.0 —	—	—	
N	7	60.5-66	63.8 —	—	—	7	55 -62	57.7 —	—	—	
O	7	59 -66	62.4 —	—	—	7	54 -61.5	57.2 —	—	—	
IJ	30	56 -62	58.9±.28	1.5	2.6	30	47 -55.5	50.8±.35	1.9	3.7	
MNO	17	59 -66	62.8±.48	2.0	3.2	17	51 -62	56.9±.64	2.6	4.6	

MEASUREMENTS OF SAMPLES OF *P. atricapillus*.

Locality	WING					TAIL					
	No.	Range	Mean	σ	V	No.	Range	Mean	σ	V	
MALES											
W. Va.	7	64 -67.5	65.9 —	—	—	7	58 -64.5	61.6 —	—	—	
*Kan.	37	62 -71.5	66.9±.36	2.2	3.3	37	61.5-70.5	65.4±.38	2.3	3.5	
FEMALES											
W. Va.	5	61 -66.5	64.3 —	—	—	5	56.5-64	61.1 —	—	—	
*Kan.	42	61.5-68	64.5±.23	1.5	2.3	42	58 -66.5	63.0±.32	2.1	3.3	

* Series taken by Wetmore, near Lawrence, and in U. S. Natl. Mus. collection.

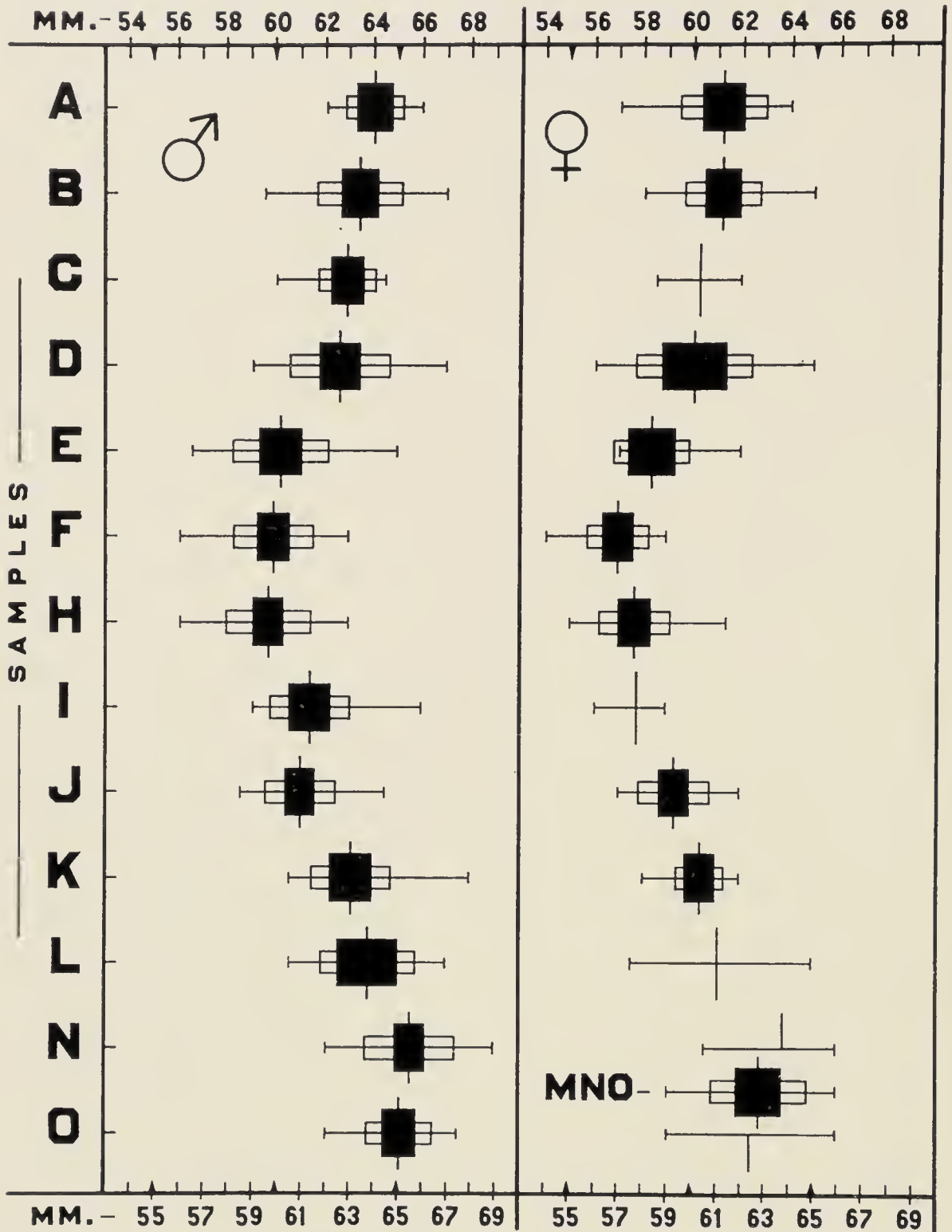


FIG. 2. Size variation (wing-length) among populations of *P. carolinensis*. (See Fig. 1 for location of samples.) In each diagram, horizontal line extends from the lowest to highest observed extreme; vertical line marks calculated mean (M); narrow rectangle represents standard deviation (σ) on each side of mean; and shaded rectangle represents twice standard error of mean ($2\sigma_M$) on each side.

larger specimens appear strikingly big-billed; but this character may well be correlated simply with over-all size.

Relative Tail-length

Since the tail/wing ratio is usually regarded as diagnostic in separating *P. carolinensis* from *P. atricapillus*, I thought it deserved special attention. Rather than present an orthodox statistical treatment of the ratios as such, I have chosen to use a diagram (Fig. 3), in which I have plotted mean wing-length against mean tail-length for males of each sample considered (open circles). We see shown, not actually a constant ratio, but rather one that

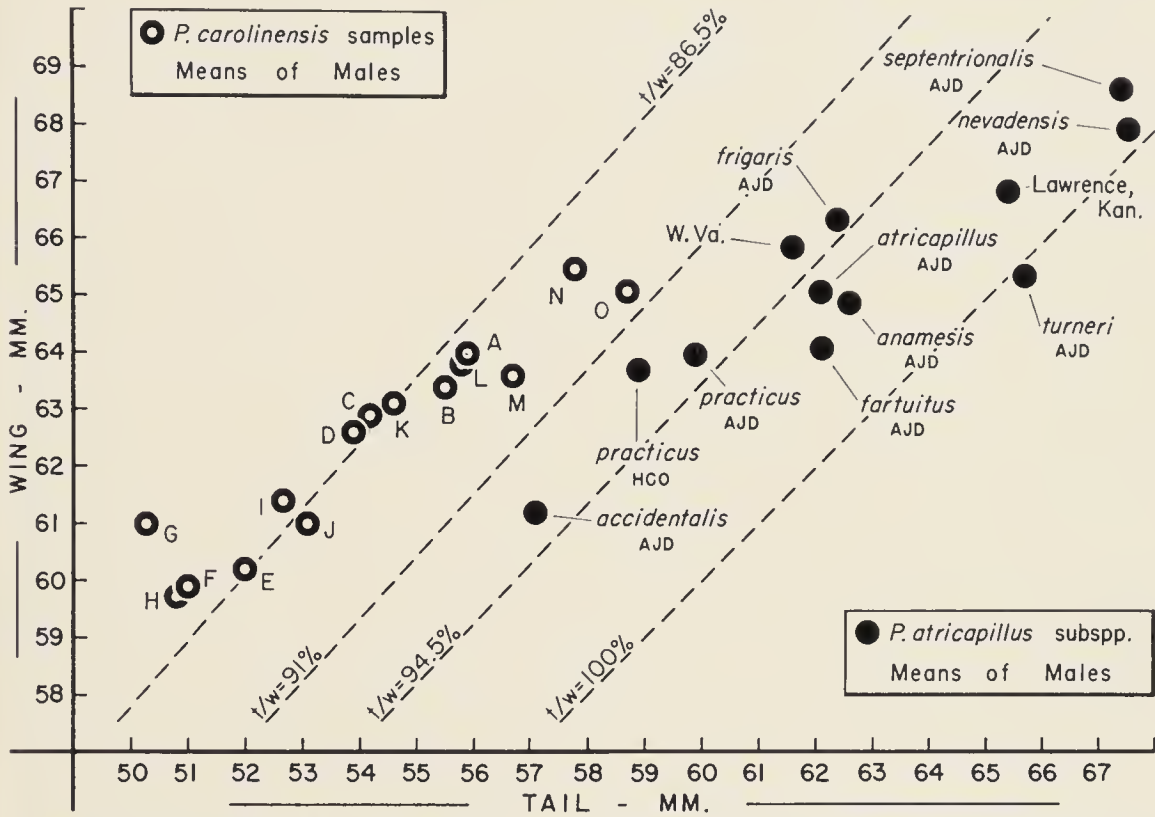


FIG. 3. Tail/wing ratios (based on mean measurements of males) of populations of *P. carolinensis* and of *P. atricapillus*. Data for most races of *atricapillus* from Duvall (1945 - AJD); that for one sample of *practicus* from Oberholser (1937: 220 - HCO); the rest from my Table 1. (For locations of lettered samples, see map Fig. 1.)

increases somewhat with over-all size of the birds. (Absolute size increases along a diagonal from lower left to upper right, while a proportionately longer- or shorter-tailed condition is indicated by a trend to lower right or to upper left respectively. For reference some lines of constant ratio have been added.) The general curve suggested is seen to lean decidedly to the right, the smaller (southern) populations averaging distinctly shorter-tailed, relatively, than the larger (northern) ones. (Plot "G", however, is further displaced because of the very small sample used.) I do not regard the differences as sufficient to be of much taxonomic importance within the species.

For comparison, I have plotted some mean measurements for populations of *P. atricapillus* on the same graph (solid circles—see details in legend).

For this purpose I have borrowed some figures given by Duvall (1945), and used a few of my own from Table 1. The interesting and somewhat disturbing feature is the way in which the largest *P. carolinensis* (those in West Virginia, etc., A-B, and especially those in Oklahoma and Kansas, N-O) seem to approach the smallest *P. atricapillus* (note *practicus* and *occidentalis*) not only in absolute mean measurements, but to some degree in proportions. The graph shows one almost continuous band of variation rather than the two parallel bands that might be expected. Furthermore, it must be remembered that Figure 3 is based on *mean* measurements. If we were to plot all individuals we would be dealing with a series of broadly overlapping ellipses (cf. Fig. 4, which is drawn to the same scale and shows two populations so plotted). The conclusion is that some individuals must occur which cannot be assigned to one or the other species on the basis of tail/wing ratio alone. Such individuals do occur, and precisely in the areas where either species might be expected (cf. Duvall, 1945:56). I have identified as *P. carolinensis* a number of remarkably long-tailed individuals, both from the east and from the west. Several of the more puzzling ones, mostly females (in the University of Kansas collection), fall within the size range even of *P. a. septentrionalis* from neighboring areas. The tendency of *P. atricapillus* to average shorter-tailed in the southern part of its range, while less pronounced, is evident, particularly in the east. From the foregoing it will be clear that I have relied heavily upon coloration for specific identification of material. There may be considerable convergence in coloration also, but my data indicate that it is more likely to be valid than size and proportion in deciding doubtful cases.

I do not suggest that hybridization or intergradation necessarily exists. I do infer, however, that there is a correlation, adaptive and/or genetic, between size and relative tail-length, which appears to apply in some manner to both species considered. Careful studies in areas where both species occur, to determine just how constant the various morphological characters are in relation to call-notes, breeding behavior, and general habits, would certainly strengthen our understanding of the distinctions.

Color

For the study of coloration features, I selected series of *P. carolinensis* males from various localities representing most of the sample areas, one group consisting of fall birds (Sept. 1 to Dec. 1) and another of spring specimens (Feb. to June). In general, the brown color of the upper parts characteristic of some of the populations is due to brownish tips on the fresh feathers, and tends to disappear first as wear progresses. On the underparts as well the buffy or rufous wash is reduced by wear and fading. Thus some of the best distinctions between the populations are all but lost in spring and summer

TABLE 2

GENERAL COLOR VARIATION IN SAMPLES OF *P. carolinensis*: a rough comparison only, disregarding seasonal change and minor variations. (See Figure 1 for location of samples.)

SAMPLE	DORSAL COLORATION	GENERAL TONE	BROWNISH WASH ON SIDES	PALE EDGINGS OF FLIGHT FEATHERS
A	very brown	medium	strong	strong
B	brown - variable to west	medium	strong	strong
D	brown	dark	fairly strong	moderate
E	brown	dark	strong	weak
F	brown	dark	strong	weak
H	rather gray - variable	medium	moderate	weak
I	gray	pale	weak	moderate
J	gray	pale	weak	moderate
L	rather gray - variable	medium	fairly strong	strong
N	gray	pale	rather weak	strong
O	gray	pale	rather weak	strong

specimens, in which we must turn to the somewhat nebulous matter of general darkness or paleness, at the risk of being misled by dirt or fading.

I would want to examine much more material, particularly from eastern areas, before attempting detailed tabulations or any sort of quantitative treatment. Basic trends in coloration, however, are not difficult to detect. Table 2, while deliberately brief and general, is an attempt to show simply the most evident of these trends, which are in fact about as expected on the basis of published descriptions.

Fresh-plumaged fall birds from Bethany, West Virginia (A), are very buffy brown above, especially in the region of the scapulars, and have a heavy wash of pale rufous along the sides, extending in most cases well back along the flanks and even to the under tail coverts. These characters are shared by the birds to the south (B-H), which are on the whole not quite so brightly washed on the sides, but are nearly as brown above, and often darker in general tone. This coloration is less well marked, but still apparent, in spring birds. In contrast, the western populations (I-O) average much grayer above and in general paler, with little color on the sides even in fall; spring and summer birds may be nearly white below. Oklahoma and West Virginia birds can be separated almost perfectly on the basis of either dorsal or ventral coloration alone. Seemingly increased variability, as well as intermediacy, is evident in the samples from the Mississippi Valley area (H,L), where the sharpest change in color occurs. The tendency toward gray dorsal coloration comes well to the east along the Gulf coast, at least to eastern Louisiana (H), where

fall birds are even grayer than those (also of intermediate color) from western Arkansas. I have seen no fall specimens from extreme western Oklahoma, which individuals, by inference from the summer ones at hand, would be the grayest of all. The brown on the sides is evident farther to the west than that on the upper parts (cf. western Arkansas birds, L), perhaps because of the paler ground color below. In the west, as in the east, it is slightly more noticeable in specimens from northern areas.

The pale feather-edgings in wings and tail are very prominent and developed to about an equal degree in the northeastern (A,B) and northwestern (L,N,O) samples, though in the latter associated with generally paler coloration. In the southwestern samples (I,J) these edgings are somewhat less well developed; and in the southeast (E,G, and especially F), they are usually quite inconspicuous.

By far the most marked color variation within *P. carolinensis*, then, appears to be a cline of decreasing brownness from east to west, both as regards dorsal coloration and washing on underparts. This cline seems to break sharply in the Mississippi Valley area. The color-change is coupled with a similar trend toward general paleness of tone. Secondarily, the light feather-edgings prominent in northern specimens tend to become narrower to the south, and very much so in the southeast, where the birds are darker generally. The brownish wash on the sides tends to become stronger, or at least brighter, from south to north, although the major trend here is from west to east. From my present data I am unable to detect that these latter changes are other than a matter of smooth clinal variation.

SUBSPECIFIC TREATMENT

It must be stressed that this is in no sense a full-scale revision, and that some conclusions herein can be no more than tentative. I have viewed the problem primarily from the population standpoint, and have not been concerned with assigning a trinomial to every specimen examined. But with the considerable amount of data before me, it still seems justifiable to comment on the broader aspects of the taxonomic situation, which are often unavoidably neglected in systematic and distributional papers involving series from only one or a few localities.

P. c. extimus (Todd and Sutton).—

This race appears to be recognizable as described (Todd and Sutton, 1936: 70). The series of 10 males and 16 females from Bethany are exact topotypes of this race. The characters of very distinct pale edgings of flight feathers, strong washing of rufous below, and marked buffy veiling dorsally of this

northeastern population have been discussed. In addition I consider the large size to be of more importance taxonomically (at least if sizeable series are treated) than have some earlier writers (cf. Wetmore, 1939:208). The measurements, particularly of sample A, in Table 1 are of interest. I consider samples A, B, C, and probably D to be representative of this form. Birds from the western portions of the range become progressively grayer and paler, and those to the south show a decrease in size and otherwise tend to intergrade with *carolinensis*.

P. c. impiger Bangs.—

The above data suggest to me that further work might prove this race a very tenuous one, if recognizable at all. Writers to date have had divergent views as to the northern limits of its range; from the specimens examined I can detect no change in size from one part of Florida to another, and very little between Florida and Georgia (see Table 1 and Figure 2). Bangs' two specimens (the female type and a male topotype) are both smaller than *any* chickadee I have measured; Mr. J. L. Peters kindly checked the measurements for me, and finds those given in the type description (Bangs, 1903:1) essentially correct. Peters writes: "type ♀ : wing, 51.5 mm.; tail, 43.5. Topotype ♂ : wing, 52.3 mm.; tail, 45.3" (letter). I cannot escape the conclusion that these are very abnormal birds, and that even if such individuals do occur more or less regularly they represent merely the extreme of the small size characteristic of all the southern population. Extremes of brownness and darkness, to be expected in this area, have not impressed me as striking in the series I have seen.

P. c. carolinensis Audubon.—

The nominate race, with (restricted) type locality at Charleston, S. C., seems to me unduly compressed between neighboring races to the north and south, and for that matter to the west, unless we somehow enlarge our concept of it. It is partly for this reason that I suggest the possibility of uniting with it the present *impiger*. Trautman (1940:311–312) feels also that "there are only two eastern races of this species"; but advocates retention of *impiger* and *carolinensis*. My comparisons, including (only two) topotypes from Charleston and specimens from many Georgia and Florida localities, lead me thus far to favor the other course. We would then be able to use the well defined characters of smaller size, reduced feather-edgings, general darkness and brownness of dorsal coloration, and (to a lesser extent) decreased brownish washing below for recognition of the southern race. My samples of this race have, however, been particularly scanty; I consider samples E, G, and probably H (though the latter average decidedly grayer above) as *P. c. carolinensis*, and am strongly tempted to include F.

P. c. agilis Sennett.—

I believe the characters and distribution of this race have been misunderstood from the time of its description (Sennett, 1888:46). If we consider the type locality, Bee County, Texas, near the very southern extremity of the species range, examine the type description, and compare the type itself with material from various parts of the western range of the species, inconsistency is at once apparent.

I have examined Sennett's type (A.M.N.H. No. 86395; G.B.S. No. 3894, sex not given). In coloration and size it agrees well with the good series at hand from Matagorda County, Texas (J), which I therefore propose to treat for present purposes as equivalent to topotypes; it shows no evidence of fading, and agrees with Matagorda birds of comparable season in the clear gray upper parts, moderate degree of white wing-edging, and pale underparts with faint buffy wash. The primaries of the type are badly broken on both sides, but in each case one or more of the longest remain, so as to yield approximately correct wing-lengths; one rectrix may have been pulled loose, as it is about 2.5 mm. longer than any other. My measurements of the type are: wing, 59.5, 60.5 mm.; tail, 54.5 mm.; culmen, about 10.0 mm. if measured to base of skull (slight dermestid work makes measurement of exposed part uncertain); and tarsus, 15.5 mm. The wing-measurements given by Sennett check reasonably well with those taken by me if allowance is made for his probably having flattened the wing. His tail-measurement of the type (2.40 in. = 60.96 mm.) is above any I can obtain even by measuring from the end of the oil gland. His figures for another bird ("No. 406 ♀ . . . wing, 2.42; tail 2.52") appear questionable. In no case have I found the tail-length of a specimen from this area to exceed the wing-length, or even to approach it closely. Reference once more to Tables 1 and 2 will show the characters I have found to exist in the Matagorda area (J) and in the area (I) extending northwest from the Gulf coast. Considering the above facts it appears clear that Sennett's type, if not all of his unfortunately few and scattered specimens, represent this extreme southwestern population. If we accept the evidence, then *agilis*, described as large and generally so considered, is pale and very gray, but in fact quite small, males averaging under 61.5 mm. in wing-length. In this restricted sense, it occurs in southeastern Texas, southern Arkansas, and most of Louisiana (I,J). In a sense Oberholser (1938:425-428) has expressed the size and color relationships as I find them, though I think his *P. c. "guilloti"* must be considered an intergrading population, occupying much of the range of *agilis* to the west and the western edge of the range of *carolinensis* to the east.

I have already called attention to the decided size gradation from the coastal area toward the north and west, which is actually about equivalent to

that throughout the whole range of the species in the eastern states. As a result of this great discrepancy in size, and minor variations in color already discussed, I am unable to assign to any described race the specimens from Kansas, Oklahoma, and central Texas (M,N,O), which I therefore propose to call

***Parus carolinensis atricapilloides*, new subspecies**

TYPE.—Adult male, presumably breeding, No. 6735, G. M. Sutton, collected by him 10 miles south of Arnett, Ellis County, Oklahoma, May 13, 1936. Measurements of type: wing, 66.5 mm.; tail, 60 mm.; tarsus, 16.5 mm.; exposed culmen, 9.5 mm.

DIAGNOSIS.—Averaging larger than any other described race of *P. carolinensis*, in wing and tail measurements. Fifty-four males measure: wing, 62-69 mm. ($65.2 \pm .24$); tail, 54-63.5 mm. ($57.9 \pm .27$). Seventeen females measure: wing, 59-66 mm. ($62.8 \pm .48$); tail, 51-62 mm. ($56.9 \pm .64$). Distinguished from *P. c. extimus* by decidedly grayer dorsal coloration at all seasons, comparative obsolescence of rufous or buffy washing on sides and flanks, generally paler coloration, and even larger average size. Most like *P. c. agilis* (as above restricted), but distinguished by much larger average size (see Table 1, Fig. 4, etc.); also by slightly stronger buffy washing on sides, and somewhat more conspicuous pale edgings on flight feathers; tail/wing ratio averaging somewhat higher, and in a few specimens considerably higher, than in *agilis*. Distinguished from *P. c. carolinensis* both by paler and grayer coloration, with much more conspicuous pale edgings on flight feathers, and by decidedly larger size.

RANGE.—The northwestern section of the species' range; from southern and eastern Kansas (Meade, Greenwood, and Douglas counties) south through nearly all of Oklahoma to central Texas. Intergrades with *P. c. extimus* to the east, probably in western Arkansas and southwestern Missouri. Intergrades with *P. c. agilis* to the south and southeast; the zone of intergradation is undoubtedly of considerable width (see Fig. 1, and discussion below), and more material is needed to establish any positive dividing lines.

To indicate the distinctness of the new race, I have set up the "scatter-diagram" shown in Figure 4, in which wing-length is plotted against tail-length for each male specimen in the samples M, N, and O (*P. c. atricapilloides*—indicated by open circles), and for those in samples I and J (*P. c. agilis*—indicated by solid triangles). This method is suggested as a convenient rough test for separation on the basis of two partially correlated characters. We see that the diagonal AB separates all but 6 of the northern birds (89%) from all but 2 (94.5%) of the southern ones, in the observed samples. This diagonal is located by the intersection of the vertical and horizontal dash lines

shown; these in turn were established by taking the point of statistically best separation on the basis of each measurement alone, as indicated. I have arbitrarily selected a line following roughly the 500-foot contour, from west of San Antonio to extreme southeastern Oklahoma and western Arkansas, which on the basis of the scattered material at hand may represent roughly the region of sharpest size-gradation. Samples K and L from this zone of intergradation, I have not used in Figure 4. The few birds in sample M average smaller than those in N and O, and thus still tend toward *agilis*; one

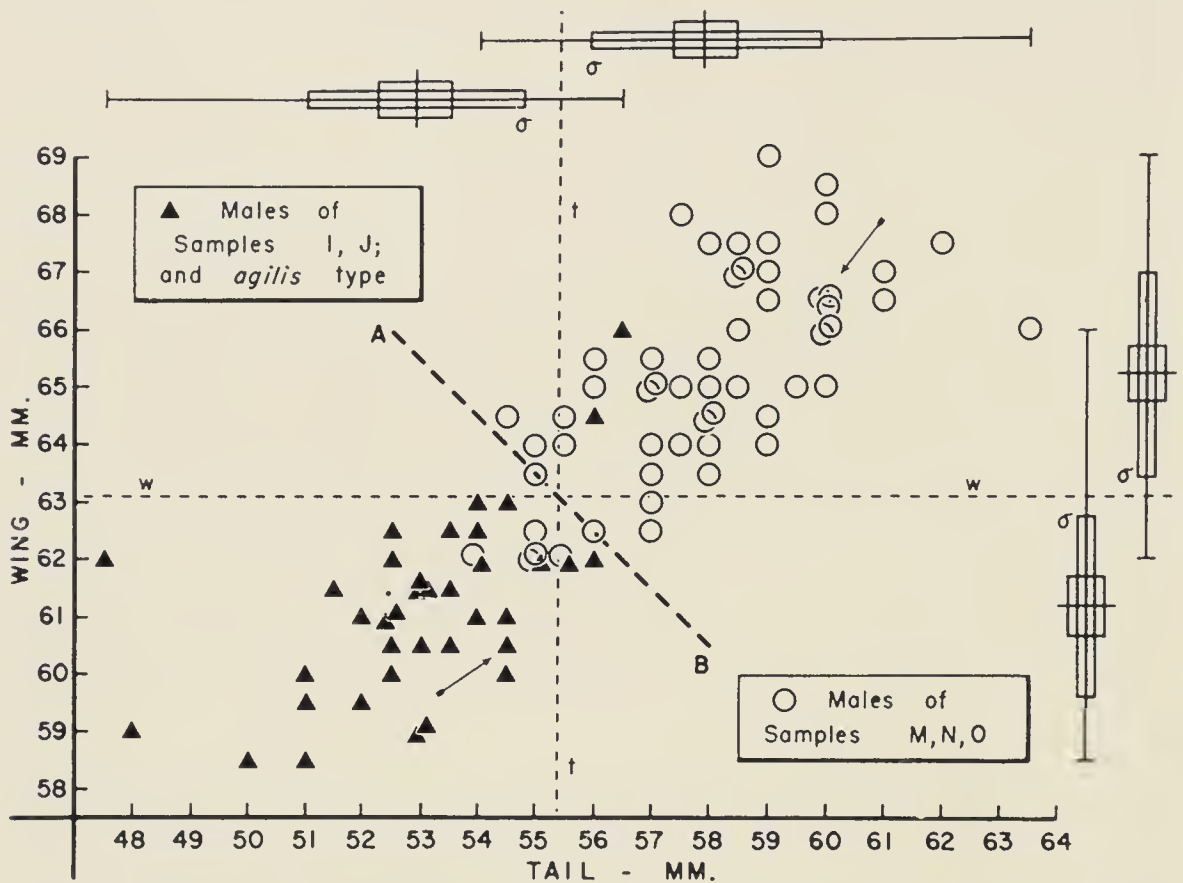


FIG. 4. Degree of distinctness on basis of wing- and tail-length between *P. c. agilis* (triangles) and *P. c. atricapilloides* (circles). AB: line of best separation, based on lines *tt* and *ww*, for each measurement alone, located by the standard deviations. Arrows indicate types. (See Fig. 1 for location of samples.)

of 7 males falls below the dividing line and another on it; they were nevertheless treated with the northern samples, in a deliberate attempt to make the test as rigorous as possible with the material available. As is clear from Table 1 and Figure 2, there is no significant difference between samples N and O. For added comparison, the collective statistics for MNO and for IJ have been added to Table 1.

SUMMARY

On the basis of specimens examined, I have outlined some slight extensions of the range of *P. carolinensis* to the northwest. My comparative data demon-

strate some of the major variational trends within this species. The most prominent of these are a cline of increasing size from south to north, and one of increasing brownness from west to east. On this basis the most logical treatment appears to me to be the recognition of four races: *extimus* (large and brown) in the northeast; *carolinensis* (small and brown) in the southeast, of which *impiger* may be considered an extreme; *agilis* (small and gray) in the southwest; and *atricapilloides* (described above—large and gray) in the northwest. This can be done without radical change in our present concepts, save for the splitting of *agilis* into two forms; additional characters serve for further separation of the several races. No very precise range limits have been outlined here for any of the subspecies and I feel that this is neither possible nor necessary at the present time, considering the clinal nature of much of the variation.

Of secondary concern, and presented only as a basis for further investigation, is the matter of general increase in tail/wing proportion in the larger populations of *P. carolinensis* (especially noticeable in *P. c. atricapilloides*), which tends to approach the reduced ratio of the smaller races of *P. atricapillus*. I have indicated the need for care in identification, and for much careful field work in critical areas.

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NOTES ON
THE ECOLOGY OF THE SHORT-BILLED MARSH WREN
IN THE LOWER ARKANSAS RICE FIELDS

BY BROOKE MEANLEY

THE Short-billed Marsh Wren (*Cistothorus platensis stellaris*) fitted into an unusual ecological picture as a late summer nesting bird in the lower Arkansas rice fields in 1950. Not until the rice began to approach maturity in the middle of August did this species reach the height of its nesting season; in fact it seemed not to be present at all about the rice fields until the rice attained a height of about two feet. Since this occurred about the second week in July, 1950, the Short-billed Marsh Wren appeared in the area on or shortly after this time.

I spent an average of ten hours daily working about the rice fields of Arkansas County, near Stuttgart, from the first of June through the rest of the summer of 1950, and not a single marsh wren was heard singing in a rice field until July 6. After that date, they became increasingly abundant, and by the middle of August about a third of the rice fields in the area had a few pairs, the number of pairs depending largely upon the variety of rice.

ACKNOWLEDGMENTS

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THE LOWER ARKANSAS RICE DISTRICT

The city of Stuttgart is the "capital" of the lower Arkansas rice district. It is located in that part of Arkansas County known as the Grand Prairie. Physiographically, the Grand Prairie is reputedly a true prairie land, and has never been forested except along the streams and bayous. Ecologically, the area can be divided into three major types: rice field (rotated with soybeans, lespedeza, and oats), bayou, and edge. A small percentage of undifferentiated land-use types exists. Among these are scrubby fields, pastures, and towns.

Typical breeding birds of the rice fields are the King Rail (*Rallus elegans*) and the Short-billed Marsh Wren; of the edge, Red-winged Blackbird (*Agelaius phoeniceus*) and Dickcissel (*Spiza americana*); and in bayous, Red-bellied Woodpecker (*Centurus carolinus*), Acadian Flycatcher (*Empidonax*

virescens), Carolina Wren (*Thryothorus ludovicianus*), and Parula Warbler (*Parula americana*). The dominant macro-vegetation of the bayous is the bitter pecan (*Carya aquatica*), willow oak (*Quercus phellos*), and overcup oak (*Quercus lyrata*).

RICE CULTURE IN ARKANSAS COUNTY

About 100,000 acres of rice are planted annually in Arkansas County. This acreage is approximately 25 per cent of the state's output, which, in turn, is 20 per cent of the entire rice crop of the United States. The half dozen varieties of rice commonly grown in the county are Zenith, Blue Rose, Blue Bonnett, Rexark, Nira, and Cody.

Rice is planted from early April to the middle of June. It is generally sown dry, and after the young plants reach a height of about six inches the field is flooded to aid the normal growth of the rice and to keep the various weeds from getting a start in the field. The field remains in this inundated state for about two weeks. It then is drained for a short period, then flooded to a depth of 6 to 12 inches a second time, and not drained again until time for harvesting.

MARSH WREN NESTING ENVIRONMENT

As the rice attains a height suitable for nesting cover about the middle of July, the Short-billed Marsh Wrens move into the rice fields, presumably from nearby grassy canal banks and fallow fields. The fields selected for nesting in 1950 were those most advanced in development, and usually those with the greatest number of weeds. The weedy rice fields provide a dense cover and some of the materials out of which the wren builds its nest. The weeds seldom reach the height of mature stands of rice, which is approximately 40 inches.

Dominant weeds of the rice fields in the Stuttgart area (see Prince, 1927: 1-10) are *Paspalum floridanum*, *Panicum dichotomiflorum*, *Echinochloa colonum*, *Echinochloa crusgalli*, *Cyperus strigosus*, *Fimbristylis autumnalis*, *Sesbania macrocarpa*, *Aeschynomene virginica*.

NESTING

The A. O. U. Check-List (1931:249) and Bent (1948:274) list the southern nesting limit of the Short-billed Marsh Wren as central Missouri. Thus, these observations extend considerably the known southern nesting limit of this species. Bent lists August 19 as the latest nesting date for this species. Eggs and young found during the first two weeks of September, 1950, in the Arkansas rice fields also extend somewhat the known length of the nesting period.

While it was difficult for me to believe that this species would be nesting so late in the summer, even when I saw male birds singing in rice fields throughout the day in August, a male and a female which I collected on

August 13 provided evidence of nesting. Testes of the male measured 10 mm. in length, while the female had a well-developed brood patch. Furthermore, territorial relationships of singing males were quite evident.

Proof of breeding was obtained when I discovered a nest with six eggs on August 20. The nest, located in a field of "Cody" rice, drained and ready for harvesting, was constructed mainly of the leaves of the rice plant (*Oryza sativa*) and a sedge (*Fimbristylis autumnalis*), and was approximately eight inches from the ground. The nest could not have been built at this low height before the draining of the field just prior to harvesting, since this field was flooded to a depth of 12 inches. I found a second nest containing one fresh egg on August 29, and a nest containing five large young on September 10.

NESTING DENSITY

I censused singing males in seven rice fields totaling 453 acres during the first two weeks in August to see if a correlation existed between nesting density and the development of various varieties of rice. The results showed that the earliest maturing varieties had the highest densities of marsh wrens. A 60-acre field of the "Cody" variety, in the late dough stage in early August, had 12 singing males. A 63-acre field of "Cody" in the same stage of development held 5 singing males. Two fields of the "Blue Bonnet" variety with 35 and 150 acres each, and maturing almost a month later than the "Cody" fields, had one and two singing males respectively.

EFFECT OF HARVESTING DURING NESTING SEASON

Birds nesting in a rice field which is harvested by a binder have little or no chance of succeeding, since this machine destroys practically all nests it passes over. Probably the only survivors in a field harvested by a binder would be those which nested early so as to have their young already out of the nest by harvest time. Fortunately for the marsh wrens, the combine now almost entirely has replaced the binder as a rice harvesting implement. A combine leaves a stubble 12 to 18 inches high—sufficient cover for any normally placed nest. The victims of this method of harvesting would be only those whose nests were in the path of the wheels, an area which I estimate to be about one-third of the field.

Twelve pairs of nesting marsh wrens were present in one rice field at harvesting time, September 4. On September 10, at least five pairs remained and there may have been others. I found a nest containing five young, a family with three fledged young, and three males singing in territories in this field on September 10.

The nesting season seemed to have ended about the middle of September. By September 15, I could find no singing males and there was no other evidence of nesting.

SUMMARY

1. The lower Arkansas rice district is a true prairie land with an impervious sub-soil, providing ideal conditions for rice-growing, and, in turn, nesting habitat for the Short-billed Marsh Wren.

2. Rice is planted from April to June and is harvested from late August through October. During the greater part of the growing season the fields are inundated.

3. The nesting season of the Short-billed Marsh Wren in Arkansas rice fields coincided in 1950 with the maturing of the rice crop in late August.

4. Fields selected for nesting are usually those with the rice furthest along in development in early August, and those with a greater number of weeds (sedges and grasses).

5. Late summer nesting dates are as follows: August 20 (6 eggs); August 29 (1 egg); and September 10 (5 young).

6. The nesting of this species in the Stuttgart area considerably extends southward the known limit of the breeding range.

7. That some correlation exists between nesting density and development of different varieties of rice is shown by the greater number of singing males in the earlier maturing varieties.

8. The nesting population is somewhat affected by harvesting operations. Machinery destroys some of the nests, causing the wrens to desert the field. Otherwise, the remaining stubble provides adequate cover for the surviving birds to complete nesting, particularly where the rice is combined rather than harvested with a binder.

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NEW AND ADDITIONAL RECORDS OF UTAH BIRDS

BY WILLIAM H. BEHLE AND ROBERT K. SELANDER

SINCE the appearance of the two check-lists of the birds of Utah (Behle, 1944, and Woodbury, Cottam and Sugden, 1949), some birds new to the state have been noted and several additional records of some of the rarer birds have accumulated. In making these data available, we also wish to correct a few inadvertent errors, oversights, and ambiguities currently in the literature of the ornithology of Utah. All specimens mentioned below are in the University of Utah Museum of Zoology (hereinafter abbreviated U.U.M.Z.). We are indebted to John Bushman, Clifton Greenhalgh, G. Hortin Jensen, Clark Johnson, C. W. Lockerbie, Richard D. Porter, and Aaron Ross for collecting or bringing into the museum several of the important specimens.

Anser albifrons frontalis. White-fronted Goose.—Although there are several records for Utah, they are mostly observations. Two specimens have been taken: female, Bear River Gun Club, mouth Sulphur Creek, 18 miles west Brigham, Boxelder County, September 28, 1928; male, Lake Front Gun Club, 4300 feet, Salt Lake County, October 10, 1948.

Chen rossii. Ross's Goose.—This species is a casual migrant but we are not aware of specimens having been previously reported from the state. A male was taken at the Bear River Refuge, 4300 feet, Boxelder County on October 27, 1949.

Anas rubripes. Common Black Duck.—Two records were cited by Behle (1944:69). Without indication of the basis for their conclusion, Woodbury, *et al.* say that the species is a "casual migrant and winter resident, both native and introduced. Most specimens have been hybrid crosses with mallard." A female shot at Farmington Bay on November 22, 1951, now No. 11890 U.U.M.Z., constitutes another definite record.

Aythya marila nearctica. Greater Scaup Duck.—The Greater Scaup is uncommon as a migrant through the state. There are two specimens in the U.U.M.Z. Both are males, one having been taken at the mouth of Bear River, Boxelder County, October 19, 1932, the other at Farmington Bay Refuge, 4300 feet, 12 miles north Salt Lake City, Davis County, March 27, 1949.

Tringa solitaria solitaria. Solitary Sandpiper.—Woodbury, *et al.* (1949:13) indicated that the form *T. s. cinnamomea* is a casual summer resident breeding in Uintah and Kane counties, and an uncommon migrant through the state. The two specimens from Kane County that they referred to (U.U.M.Z. 2635 and 2636) are instead Spotted Sandpipers (*Actitis macularia*) in winter plumage.

A record of *Tringa solitaria* possibly breeding in central-western Utah is afforded by a specimen taken at Ibapah, 5200 feet, Tooele County, on July 15, 1950. It was a male with testes 12 mm. long, and was one of a pair. Richard Porter, who collected the specimen, said these two sandpipers would not leave a certain area along an irrigation canal. From these data we infer that they were breeding and thus should be referred to *T. s. solitaria* (see Conover, 1944). The wing of the specimen obtained measures 130 mm. and the culmen, 31.0 mm. The back seems olivaceous and is spotted with white. A white supraloral streak and dark loral streak extend part way to the eye. The primaries are immaculate.

These two birds from Ibapah and those reported by Twomey (1942:392) from the Uinta Basin of northeastern Utah, which were also probably breeding, seem to be among the southernmost records of breeding birds for the species. According to Conover (*op. cit.*: 541), *T. s. cinnamomea*, the northern race, migrates mostly west of the Mississippi, so should ultimately be found in Utah. The only other two examples we have from Utah, although not breeding birds, seem to be closest to *T. s. solitaria*. One is a male taken at Farmington Bay, 4300 feet, Davis County, May 10, 1950. Its wing measures 132.5 mm. and the culmen 28.0 mm. The other is an unsexed specimen, probably a female, taken July 9, 1937, at a pond in Monument Valley, 5400 feet, two miles southwest of Poncho House, San Juan County, Utah, reported by Woodbury and Russell (1945:48). Its wing measures 140.8 mm. and the culmen 31.1 mm. Another specimen, a male, taken July 14, 1937, at mud flats at Kayenta Reservoir, 5500 feet, Navajo County, Arizona, has a wing measurement of 136.1 mm. and a culmen of 31.2 mm. Its testes were not enlarged.

Erolia alpina pacifica. Red-backed Sandpiper.—In Utah this species is an uncommon but regular migrant, known to occur from May 1 to 26 and August 11 to November 18, according to Woodbury, *et al.* (1949:14). Apparently, this is based principally on sight records. Since few specimens have been collected, it seems desirable to report two specimens in the U.U.M.Z. collection. Both are females: one was taken at the mouth of the Bear River, Boxelder County, May 26, 1932; the other, at Farmington Bay Refuge, 4300 feet, Davis County, May 10, 1950.

Limnodromus griseus. Short-billed Dowitcher.—Woodbury, *et al.* (1949:13) listed *L. g. griseus* as a "casual but probably regular migrant through the state; available dates are May 20, July 21, August, September 17, 30." It is not indicated whether specimens are the basis for the records. In his revision of the genus, Pitelka (1950:48) listed only a single specimen of *Limnodromus griseus* from Utah which he assigned to the race *L. g. hendersoni*. It is an adult male taken on May 20, 1915, at the mouth of the Bear River. We can report a second record (U.U.M.Z. 8311) of this race, namely an adult female, in almost complete winter plumage, taken on August 17, 1946, also at the Bear River Refuge. It appears that this species is relatively uncommon in Utah, there being but two definite records.

Limnodromus scolopaceus. Long-billed Dowitcher.—Woodbury, *et al.* (1949:13) stated that *L. griseus scolopaceus* (= *L. scolopaceus*, Pitelka, 1950)³ is an "abundant migrant through state, concentrating in large flocks mainly in Great Salt Lake and Utah Lake valleys, recorded from March 29 to May 13 and August 13 to November 5, but stragglers as late as December 12." These dates probably are based mainly on sight records and may refer to both species.

An earlier spring date than Woodbury, *et al.*, gave pertains to three examples of *L. scolopaceus* (2 adult males, 1 adult female) taken March 23, 1949, at Deckers Lake, 4300 feet, Salt Lake County. Of these, one male is in complete winter plumage, another shows a few feathers of the nuptial plumage on the breast and scapular region, and the female has feathers of the breeding plumage on the breast, belly, back, and upper wing-coverts.

Micropalama himantopus. Stilt Sandpiper.—Woodbury, *et al.* (1949:14) listed this species as a casual migrant on the basis of a specimen taken in 1893, labelled merely "Utah," a sight record of several at Bear River Marshes, July 26, 1932, and a specimen (U.U.M.Z. 11889) from Moab, taken in 1936. The latter, however, we find is a skin of the Long-billed Dowitcher (*Limnodromus scolopaceus*).

Columba fasciata fasciata. Band-tailed Pigeon.—A male was taken at New Harmony,

5250 feet, Washington County, June 24, 1950. The bird was one of a small flock flying along a stream in a Gambel oak-yellow pine community.

Coccyzus erythrophthalmus. Black-billed Cuckoo.—Heretofore this species was unknown from Utah. An adult female was obtained when it flew into a window at Bountiful, 4400 feet, Davis County, July 9, 1951. The bird was breeding, since it had a brood patch, an enlarged ovary and oviduct, and an egg 12 mm. in diameter in the oviduct. The Black-billed Cuckoo has been reported in eastern Montana (Saunders, 1921:71), eastern Colorado (Ridgway, 1916:39), and Idaho (Arvey, 1947:202).

Chordeiles minor minor. Eastern Nighthawk.—A male Nighthawk, collected May 29, 1942, at the mouth of Ogden Canyon, 4300 feet, Weber County, Utah, is referable to *minor* in both color and size. The specimen is the second record for Utah of this transient subspecies.

Colaptes auratus luteus. Northern Flicker.—The Yellow-shafted Flicker is uncommon in Utah. One flew into a window of a residence in Salt Lake City on April 5, 1950, and was obtained as a specimen. It was an adult male with testes slightly enlarged. Although closer to *C. a. luteus*, the specimen is a hybrid with *C. cafer collaris*. It has the red malar stripe and gray throat and neck of *C. cafer*, but the scarlet nuchal band of *C. auratus*; the lining of the wings and tail, while predominantly yellow, actually is intermediate between the normal colors of the two species.

Twomey (1942:406) stated that he found no indication of hybridization in the 9 specimens of *C. c. collaris* that he took in the Uinta Basin or in several others observed there. A breeding female in the U.U.M.Z. collection, taken at Dry Fork Canyon, 6000 feet, 15 miles north of Vernal, Uintah County, on June 28, 1950, has the outer tail feather on the right side yellow-orange, indicating some hybridization with *C. auratus* in that geographic area. Several other examples of *C. c. collaris* from various parts of the state show indications of hybridization, especially in possession of a light nuchal band.

Progne subis subis. Purple Martin.—Twomey (1942:417) found this species nesting in bird boxes about the town of Vernal and observed pairs in Ashley Creek Canyon and along the Duchesne River. Woodbury, *et al.* (1942:22) indicated that martins breed in colonies in aspens in the mountains of Utah. Actually, few observations have been made of the species in the state, and apparently specimens have not been reported. It is of interest, therefore, that, during the summer of 1950, we discovered two colonies in the Wasatch Mountains. They were fairly common at Payson Lakes, 8300 feet, 12 miles southeast of Payson, Utah County, between July 10 and 13, 1950. The birds frequented boggy areas surrounding the lakes where they nested in cavities in the aspens in association with Violet-green Swallows (*Tachycineta thalassina*), Tree Swallows (*Iridoprocne bicolor*), and Red-naped Sapsuckers (*Sphyrapicus varius*). The martins were feeding young at the time. Fourteen specimens were obtained as follows: 2 second-year females, 1 adult female, 4 males in adult plumage, and 7 males in second-year plumage. All were presumably in breeding condition since their gonads were enlarged (testes 8-15 mm. long). We saw few adult males.

On July 10, 1950, two adult male Purple Martins were collected by Richard Porter in a similar environmental situation at Squaw Flat, Monte Cristo, 8000 feet, Weber County.

Although Ridgway (1877:459) reported Purple Martins as "extremely abundant" among the aspens near Parleys Park (near Snyderville, 7000 feet, Summit County) in 1869, they have not been found there in recent years, despite extensive field work, although, seemingly, the habitat is similar to that at Payson Lakes and Monte Cristo.

Hylocichla guttata guttata. Alaska Hermit Thrush.—Another of the few examples of this casual migrant taken in Utah is an adult male obtained at the Bear River Refuge, 4300 feet, Boxelder County, on October 15, 1950.

Hylocichla guttata slevini. Monterey Hermit Thrush.—Two migrant Hermit Thrushes have recently been identified for us as of this race by A. H. Miller. Both are males, one from one mile west of Farmington Depot, 4350 feet, Davis County, April 27, 1948, the other from along the Surplus Canal, 4300 feet, 5 miles northwest of Salt Lake City, Salt Lake County, May 9, 1949. In size and color they resemble breeding birds from Atlin, British Columbia. These two examples are similar to three specimens that Woodbury, *et al.* (1949:25) called *H. g. oromela* (as noted on the labels, U.U.M.Z. Nos. 6721, 6722, 4076). The data for these latter three are as follows: male, mouth of Bear River, below Bear River Club, 20 miles west of Brigham, Boxelder County, May 22, 1933; female, Clear Creek (Raft River Mountains), Boxelder County, May 9, 1933; female, Salt Lake City, Salt Lake County, May 20, 1937.

Hylocichla fuscescens salicicola. Willow Thrush.—Although the early collectors in Utah, notably Ridgway, reported this species as fairly common in the Wasatch Mountain area, no specimens were obtained. Through subsequent years no examples were collected, and, even though some observers occasionally reported the species, we felt that either it did not actually occur in Utah or was much less abundant than in earlier times. On June 14, 1951, we collected a male from a willow thicket along Clear Creek, 5500 feet, Raft River Mountains, 3 miles southwest of Nafton, Boxelder County, Utah. The bird may have been breeding since its testes were 10 mm. long.

Regulus satrapa olivaceus. Western Golden-crowned Kinglet.—This species is not listed for the Uinta Mountains by Twomey (1942:433) although Woodbury (1939:159) reported sight records in that area made by Clarence Cottam. We shot a male at the mouth of Brown Duck Canyon, near Moon Lake, 8500 feet, Duchesne County, on September 2, 1948.

Anthus spinoletta alticola. Rocky Mountain Pipit.—Pipits have long been known to be summer residents in the Uinta Mountains and have been presumed to occur in other high mountains of the state. We recently obtained proof of their presence in the Wasatch and Deep Creek mountains of northern Utah. Six specimens (2 adult males, 1 immature male, 2 adult females, and 1 immature female) were secured on the talus slopes of Devil's Castle Mountain, 10,000 feet, Alta, head of Little Cottonwood Canyon, Salt Lake County, on August 4, 1949. An adult female was obtained by Richard Porter from near the summit of Bald Mountain, 11,000 feet, Deep Creek Mountains, Juab County, June 5, 1950, and a male was taken from the cirque between Mt. Ibapah and Bald Mountain, 11,600 feet, Deep Creek Mountains, July 2, 1950. The latter specimen had testes 8 mm. long. The Deep Creek Mountain specimens represent a considerable extension of range in Utah and, to our knowledge, the first probable breeding record from a mountain range in the Great Basin.

Bombycilla cedrorum. Cedar Waxwing.—Although this species is considered to be a casual breeder in northern Utah, as well as a sporadic winter resident throughout the state, breeding records authenticated by specimens are few. Specimens in the U.U.M.Z. collection representing probable breeding records are as follows: A pair was collected at Paradise, Cache County, July 24, 1932. Two males and two females were taken May 12-13, 1946, in Cave Lakes Canyon, 5 miles northwest of Kanab, Kane County. They behaved as though paired and about to nest. An adult male in worn plumage, testes

3 mm. long, was taken August 16, 1949, at the Farmington Railroad Station, 4300 feet, Davis County. It was one of three seen in a willow clump.

Vireo solitarius plumbeus. Plumbeous Vireo.—Woodbury, *et al.* (1949:27) said this form was a summer resident, "mainly of pigmy conifers, possibly in oak brush or stream-side vegetation; breeding not known." Twomey (1942:436) collected four breeding specimens in the Uinta Mountains and regarded it as "a sparsely distributed summer resident." We secured three breeding specimens from the Uinta Mountains on June 27-29, 1950, at Dry Fork Canyon, 6000 feet, 15 miles north of Vernal. These corroborate the breeding status of the Plumbeous Vireo in Utah because the two males which we collected had enlarged testes and the female had a brood patch.

As to the habitat preference, we have found these birds occurring in summer not so much in the juniper-piñon pine or oak belt associations as in a canyon bottom habitat of willows, cottonwoods, and associated vegetation. Twomey found them along the water-courses of the Uinta Basin and stated (*loc. cit.*) that "it nests only in very restricted areas in the lower valleys where it can find water and dense cover."

Mniotilta varia. Black and White Warbler.—Following a period of snow and cold, a specimen was picked up on December 10, 1951, in the yard of a resident on the east bench of Salt Lake City. This apparently constitutes the first record for the state. The species has been reported, however, as occurring casually in Wyoming, Montana, and Colorado.

Vermivora celata celata. Orange-crowned Warbler.—Two early fall migrants are a female taken September 3, 1949, at Arcadia, 5000 feet, 14 miles northeast of Duchesne, Duchesne County and a female taken at Lake Solitude, 9033 feet, near Silver Lake Post Office (Brighton), Salt Lake County, on September 4, 1945.

Dendroica townsendi. Townsend's Warbler.—Woodbury, *et al.* (1949:29) indicated May 27 as the latest known date of occurrence of Townsend's Warbler in Utah in spring. We collected an adult female in the Deep Creek Mountains, head of Pass Creek, 8000 feet, 6 miles east of the Goshute Indian Village, Juab County, on June 7, 1950. This bird may have been an extremely late migrant, but the small size of the ovary suggests that it was a non-breeding individual which failed to complete its northward migration.

The same authors gave the known fall migration dates as August 10 to October 9. An immature female was taken at Alta, 9000 feet, head of Little Cottonwood Canyon, 15 miles east of Salt Lake City, Salt Lake County, on July 28, 1949. It was extremely fat.

Seiurus noveboracensis linnaeus and *S. n. notabilis*. Water-thrush.—The Water-thrush occurs as a casual migrant in Utah, eight specimens having thus far been reported, all as of the race *notabilis* (see Woodbury, 1939:161; Twomey, 1942:445; and Behle and Ross, 1945:169). A male specimen collected May 10, 1949, from a willow and rose streamside habitat at the entrance of Farmington Bay Refuge, 4300 feet, Davis County, was identified for us by A. H. Miller, on the basis of color, as of the race *linnaeus*. It is, however, somewhat atypical by reason of its large size (wing 77.4, tail 54.8, tarsus 21.5 mm.) An additional record of *notabilis* is a female taken May 15, 1949, along a stream three miles east of Benjamin, 4400 feet, Utah County. Selander saw a single Water-thrush in similar habitat near Snyderville, 6900 feet, Summit County, May 14, 1949.

Setophaga ruticilla tricolora. Northern Redstart.—This species has been considered as a rare breeder in northern Utah. Records were summarized by Ross (1944:129), and Twomey (1942:449) reported two fall records for the Uinta Basin. A probable breeding record for that region is a male adult which we obtained at Merkley Park, 6000 feet,

Ashley Creek, 10 miles north of Vernal, Uintah County, June 12, 1949. An immature female also was taken at Arcadia, 5000 feet, 14 miles northeast of Duchesne, Duchesne County, September 3, 1949. Several redstarts, presumably migrants, were observed on the north side of the Uinta Mountains on September 12, 1950, in streamside vegetation at Hideout Canyon, 5800 feet, along the Green River, Daggett County.

Icterus parisorum. Scott's Oriole.—An unpublished record of this rare species in Utah is of a female in first-year plumage which was shot by John Bushman, May 20, 1951, in a juniper-piñon pine association at the Ekker Ranch, 6000 feet, in the Robbers' Roost country, 25 miles east of Hanksville, Wayne County.

Guiraca caerulea interfusa. Western Blue Grosbeak.—Hitherto known only from southern Utah, a considerable northward extension of range in Utah is indicated by a male which was caught in a trap at the Upland Game Bird Refuge, 5200 feet, Vernal, Uinta County, in June, 1950. Remnants of the bird were saved as evidence. Seemingly, the species is not of accidental occurrence in the valley for another adult male was seen at Vernal on August 4, 1951.

Hesperiphona vespertina brooksi. Western Evening Grosbeak.—Although common in winter, especially during 1950-1951, summer records for Utah are few and are mostly sight records. Twomey (1942:459) collected three specimens on July 2 and 3, 1937, which he called *H. v. montana* without critical comment. An adult male was taken at Parley's Park, two miles south of Snyderville, Summit County, on August 6, 1949. It was perched in a cottonwood tree with another Evening Grosbeak, presumably the female. The male taken was in worn breeding plumage and its testes were 5 mm. long. On the basis of the large bill (depth 15.4 mm. and width at base 13.9 mm.) it is referable to the race *brooksi*.

Leucosticte atrata. Black Rosy Finch.—Probable breeding status of this finch in the Wasatch Mountains, as well as the Uinta Mountains, was established when we collected four examples (adult male, adult female, immature male, immature female) on the talus slopes of Devil's Castle Mountain, 10,000 feet, at Alta, head of Little Cottonwood Canyon, Salt Lake County, August 4, 1949.

Calamospiza melanocorys. Lark Bunting.—Known chiefly as a migrant, it has also been considered a probable breeder. Suggestive evidence of breeding status is afforded by an adult male, testes 15 mm. long, collected in a wet pasture at Murray, 4400 feet, Salt Lake County, June 11, 1950.

Ammodramus savannarum perpallidus. Western Grasshopper Sparrow.—In reporting that no recent records of this species are available from areas other than the Uinta Basin, Woodbury *et al.* (1949:33) overlooked a recent record from west of Salt Lake City by Behle and Ross (1945:169).

Pooecetes gramineus affinis. Oregon Vesper Sparrow.—This sparrow was reported previously as a casual migrant in Utah on the basis of two specimens from Garfield County. There are now two other records. One is of an immature female from the junction of the Virgin and Santa Clara rivers, 2700 feet, two miles south of St. George, Washington County, taken September 11, 1941. The other is an immature of undetermined sex taken at Farmington Bay Refuge, 4300 feet, Davis County, September 1, 1949.

Zonotrichia querula. Harris's Sparrow.—Another record to add to the few for the state is of a female from two miles west of Mt. Pleasant, 6000 feet, Sanpete County, February 4, 1951.

Zonotrichia coronata. Golden-crowned Sparrow.—In reporting the available records of this species for the state, Woodbury, *et al.* (1949:35) overlooked the record from Standrod, Boxelder County, by Greenhalgh (1948:46).

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THE ALDER FLYCATCHER IN WASHTENAW COUNTY, MICHIGAN: BREEDING DISTRIBUTION AND COWBIRD PARASITISM

BY ANDREW J. BERGER AND DAVID F. PARMELEE

THE Alder Flycatcher (*Empidonax traillii*) is, taxonomically, a much-discussed species about whose detailed breeding distribution little has been written. It has been shown (Berger and Hofslund, 1950; Berger, 1951b) that this species is a common breeding bird in the Ann Arbor region. In 1951, we decided to make a survey of the breeding Alder Flycatchers in Washtenaw County, Michigan. We wanted to determine whether the species breeds throughout the county and whether it is as abundant elsewhere as in Ann Arbor Township. Although we had done no previous field-work in 12 of the 20 townships, we thought, from past experience, that it would be a simple matter to locate the flycatchers by their song as we drove slowly along county roads. We found on July 1 and thereafter, however, that the males sang from dawn to about 8:30 a.m., were generally quiet throughout most of the day, and began to sing vociferously about 8:00 p.m. Singing stopped again about 9:00 p.m. (see McCabe, 1951, regarding morning and evening song in Wisconsin). During most of the day, therefore, it was necessary to stop and search for the birds in what we believed to be suitable habitat. With the exception of Sharon Township and one locality in Ann Arbor Township, we avoided rivers in our survey because we wished to emphasize the fact that in southern Michigan the Alder Flycatcher habitually nests in the vicinity of ponds and potholes and in a dry habitat, as well as along rivers and in extensive marshes. We were unable to detect any differences in the songs and call-notes given by birds living in the wet and the dry habitats.

We found the first nest on June 4, 1951, and five additional nests under construction on June 8, but the survey itself was not begun until June 22. It was completed on July 7. Time available for the study was limited: the longest period in the field on any one day was six hours, the shortest period, one hour. Parts of seven days (27 hours) were spent in the survey. We drove 340 miles. In most townships we searched only long enough to find one nest, although we noted the number of birds seen or heard. This report obviously is not a breeding census, but rather a survey to show that the Alder Flycatcher is generally distributed in Washtenaw County, and that it does nest in each of the 20 townships of that county.

As indicated above, the number of nests listed after the several townships in Table 1 is not necessarily an indication of the species' abundance. More nests were found in Ann Arbor Township partly because we knew it better

TABLE 1

BREEDING DISTRIBUTION OF THE ALDER FLYCATCHER IN WASHTENAW COUNTY IN 1951

Date	Township	Section	Nest-site	Nest Contents
June 22	Ann Arbor	27	1. Cornus	4 eggs.
			2. Salix	1 Cowbird egg and 3 host eggs.
			3. Cornus	1 Cowbird egg and 4 host eggs.
			4. Cornus	3 eggs.
			5. Salix	1 egg.
			6. Salix	1 egg.
			7. Cornus	4 eggs.
			8. Salix	Complete but empty.
June 24	Northfield	31	9. Cornus	3 eggs, 2 of which were broken.
June 24	Ypsilanti	19	10. Crataegus	4 eggs.
June 24	Pittsfield	12	11. Cornus	4 eggs.
June 24	Augusta	20	12. Cornus	4 eggs.
June 24	York	32	13. Alnus	1 egg.
June 24	Saline	28	14. Cornus	1 Cowbird egg.
June 24	Manchester	12	15. Sambucus	1 Cowbird egg and 4 host eggs.
July 1	Salem	5	16. Cornus	4 young about 5 days old.
			17. Crataegus	4 eggs.
July 1	Northfield	1	18. Cornus	2 eggs and 2 recently hatched young.
July 1	Webster	6	19. Cephalanthus	3 eggs.
July 1	Superior	20	20. Cornus	1 egg and 1 day-old dead young.
			21. Cornus	4 young about 3 days old.
			22. Crataegus	Nest under construction.
			23. Crataegus	3 eggs.
July 3	Ann Arbor	31	24. Cornus	4 young about 1 week old.
			25. Crataegus	3 young about 5 days old.
			26. Crataegus	4 young about 2 days old.
			27. Crataegus	1 recently hatched dead young (with most of viscera eaten) lying on ground beneath nest, and 1 day-old young in nest with bloody left scapular region.
		33	28. Cornus	3 eggs nearly ready to hatch.
			29. Ligustrum	4 eggs.
			30. Lonicera	1 Cowbird egg and 3 host eggs.
		36	31. Crataegus	4 eggs.
			32. Crataegus	4 eggs.
			33. Crataegus	2 eggs and 1 young 3-4 days old.
July 4	Ann Arbor	12	34. Crataegus	2 eggs.
			35. Crataegus	3 young about 1 week old.
July 4	Dexter	32	36. Cephalanthus	1 Cowbird about 1 week old and 1 host egg.
July 4	Lyndon	28	37. Cephalanthus	1 Cowbird egg and 3 host eggs.
July 4	Scio	17	38. Cornus	3 eggs.
		25	39. Sambucus	Complete but empty.
July 4	Sylvan	9	40. Cephalanthus	Adult brooding 4 recently hatched young.
		10	41. Nest not found	Adult attending 1 stub-tailed fledgling out of nest 1 or 2 days.
		15	42. Pyrus Malus	Complete but empty new nest.
July 4	Lima	14	43. Alnus	1 egg.
July 5	Lodi	18	44. Cornus	4 eggs.
July 7	Freedom	21	45. Cornus	3 young nearly ready for fledging.
July 7	Sharon	28	46. Cornus	1 Cowbird and 1 flycatcher, both about 1 week old.
July 7	Bridgewater	20	47. Sambucus	4 young about 10 days old.

than the others, and partly because the colonies there were larger. There is, however, considerably more suitable habitat for the Alder Flycatcher in the northern two tiers of townships than in the southern two. In the latter, a high percentage of the land is cultivated or is in woodlots; lakes, ponds, and marshes are relatively uncommon. For example, we found only three pairs of Alder Flycatchers (one pair each in Sections 1, 28, and 29) in Saline Township while driving 34 miles over county roads during a three-hour period. This is about the same length of time that was required to find nests in each



FIG. 1. Typical *Crataegus* habitat of the Alder Flycatcher in Washtenaw County, Michigan, Section 36, Ann Arbor Township. From a Kodachrome transparency taken July 20, 1951, by A. J. Berger.

of five townships in the northwestern corner of Washtenaw County (see data for July 4). In the southern townships, the birds, for the most part, occur as isolated pairs, not in colonies. In the more northern townships, on the other hand, there are many lakes, ponds, and marshes. Here the species is much more common during the breeding season. Furthermore, colonies of five or more pairs may be found regularly. We feel certain that one could find 40 or 50 nests in one day in almost any of the northern two tiers of townships, whereas in some of the southern townships, one would do well to find three or four nests in a full day of searching. In Ohio, Campbell (1940: 195) also noted that: "Unlike other local flycatchers, Alders often nest in small colonies of three to six pairs."

Although meager, information is available which sheds some light on geographical differences in habitat and nest-site preference. We suspect that these differences may be more apparent than real, since the Alder Flycatcher has received little intensive study in the field. Barrows (1912:404) noted that in Monroe County, Michigan, Mr. Trombley "found at least twenty nests in one restricted locality, all in alders, willows or similar low growth in wet ground." Hyde (1939:155) stated that in New York: "The alder flycatcher is well named, for it is seldom seen or heard outside an alder swamp, and few large alder swamps are without at least one pair of the birds." In Ohio, Trautman (1940:295) said that this species "nested almost everywhere about the lake, swamps, lowlands, and creeks where swampy and brushy conditions prevailed. For nesting sites it seemingly preferred brush, 3 to 18 feet high, composed of such trees as small willows, alders, buttonbush, and dogwood." Farley (1901:350) said of Alder Flycatchers in Massachusetts: "So far as I have observed, it nests invariably in a bush, selecting most often a wild rose, or clump of rose shoots or sprays—usually *Rosa carolina* L." He added that once he found a nest in *Spiraea salicifolia*. Mousley (1931:551) stated: "The favourite nesting site around Hatley [Quebec] is in the forks of a spiraea bush, only once have I found a nest in an alder tree, twice in nut bushes, and once in a wild gooseberry bush." Campbell (1936) described a population of Alder Flycatchers in Ohio which nested in cockspur hawthorn. In one wet habitat near Ann Arbor, Michigan, Berger and Hofslund (1950) found the following three plants most often used for nest-sites: nine-bark (*Physocarpus*), 14 nests; dogwood (*Cornus*), 8 nests; willow (*Salix*), 7 nests. In the present study we found nests in the following: *Cornus*, 18 nests; *Crataegus*, 12; *Salix*, 4; *Cephalanthus*, 4; *Sambucus*, 3; *Alnus*, 2; and one each in *Pyrus*, *Ligustrum*, and *Lonicera*.

In Washtenaw County, the Alder Flycatcher frequently nests in *Crataegus* bushes on dry hillsides, usually in the vicinity of small ponds. By the first of July many of these ponds (sometimes not more than 50 feet in diameter) have become dry. Berger has found the Alder Flycatcher nesting in dry habitat in Section 20, Superior Township, and in Sections 12, 27, 31, 33, and 36, Ann Arbor Township. At the University Botanical Gardens (Section 33, Ann Arbor Township), the birds nest most frequently in privet (*Ligustrum vulgare*) and Tartarian honeysuckle (*Lonicera tatarica*), but a nest with one Cowbird (*Molothrus ater*) egg and two host eggs found there on July 20, 1951, was built in a wayfaring tree (*Viburnum lantana*). We assume that one familiar with the southern two tiers of townships would find local breeding populations of Alder Flycatchers in similar dry habitats.

In writing of the Alder Flycatcher, most authors emphasize its propensity for nesting in dense thickets. This is true, in part, in southern Michigan, al-

though the species commonly builds its nests in an isolated bush. When nests are built in dense thickets, however, they usually are placed in the outer edge of the thicket, often in an exposed situation. One frequently can find the nest simply by walking around the margin of a thicket. We also found several nests in road-side shrubbery; one such nest was built only seven feet from the edge of a road. Previous reference (Berger and Hofslund, 1950; see also Fargo, 1928) has been made to the two general types of nests, both of which may be found in the same colony, which are built in southern Michigan: those built in an upright crotch, and those fastened to a horizontal branch. The latter usually are less concealed, whereas the former sometimes are placed within the depths of thickets. In general, however, the bird is an edge-nester.

We found the incidence of Cowbird parasitism (20.8% of 48 nests) considerably higher than in recent southern Michigan observations (8.1% of 37 nests, Berger, 1951a). Gibbs (1890:8) stated that Traill's Flycatcher (=Alder) served as a host in southern Michigan. Bendire (1895:311) noted that: "The Cowbird occasionally deposits an egg in the nest" of the Alder Flycatcher. From data available at the time, Friedmann (1929:209) considered this species a "rather rare molothrine victim," but added further (p. 210): "Cook, in his unreliable list, mentions it as a molothrine host in Michigan." In Ohio, Hicks (1934:386) reported 21% of 108 nests parasitized, and Trautman (1940:296) found 9 out of 16 nests parasitized at Buckeye Lake. On August 19, 1951, Berger found a nest containing three Alder Flycatchers within a day or two of fledging. This nest was a two-storied structure and contained one Cowbird egg and one host egg in the lower story. The only previous report of a two-storied nest of the Alder Flycatcher seems to be that of Anderson (1907:299) who said: "W. A. Bryan has also found a Traill Flycatcher's nest with a Cowbird's egg imbedded."

Much interesting and significant information could be obtained by co-operative studies of a single species in different parts of its breeding range. See, for example, the discussion by Aldrich (1951) regarding difficulties involved in the determination of subspecies of the Alder Flycatcher because data on breeding status were lacking. Of necessity, Aldrich selected arbitrary dates (June 21 to July 26) for deciding which specimens he examined were migrants and which were breeding birds. Similarly, Phillips (1948:507) said that "only from June 25 to July 20 may the birds be presumed to be on their breeding grounds." Four years' observations in the Ann Arbor region have shown us that the breeding season here extends at least from June 4 to August 19. It remains to be determined whether or not late spring or early fall migrants also appear on the breeding grounds during this period.

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DEPARTMENT OF ANATOMY AND MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN, ANN ARBOR, SEPTEMBER 15, 1951

A NEW OVENBIRD FROM THE SOUTHEASTERN UNITED STATES

BY THOMAS D. BURLEIGH AND ALLEN J. DUVALL

IN THE course of identifying a collection of breeding birds from northern Georgia we were impressed with the distinct appearance of the Ovenbirds at this southern extremity of their breeding range in the eastern United States. A critical examination of over 30 breeding birds revealed the fact that a well-marked subspecies was represented, its characters being as follows:

***Seiurus aurocapillus canivirens*, new subspecies** Southeastern Ovenbird

Type.—Adult male, United States National Museum No. 342053, Fish and Wildlife Service collection; Margret, Fannin County, Georgia, July 5, 1929; collected by Thomas D. Burleigh, original number 476.

Subspecific characters.—Similar to *Seiurus aurocapillus aurocapillus* (Linnaeus) of the northeastern United States and Canada, but upper parts paler and grayish green rather than bright green. In this respect it suggests *S. a. cinereus* A. H. Miller of the eastern slopes of the Rocky Mountains, but is greener and noticeably less gray above, and the ochraceous-buff of the crown is brighter. From *S. a. furvior* Batchelder, of Newfoundland, it differs in lacking the definite brownish tinge of the upper parts, and in having the markings on the upper breast and sides paler.

Geographic distribution.—Breeds in the southeastern United States from eastern Virginia and West Virginia south to northern South Carolina, northern Georgia, and northern Alabama. In winter south to the West Indies and Quintana Roo.

Remarks.—Superficially this southeastern race of the ovenbird more closely resembles breeding birds from the Rocky Mountains than it does the nominate race. The grayish wash of the upper parts is not so intense as in *cinereus* so the suggestion of green is more noticeable, but in comparison *aurocapillus* is much brighter green above than *canivirens*. Miller (1942. *Condor*, 44:185–186) noted that in a series of eastern birds that he compared with his new race several approached closely the least gray individuals of *cinereus*, and he interpreted these few gray birds as variants of the eastern population rather than as examples of his Rocky Mountain race. These specimens have not been examined in connection with the present study, but they probably were from the southeastern United States, and thus he was justified in hesitating to call them *cinereus*. Birds from western Maryland and Pennsylvania are intermediate in their characters, but closer to *aurocapillus* than to *canivirens*. No

positive breeding birds have been examined from the District of Columbia and adjacent areas in Virginia and Maryland. Eight spring examples seem to be referable to *aurocapillus*, while 6 are like *canivirens*. Thus, from the available evidence, the region around the District of Columbia is either one of intergradation or the 6 spring examples of *canivirens* represent the breeding form and the other 8 birds seen are migrants of *aurocapillus*.

In describing the races from Newfoundland and from the eastern slopes of the Rocky Mountains, neither Bateholder nor Miller designed the breeding populations to which the name *Seiurus aurocapillus aurocapillus* should be restricted. It seems desirable, therefore, that this be done at this time. *Motacilla aurocapillus* was described by Linnaeus (1766. "Systema Naturae," 1:334) and was based on Edwards' plate and text (1758. "Gleanings of Natural History," 5:91, pl. 252) and on Brisson's description (1760. "Ornithologia sive synopsis methodica," 3:504). It appears that Brisson based his description on Edwards, and that the specimen from which Edwards made his plate was obtained "at sea, in November, 1751, by the late Tho. Staek, M. D. and F.R.S. in his Voyage to Jamaica, as the ship lay becalmed, about eight or ten leagues distant from Hispaniola" (Edwards, *loc. cit.*). Edwards further stated that he received two specimens of the "golden-crowned thrush" from William Bartram of Pennsylvania, which confirmed his opinion that they were "birds of passage." In the collections in the U. S. National Museum, 18 ovenbirds were examined from Haiti. Fifteen of these are typical of the breeding populations of the northeastern United States and eastern Canada, the upper parts being bright green with no suggestion of a gray wash. The remaining three clearly resemble the breeding birds of the southeastern United States. It seems, therefore, that the more northern mainland race is definitely commoner in Haiti in migration than is the southeastern form, and that it should be designated as the nominate race with a breeding range from Nova Scotia south to Pennsylvania.

An examination of material from the western United States indicates that *cinereus* has a much larger breeding range than that given in the original description by Miller. In addition to one example from the type locality, we have studied breeding birds from Glasgow, Leedy, Ekalaka, and Fort Keogh, all in Montana. We have also examined six birds from North Dakota (Fort Rice, Oakdale, and Bismark), two from Wyoming (Bear Lodge Mountain), and one from Missouri (Independence, June 20, 1857).

Although Miller (*loc. cit.*) states that one example from Edmonton, Alberta, is referable to *aurocapillus*, we have seen a specimen from Fort Chipewyan (May 29, 1901) and another from the Slave River (June 10, 1901) which seem referable to *cinereus*. However, an immature in fresh fall plumage from Fort McMurray (Aug. 10, 1903) does not seem referable to either of the two

rates expected in northern Alberta. Neither Godfrey (1950. *Canadian Dept. Resources Development Bull.*, 120:72) nor Rand (1948. *Natl. Mus. Canada Bull.*, 111:75) could definitely identify, racially, a small series of birds from southern Alberta and southern Saskatchewan. Additional material and study is needed to determine what race or races breed in Alberta and other prairie provinces of Canada.

Newfoundland breeding specimens from Notre Dame Bay, Badger, Glenwood, and Bonne Bay are all typical *furvior*. Three breeding birds from Tompkins, in extreme southwestern Newfoundland, likewise, are typical *furvior*, as are two May examples. However, two other late May birds from the same locality are inseparable from typical *aurocapillus*. Four fall specimens from Tompkins and Doyles are representative of *furvior*, but a September 8 (1946) example from Tompkins, and two birds which struck the lighthouse at Cape Anguille in the same region in the fall are like typical *aurocapillus*.

With the evidence available from specimens, we are not certain if these spring and fall examples of *aurocapillus* are birds which wandered north from the normal breeding range of *aurocapillus* in Nova Scotia, or if they represent breeding populations from the area about Tompkins, the latter being one of intergradation between *aurocapillus* and *furvior*.

BREEDING DISTRIBUTION of the new race *canivirens* is based on specimens examined in the U. S. National Museum and Fish and Wildlife Service collections from the following localities:—*Georgia*: White Co. (Tray Mtn.), Young Harris, Darien, Decatur, Atlanta, Smyrna, Blood Mtn., Margret, Athens; *North Carolina*: Asheville (Bent Creek), Murphy, Hayesville, Clinton; *Tennessee*: Carter, Parksville, Copperhill, Crossville, Sullivan Co. (Shady Valley), Cosby; *West Virginia*: Pocohontas Co. (Cranberry Glades), Randolph Co. (Cheat Bridge); *Kentucky*: Cooperville, Wayne Co. (Rocky Branch), Lynch; *Alabama*: Aniston; *Virginia*: Belle Haven, Eastville.

MIGRATION of the various races of the Ovenbird may be indicated by identifications of the following specimens taken outside of their known breeding range:—

(*S. a. canivirens*) *Cuba*: Guanajay; *Jamaica*: Moneague; *Puerto Rico*: Vieques I.; *Haiti*: Port au Prince, Little Cayemites; *Virgin Islands*: St. Thomas; *Bahamas*; *Quintana Roo*: Cozumel Island; *Florida*: Key West and Gainesville; *Mississippi*: Horn Island, Deer Island, and Gulfport.

(*S. a. furvior*) *Sinaloa*: near Mazatlán; *Bahamas*: New Providence and Abaco; *Leeward Islands*: Antigua; *Mississippi*: Ariel and Deer Island; *Louisiana*: New Orleans; *North Carolina*: Asheville (Bent Creek) and Statesville; *Georgia*: Athens; *Maryland*: Baltimore and Montgomery Co. (Sligo Branch); *Virginia*: Fairfax County, Shenandoah National Park, and Oakton; *District of Columbia*: Washington Monument; *Pennsylvania*: Rochester; *Ohio*: Painesville; *Ontario*: Toronto.

(*S. a. aurocapillus*) *Panamá*: Chiriquí; *Costa Rica*: Guanacaste (Hacienda Santa Marta); *Guatemala*: Petén (Remate); *British Honduras*: El Cayo; *Caribbean Sea*: Swan Island; *Tabasco*: Teapa; *Veracruz*: Tres Zapotes and Conejo; *Sinaloa*: Mazatlán; *Nuevo Leon*: Monterrey; *Jamaica*: Long Hill; *Haiti*: Cerca La Source, Little Cayemites, Tortuga

I., Caracol, Cahobas, La Gonave, Hinche, Pie de Macaya, Gonave I., Jeremie, and St. Raphael; *Bahamas*: Nassau; *Puerto Rico*: near Mayaguez, N. Guanica Lagoon, Anasco, Guanica, Río Piedras, Cayey, and Culebra I.; *Leeward Islands*: Antigua; *Virgin Islands*: St. Croix (Anna's Hope); *Florida*: Brevard Co. (Padgett Creek); *Mississippi*: Gulfport; *Nebraska*: mouth Platte River; *Georgia*: Athens and Harlem; *North Carolina*: Asheville (Bent Creek); *West Virginia*: Enon.

(*S. a. cinereus*) *Nebraska*: Camp Sheridan; *Chihuahua*: Mesquite (=Mosquito) Springs; *Sinaloa*: Mazatlán; *Yucatán*: Temax.

FISH AND WILDLIFE SERVICE, MOSCOW, IDAHO, AND WASHINGTON, D. C.,
May 28, 1951

GENERAL NOTES

Nest of Red-shouldered Hawk with six eggs.—On February 15, 1943, I noted that a pair of Red-shouldered Hawks (*Buteo lineatus*) were beginning their nesting activities in a small woodland in Jefferson County, Kentucky. A pair of Red-shoulders had nested in that woodland the four preceding seasons.

I made several visits to the nest in early March. I found one egg March 13, two on March 16, three on March 19, and four on March 22. I do not know exactly when these eggs were laid. On March 22 I supposed the last egg had been laid, so discontinued my visits for a time. In previous years the clutch had never exceeded three eggs, and the behavior of the birds, especially that of the highly belligerent female, led me to believe that they were the same pair which had nested there before.

On April 10 there were six eggs. On April 15 the female was still incubating, and since none of the eggs showed any sign of hatching I collected them. All were addled, though the presence of small embryos indicated that incubation had been successful for a time. The embryos may have been killed by the unusually cold weather.

The possibility that two females were responsible for the six eggs seems ruled out by the consistently aggressive attitude of the female throughout my several visits to the nest in 1943. Nor do the measurements of the eggs in any way suggest two "natural" sets. In order of laying (respective order of the last two not known) they measure: 53.5×42.5 , 52.5×42.5 , 55×42 , 54×44 , 54×43.5 , 55.5×42 mm.

There is general agreement that three or four eggs comprise the usual clutch of this species and three eggs are more usual than four. However, Bendire (1892. *U. S. Natl. Mus. Special Bull.* No. 1, p. 222) recorded a set of six eggs taken by Dr. William Wood, of East Windsor Hill, Connecticut, and another set of six collected by R. B. McLaughlin, of Statesville, North Carolina, April 5, 1889. Sets of this size apparently are very rare. It is interesting to note that two of the three mentioned come from the southern United States, where small, rather than large, clutches might be expected (*cf.* Rensch, 1938. *Proc. Eighth International Orn. Cong.*, Oxford, England, pp. 306, 308).—THOMAS P. SMITH, *W-5 Green Tree Manor, Louisville, Kentucky, November 10, 1950.*

The status of Barrow's Golden-eye in Kansas.—Barrow's Golden-eye (*Bucephala islandica*) has been reported from Kansas on the basis of six specimens in the University of Kansas Museum of Natural History. I have recently reidentified all six as American Golden-eyes (*Bucephala clangula americana*).

Bunker (1913. *Kansas Univ. Sci. Bull.*, 7:141) first reported Barrow's Golden-eye from Kansas, recording the first five of the specimens listed below as "a new species for the state." Long (unpub. ms.) reported the sixth specimen. All six were reported again as Barrow's Golden-eyes by Long in his "Check-List of Kansas Birds" (1940. *Trans. Kansas Acad. Sci.*, 43:438).

Data concerning these specimens include the following: ♂ KU 6403 (1904, Leavenworth County), ♂ KU 6401 and ♂ KU 6402 (1903, Douglas County), ♀ KU 7744 and ♀ KU 7745 (1909, Douglas County), and ♀ KU 5904 (1911, Douglas County). All three males are in juvenal plumage. Since female and immature male Barrow's Golden-eyes are difficult to distinguish from American Golden-eyes in corresponding plumages, I sent the specimens in question to Dr. Herbert Friedmann for examination. Dr. Friedmann agreed that all of the specimens were American Golden-eyes.

It seems, therefore, that Barrow's Golden-eye must be dropped from the list of birds now known from Kansas. However, the possibility of its occurrence must still be con-

sidered since it is reported in the neighboring states of Colorado (1931. A. O. U. Check-List, 4th Ed., p. 53) and Nebraska (1945. Haecker, Moser, and Swenk, *Nebraska Bird Rev.*, 13:7). Harris (1919. *Trans. Acad. Sci. St. Louis*, 23:237) listed Barrow's Golden-eye as a "very rare winter visitant" in the Kansas City region. He mentions only two "authentic" records. Since, however, his list of birds for this region include some observations made in Douglas County, Kansas, his statement may have been based at least in part on the misidentified specimens.

Long (1940. *Trans. Kansas Acad. Sci.*, 43:438) designated the American Golden-eye as "an uncommon migrant throughout the state." Actually, this species appears to be a regular winter resident although occurring usually in small numbers.—WILLIAM B. STALLCUP, *University of Kansas Museum of Natural History, Lawrence, Kansas, May 28, 1951.*

Birds becoming "caught" in flocks of other species.—Under this caption, in two recent issues of *British Birds* (1950, 43:332-333; 1951, 44:197-201), several observers have reported instances in which single birds, or small groups, of one species, (1) when flushed with a flock of another species, apparently were unable to break away and instead were impelled against their usual flight habits to follow the maneuvers of the preponderant species; (2) seemed to join flocks of a different species voluntarily and participate in their flights. Some incidents recorded by Selous (1905. "Bird Life Glimpses," pp. 60, 127) and several in the *Auk* (1933, 50:211, 355-356) appear to be earlier examples of the second type.

In suburban Baltimore I have seen one occurrence resembling the first type. On the evening of September 21, 1949, I found some hundreds of Starlings (*Sturnus vulgaris*) and a number of Purple Grackles (*Quiscalus quiscula*) in a park wood. Repeatedly, when the Starlings made mass flights from treetops out over the wood and back, some of the grackles took off, circled, and came back with them. Finally, a single great exodus toward a roost one-half mile away cleared the wood of all the birds.

Four times between December 7, 1949, and January 17, 1950, also in suburban Baltimore, I saw Starlings flying with a flock of Rock Doves (*Columba livia*) that usually numbered around 40. Only once did I see the entire incident. That time the pigeons left their loafing roof, made one great circle in the air, and alighted again. Just after they rose, a loose band of 10 or 12 Starlings appeared near them. One of the Starlings entered or was swept up by the fore-edge of the flock of pigeons and flew there through half of the circle before sheering away. On the other three occasions the flying flock was already a mixed one when I sighted it. Once there were 9 Starlings, in two groups, in the fore-edge, and they stayed there, as much a part of the flock formation as the pigeons themselves, during two or three great curves that the birds made. Again, I was just in time to see 3 Starlings drop out of the flying flock. Once, in a flock that I glimpsed for a few seconds, there were 13 Starlings and only 8 pigeons; I saw less than one-fourth of a large circle made that time.

Although the circumstances of the first Starling-pigeon incident suggest "entrapment," the repeated occurrence of these mixed flocks suggests voluntary association. It may be significant that all of the Starling-pigeon incidents noted occurred at about 8 a.m., when the Starlings had only recently arrived at my observation point, 5 miles airline from their downtown roosts. Possibly these birds were still under the influence of their dispersal-flight impulse. Similarly, the grackles of my first observation were keyed for a flight to a roost.—HERVEY BRACKBILL, 4608 Springdale Avenue, Baltimore 7, Maryland, June 29, 1951.

Western Meadowlark attacks ground squirrel.—While driving along a county road just south of the Cache la Poudre River, three miles west and one mile north of Greeley, Weld County, Colorado, on May 14th, 1951, I saw a Western Meadowlark (*Sturnella neglecta*) fluttering up and down a short distance away. Closer observation revealed that the bird was attacking a thirteen-lined ground squirrel (*Citellus tridecemlineatus*). The bird was hovering over the ground squirrel and repeatedly striking at it as it ran through the grass. The outcome was not learned as the two animals passed from view over a ridge with the meadowlark still in close pursuit.

This seems noteworthy to me since I had not previously seen a meadowlark attack any mammal. I suppose that the ground squirrel had molested or had been near the bird's nest.—CLARENCE A. SOOTER, 5311 West 55th Street, Mission, Kansas, September 27, 1951.

Harrying of herons by gulls—a further note.—Imhof (1950. *Wilson Bulletin*, 62:210) reported the chasing of a Great Blue Heron (*Ardea herodias*) by a Ring-billed Gull (*Larus delawarensis*), and in view of his notes I (1951. *Wilson Bulletin*, 63:110) reported the chasing of a European Grey Heron (*Ardea cinerea*) by a European Common Gull (*Larus canus*). Since then I have read a comment by Stacey (circa 1947. "This Wild Company." Edmund Ward, Leicester, England, p. 52) on the chasing of the Grey Heron by the Black-headed Gull (*Larus ridibundus*). Since the reference may not be readily accessible to my American readers, I quote:

"Over the Norfolk marshes I have seen how the black-headed gulls will follow and chivvy any heron which flies over their breeding-ground, yet the bittern (according to my limited observations on this bird), so very much like the heron in flight, is tolerated and not interfered with at all. Should a heron happen to cross a field where the peewits nest, the plovers will make the air scream with their frantic attacks until the imagined danger has passed. Why birds should so resent this harmless grey creature I do not know, but perhaps, like all big people, he is good-natured and does not mind."

All three authors express surprise at this persecution of the heron. Note also that Stacey twice comments that it happens when the heron flies *over the breeding grounds* of the other species.

Pereyra (1938. *Aves de la zona ribereña nordeste de la provincia de Buenos Aires* [Birds of the northeast riverside zone of the province of Buenos Aires]. *Memoirs Zool. Gardens La Plata*, Govt. Print. Office of La Plata, p. 46) speaking of the Black-headed Teal, *Heteronetta atricapilla* (Merrem) says: "This queer duck never makes a nest but lays its eggs in the nests of various species of aquatic birds of a variety of families and orders, for it not only parasitizes other ducks but also coots or gallinules, herons, ibises, and gulls; . . . The strangest is to see them in the nests of white herons or egrets, and I once had the opportunity of seeing a newly hatched duckling in such a nest. It very promptly withdrew to the water, and swimming vigorously attempted to put some distance between itself and the danger, possibly because it might fall victim to those same herons which might either eat it or feed it to their own young."

Witherby, *et al.* (1945 [reprint of vol. 3, 1939]. "The Handbook of British Birds." H. F. and G. Witherby, Ltd., London) discuss the food of various herons, and note that a variety of small birds and young of larger birds have been eaten. The prey includes domestic chickens, terns, and Great Crested Grebes. There is therefore no reason to doubt that the young of the lapwing and of gulls would be eaten if opportunity occurred. The behavior of the adults of these species may therefore be not entirely irrational. Most

of these frequently nest in places readily accessible to herons.—F. W. PRESTON, *Box 149, Butler, Pennsylvania, July 18, 1951.*

Homing ability of female Cowbirds.—Eastern Cowbirds (*Molothrus ater*) possess a marked ability to return to their place of banding. Summaries of the homing ability of Cowbirds banded by William I. Lyon appeared in *Inland Bird Banding News*, Vol. 7, No. 1, p. 7, and Vol. 9, No. 2, p. 10. Fox (1940, *Bird-Banding*, 11:23) recorded a female Cowbird which returned a distance of 107 miles in less than two days, and, on another occasion, the same bird returned 184 miles in one week.

Females seem to return and to repeat in traps more frequently than do males. Nice (1935, *Inland Bird Banding News*, 7, No. 2: 2) noted that of four males and nine females banded, no males returned but she had "two females for two seasons each, and two other females for three seasons."

My records of banded Cowbirds show the tendency of female Cowbirds to remain in a locality throughout the breeding season, and also shows their ability to return quickly to the banding station after being transported distances. These Cowbirds were trapped in a $\frac{3}{4}$ inch chickenwire trap, with open ground funnels, all painted black. Bread and a pan of water were used as bait. All birds recorded here had their band numbers checked in the hand, although some birds were also color-banded.

An adult female Cowbird, banded No. 39-255053 at Harrisburg, Pennsylvania, on May 10, 1948, repeated May 11, 18, June 2, 16, 19, 24 (twice), 25, 27, and 28. On the latter day she was taken 6 miles southwest and released at 7:40 a.m. On July 1 she was back in the trap and continued repeating on July 2 (twice), 4, 5, 6, 7, and 12. In 1949, this female and a male entered the trap on April 5. The male was banded No. 39-255078. This pair was taken that same day to the Indiantown Gap Military Reservation, 22 miles northeast, and released at 12:55 p.m. In flight they kept together until out of sight. The male was not seen again. The female entered the same trap at 7:30 a.m. on April 7, two days later. She then repeated April 27 and 30 and was taken that last day 10 miles east and released at 11:40 a.m. Three days later she was back again, repeating May 3, 10, 14, 17, 18, 20, and 24 on which day she was apparently carrying a large egg. I did not weigh any of the Cowbirds, but I could feel a hard lump the size of a marble in the lower abdomen. Since I could not feel this object when I examined the bird again on May 25, I think that she had laid the egg before entering the trap. On May 25, I released the bird 16 miles from my trap and never saw her again.

Another pair of Cowbirds, Nos. 39-255006 and 7, trapped together May 10, 1947, was used experimentally. The male repeated May 16, was taken 3 miles to the State Capitol, released and not seen again until June 18 and 31. He was shot at Leland, North Carolina, the week of January 19, 1948.

The female, No. 39-255006, color-banded but recorded by handling, displayed her homing abilities through two seasons. Banded May 10, 1947, she repeated May 17, 31 (twice), June 17, 18, 24, 28 (twice), July 1, 3, 5, and 11. Returning on April 15, 1948, she repeated April 30, May 2, 8, and 9. On the last date she was carried 56 miles southwest to Chambersburg and released at 6:30 p.m. On May 14 she entered the trap at 5:30 p.m. On her next repeat, May 24, she apparently carried a large egg which was laid before her next visit, May 26. Then she repeated May 28 (twice), 29 (four times), and 30. Then taken 6 miles south through Harrisburg and released at 4:03 p.m., she was back at 6 a.m. the next morning. She repeated on June 1, 3, 5 (four times), 7 (twice), 9, and 10 (again apparently with a large egg which was laid before she entered the trap at 7:00 a.m., June 11). I took her by train to Philadelphia, 100 miles east, and released her

at the University of Pennsylvania at 10:30 a.m. on June 12. Just four days later, on June 16, she had found her way back and I saw her enter the trap at 10:15 a.m. This female then repeated again on June 18 (twice), 19, 20, 21, and 22. There are no further records of her.—HAROLD B. WOOD, 3016 N. Second Street, Harrisburg, Pennsylvania, January 28, 1951.

Flight-speed of the Mourning Dove.—While driving toward Ridgetown, Ontario, on June 6, 1951, I had an opportunity to “clock” the speed in flight of a Mourning Dove, *Zenaidura macroura*.

The bird flushed from a hedgerow on the left side of the road and flew, in typical, direct flight, parallel with the vehicle, a distance of more than three-tenths of a mile. It was about twenty-five feet from my car, and flew approximately five feet above the ground. Adjusting the speed of the automobile to that of the bird, I discovered that the dove was moving at 55 miles per hour, as indicated by the speedometer of the vehicle. The flight, which was along a straight highway and “cross-wind,” ended when the dove entered a roadside thicket.—ERIC WALTER BASTIN, 43, Inglewood Drive, Hamilton, Ontario, August 27, 1951.



Female Cowbird hung in an old nest of Baltimore Oriole.—While inspecting nesting territories of the Baltimore Oriole (*Icterus galbula*) eight miles northwest of Ann Arbor, Michigan, I found the results of an interesting bird catastrophe. On May 6, 1951, I discovered the remains of four old oriole nests in a row of trees along a small stream in an open pasture. From one oriole nest dangled a female Cowbird (*Molothrus ater*), obviously dead for no more than a few weeks. On May 8, returning with climbing irons and ropes, I succeeded in cutting down the nest and found that the Cowbird hung by a single loop of horsehair. The body was somewhat desiccated but was fairly intact. Dissection of the body cavity showed no signs of the hard parts of an egg, yet it is hard to believe that the Cowbird was doing anything other than looking into old nests

when caught and strangled. This furnishes evidence additional to that already in the literature that the Cowbird does not always find nests solely by watching the activity of other birds.

Two of the old oriole nests mentioned above were unusual in the great amount of horsehair used in their construction; the remains of the one pictured contained well over eighty percent horsehair.—K. T. ROGERS, Dept. of Anatomy, E. Medical Bldg., Ann Arbor, Michigan, June 8, 1951.

Sutton's Warbler (*Dendroica potomac*) again observed in West Virginia.—In late May, 1950, eight members of the Buffalo Ornithological Society visited the eastern

panhandle of West Virginia to observe the bird life of that region and to attempt again to locate Sutton's Warbler. After searching for some time along the Potomac near Shepherdstown, we spent several hours on Opequon Creek, about four or five miles southeast of Martinsburg, in an area known locally as Cose Dale. Here we heard a number of likely-sounding warbler songs, but each singer turned out to be a Parula Warbler (*Parula americana*).

I did, however, locate one Sutton's Warbler about forty feet up in an ash tree, near the creek at Dandridge's Dam, and was able to show it to every member of our party. The bird was in sight for several minutes, during part of which period it preened, allowing careful study of its entire underparts and part of its back. The fact that it did not sing led us to believe that it was a female. All of us noted the bright yellow throat, black-bordered at the side, the black extending slightly forward, tending to form a very incomplete ring across the breast. There was a white line over the eye, but no white area down the side of the neck nor any heavy black side-striping such as characterizes the Yellow-throated Warbler (*Dendroica dominica*). One of our observers, Bernard Nathan, was able to make out the greenish tinge on the back. Parts of the back visible to me seemed to be uniformly grayish and the crown also was gray, but darker. The bird later flew into a large sycamore and was soon lost to sight. Aside from Nathan and myself, the following persons saw the bird: Mr. and Mrs. Edward C. Ulrich, Heather Thorpe, William Almendinger, Robert Sundell, and Irwin Woldman. The date was May 29.

Next morning we continued our search, but without success. The heavy foliage could easily have hidden the birds, of course.

In early June 1951, we spent several days in the vicinity of Cose Dale and Dandridge's Dam, as well as along the banks of the Potomac and other neighboring areas, but were unsuccessful in locating Sutton's Warbler. However, we intend to continue our search for the bird and its nest, and thus ascertain whether both birds of the pair prove to be *Dendroica potomac*. We wish to thank Maurice Brooks, of West Virginia University, and Miss Serena Dandridge, of Shepherdstown, for aid and suggestions given our group; also Miss Dandridge and Miss Nina Mitchell for their hospitality.—HAROLD D. MITCHELL, 378 Crescent Avenue, Buffalo 14, New York, September 1, 1951.

Black Vulture depredations at Kentucky Woodlands.—The owner of a large farm within the area of Kentucky Woodlands Wildlife Refuge between the Tennessee and Cumberland rivers reported that he had lost a number of young pigs from attacks by Black Vultures (*Coragyps atratus*). I went to his farm on April 12, 1949, to investigate the report. He showed us three young pigs that had survived recent attacks. The pigs' tails were lacerated and broken, but the vultures had been driven away before serious damage had been done. The farmer estimated that vultures may have killed as many as 40 pigs on his farm during the previous year and a half. He had not, however, actually seen more than half that number being eaten by the predators. He reported that the birds attacked the tail and rectum and pulled out the intestines. Recently he had arrived at the scene of an attack in time to drive away several of the vultures from pigs still alive, but so badly injured that they died later. Although usually only new-born pigs were eaten, he described one case of a pig two weeks old that had been badly injured. The owner had also lost two calves which he thought had been killed by Black Vultures.

The farmer was able to describe accurately the differences between Black Vultures and Turkey Vultures (*Cathartes aura*) and assured us that only the former had been responsible for the depredations. The refuge manager, Talbott Clarke, verified many of the details in the farmer's account.

In a recent note (1947. *Auk*, 64:131—132), I reported a similar case in Meade County, Kentucky, 200 miles east of Kentucky Woodlands. As far as I can ascertain, this is only the second time that Black Vultures have been found preying on domestic stock in Kentucky. I can find no evidence that Turkey Vultures participate in these raids. W. J. Hamilton (1941. *Auk*, 58:254) reported Turkey Vultures killing young pigs near Fort Myers, Florida. In my earlier article, I expressed a doubt as to the identity of the birds involved. Dr. Hamilton has since informed me by letter that his informant was sufficiently familiar with both species of vultures to make the identification certain.—HARVEY B. LOVELL, *Biology Department, University of Louisville, Louisville, Kentucky, July 12, 1951.*

Stoddard's Yellow-throated Warbler in Bay County, Florida.—Roy C. Hallman of Port St. Joe, Florida, recently sent me for identification three specimens of the Yellow-throated Warbler (*Dendroica dominica*) collected at Panama City, Bay County, Florida, in the summer of 1942. A male taken June 27 is in worn breeding plumage. A female in fresh winter plumage, and labelled "adult" was taken July 15. A second specimen taken July 15, marked "immature sex?," is definitely browner in tone than the "adult" female.

The male in worn breeding plumage is the only conspicuously slender-billed bird of the three. Its bill-length is 14.5 mm. The "adult" female and young bird are fairly long-billed (respectively 13.5 and 12 mm.), but heavier-billed than the breeding male.

I do not hesitate to call the breeding male specimen an example of *D. d. stoddardi* and I am much interested in ascertaining that that race breeds in Bay County. As for the other two birds, they probably were transients from a breeding ground elsewhere. Mr. Hallman informs me that they were associating with a single Black and White Warbler (*Mniotilta varia*), a species which does not nest anywhere in the vicinity and which does not ordinarily arrive from the north nearly so early in fall migration.

All three specimens of *D. dominica* are yellow in the supraloral area. The adult male, "adult" female, and immature bird measure, respectively: wing, 67, 66, 62 mm.; tail, 50, 51, 49 mm.; and tarsus, 16.5, 17.5, and 17 mm.—GEORGE MIKSCII SUTTON, *University of Michigan Museum of Zoology, Ann Arbor, October 13, 1951.*

Upland Plover and Yellow-headed Blackbird in the Chicago region.—W. L. McAtee (1951. *Wilson Bulletin*, 63:112) recently recorded only one observation of the Upland Plover (*Bartramia longicauda*), and one of the Yellow-headed Blackbird (*X. xanthocephalus*) in the Chicago region. His note would infer that the report of Ford, Sanborn, and Coursen (1934. *Chicago Acad. Sci. Program of Activities*, 5 (2-3):39 and 65) indicating them to be "fairly common" is not correct.

For the past six years I have been observing birds in the Chicago region and have repeatedly found the Upland Plover. One pair (one of them identifiable by a crippled foot) returned each year for three years to a pasture north of Itasca. In 1947, in the area delineated by the towns of Itasca, Barrington, Arlington Heights, Mt. Prospect, and Prospect Heights, I recorded over 50 observations of Upland Plover and located six family groups. Twice I have seen plovers near Joliet and once near Essex in the north-western corner of Kankakee County.

Each year I have found Yellow-headed Blackbirds at Baker Lake, Barrington, where they nest. I have been informed by local ornithologists that the birds had been nesting there for some years previous to my finding them. This year (1951) I counted six males in their territories. On two occasions I have seen this species in other nearby marshes. Although I have not seen them in the Calumet Lake region, they are reported there regularly.—F. J. FREEMAN, *Itasca, Illinois, July 29, 1951.*

EDITORIAL

One of the more important sources of Wilson Club funds, other than annual dues, is the sale of back issues of the *Bulletin*. The most advantageous of these sales is the sale of sets or long runs. A shortage of even one back number sometimes prohibits the sale of a considerable number of volumes. Volumes which can not be sold for this reason then become a liability rather than an asset.

Owing to certain unfortunate circumstances, we are now embarrassed by a shortage of three numbers (Nos. 1, 2, and 3) of the 1951 volume. We are especially short of the March issue. We suspect that many members do not keep all back issues on file. These members will be doing the Club a real and important service by returning any of the first three numbers of the 1951 volume no longer needed to the "Wilson Ornithological Club Library, Museum of Zoology, University of Michigan, Ann Arbor, Michigan" so that more sets can be sold. Members are reminded that increased club funds mean bigger and better future *Bulletins*!

One of the objectives of the Wilson Ornithological Club has always been the encouragement of research, particularly among the younger members. Research costs money, even the small field projects which require the weekly or daily use of an automobile to and from the site of operations. And money is something that isn't always available when and where it is most needed. Several generous friends of the Club have seen this problem and met it in a way which has, we believe, paid big dividends.

The *Louis Agassiz Fuertes Research Grant* of \$100 was first announced in 1947, contributed by a staunch friend who prefers to remain anonymous. The *Pell Fund*, generously given to the Club in honor of the late S. Morris Pell for the purpose of encouraging young bird artists, was announced to members the same year. And last year still another award, the *Chalif Grant*, was announced with the special aim of encouraging and implementing field research in Mexico.

Your Research Committee, assigned the responsibility of selecting recipients, has been impressed with the high quality of the applications they have received. It is an indication of the kind of ornithology that we like to think the Club is fostering. Our only regret is that we have to disappoint so many applicants, but certainly no stigma can be attached to not being selected.

We hope that all members are aware of these awards and their eligibility to apply for them. Your chairman is ready to send application blanks and further information to any interested party. Act promptly, as the selections for the Fuertes and Pell Grants will be made and announced at the annual meeting in Gatlinburg, April 25-26, 1952. The closing date for receipt of applications will be March 25.

Your committee members are: Ernst Mayr, Frank Pitelka, George Sutton, Dwain Warner, and John Emlen, chairman. —JOHN T. EMLEN, JR.

The National Science Foundation has announced recently the establishment of research fellowships in various fields, including biology, as follows:

Predoctoral graduate fellowships, stipend \$1400, \$1600, or \$1700 per academic year, with additional allowances for married fellows and those with dependent children.

Postdoctoral fellowships, stipend \$3000 per academic year, with additional allowances as above.

The National Science Foundation will pay tuition and laboratory fees charged by the institution at which the fellow is studying. A limited travel allowance is paid. The fellowships are awarded solely for the education, training, and development of the recipients. Applications for the 1952-53 academic year are already closed, but those persons interested in applying at some later date should contact the Fellowship Office, National Research Council, 2101 Constitution Avenue, N. W., Washington 25, D. C.

The Wilson Ornithological Club welcomes the formation of the Southern Ornithological Society, which was established at Gainesville, Florida, on September 29, 1951. The purposes of the Society are to stimulate interest and to promote research in Ornithology.

Dr. Pierce Brodkorb was elected President; Julian Baumel, Vice-President; David Karraker, Secretary; and Earl C. May, Treasurer.

Correspondence should be addressed to David Karraker, Department of Biology, University of Florida, Gainesville, Florida.

THE MEMBERSHIP COMMITTEE

There are interested and enthusiastic bird students scattered throughout our land who do not belong to the Wilson Ornithological Club. A large majority of them are amateurs, a fact which doesn't lessen their possible contributions to ornithology and to our organization. The amateurs are, however, more difficult to contact in regard to membership. We think that these people would profit by membership. In turn, the club would profit by having a larger Bulletin, greater influence, and wider recognition. The membership committee cannot possibly search out all of these individuals. Each of you may know one or more persons who should join. Visualize what would happen to the club if each present member were to find one interested new member. The membership committee can function successfully only if the members will submit names to them. If you know of someone who should be a member, send the name and address of that person (typed or printed clearly, with the Miss, Mrs., Mr., or Dr. clearly indicated) to any of the following Membership Committeemen:

Ralph M. Edeburn, Chairman, Marshall College, Huntington, W. Va.

Hal H. Harrison, 1102 Highland Street, Tarentum, Pa.

R. T. Gammell, Kenmore, N. D.

George H. Lowery, Jr., Museum of Zoology, Louisiana State Univ., Baton Rouge, La.

Robert C. Conn, 769 Park Avenue, Bound Brook, N. J.

G. M. Sutton, Museum of Zoology, University of Michigan, Ann Arbor, Mich.

Thomas D. Burleigh, Forestry Building, Univ. of Idaho, Moscow, Idaho.

Gale Monson, P. O. Box 1717, Parker, Arizona.

Eugene Eisenmann, 11 Broadway, New York 4, New York.

Thomas H. Foster, West Road, Bennington, Vermont.

Harold D. Mitchell, 378 Crescent Avenue, Buffalo 14, N. Y.

Doris H. Speirs, R.R. No. 2, Pickering, Ontario.

Wendell P. Smith, Newbury, Vermont.

Virginia S. Eifert, 705 W. Vine Street, Springfield, Ill.

Lewis Terrill, 216 Redfern Avenue, Westmount, Montreal 6, Quebec.

OBITUARY

ROSE SCHUSTER TAYLOR (Mrs. Henry James Taylor) was born on a Wisconsin pioneer farm two miles west of Middleton in Dane County on January 5, 1863. She was graduated

from the University of Wisconsin in 1885 with second honors in her class. After her marriage in 1887 the family home was maintained in Sioux City, Iowa, where Mr. Taylor practiced law for the remaining 15 years of his life. In 1931 she moved to Berkeley, where she died on January 25, 1951, at the age of 88. Three sons and a daughter survive Mrs. Taylor. Naturalists in the central and western United States know Mrs. Taylor for her ornithological and botanical writings. For thirty years, after 1915, she had continuously in preparation some article based on thorough and original study. Her more than forty publications in this period dealt with birds, plants, natural history of Yosemite, Indians, and biographies of naturalists, especially ornithologists of the midwestern states. These reports contained abundant facts and characterizations obtained at first hand or from sources not available in print. About twenty persons were included, and special enthusiasm was devoted to the accounts of Coues, the Kumliens, and Miss Sherman. Along with this work she had an important influence upon a great many people through her varied services in community enterprises, upon natural history institutions, and upon other organizations. Many traveling naturalists made her home their headquarters in Sioux City or Berkeley. For a long period she spent a part of each year in Yosemite where she helped in the Museum and with other parts of the nature work. Mrs. Taylor joined the Wilson Ornithological Club in 1916, and later became a life member. For years she regularly made the long trip from California to attend the annual meetings. She joined the Cooper Club in 1920 and maintained active membership for twenty years. Accounts of her life have appeared in *Iowa Bird Life* (1951, vol. 21: 2-5) and *Yosemite Nature Notes* (1951, vol. 30: 13-14).—JEAN M. LINSDALE.

THE WILSON ORNITHOLOGICAL CLUB LIBRARY

The following gifts have been recently received. From:

Aaron M. Bagg—1 reprint	New Zealand Department of Science and Industrial Research (Animal Ecology Section)—1 book, 3 reprints
Andrew J. Berger—1 periodical	Margaret M. Nice—11 reprints, 8 magazines, 6 books
Hervey Brackbill—1 book	Walter P. Nickell—1 reprint
Oscar McKinley Bryens—1 reprint	Eugene P. Odum—1 book, 4 reprints
Mildred F. Campbell—1 book	Christopher M. Packard—2 reprints
Betty Carnes—1 book	William H. Phelps—5 reprints
Robert M. Chew—1 reprint	Frank A. Pitelka—3 reprints
J. Fred Denton—5 reprints	Aretas A. Saunders—3 books
Eugene Eisenmann—1 reprint	Frederic R. Scott—6 magazines
William G. Fargo—1 book	Clarence A. Sooter—1 reprint
Martin L. Grant—6 reprints	Robert E. Stewart—3 reprints
Fr. Haverschmidt—3 reprints	Robert W. Storer—1 book, 2 reprints
Karl W. Haller—9 books	George M. Sutton—2 books
James Hodges—1 pamphlet, 12 reprints	Josselyn Van Tyne—12 reprints
Philip S. Humphrey—1 reprint	F. A. Ward—1 magazine
Leon Kelso—2 pamphlets	L. R. Wolfe—27 reprints, 8 magazines
Nada Kramar—2 books, 68 reprints and pamphlets	University of Wisconsin Department of Wildlife Management—2 reprints
H. B. Lovell—1 reprint	
Douglas S. Middleton—1 bulletin	

ORNITHOLOGICAL LITERATURE

THE PHEASANTS OF THE WORLD. By Jean Delacour. Country Life Limited, London, and Charles Scribner's Sons, New York, 1951:8¾ × 11¼ in., 347 pp., with 16 color plates and 16 monochrome plates, and 21 maps and diagrams. \$35.00.

No ornithologist living today is better fitted to attempt the task of preparing a new monograph on the pheasants than Jean Delacour. It is a particular pleasure then that he has chosen to do so, and to revise and emend so carefully and notably the previous monographs on one of the most beautiful of all avian families. His immediate predecessor in an illustrious line was Dr. William Beebe, whose four magnificent volumes on the subject, published between 1918 and 1922, have long been out of print as well as somewhat outmoded by advancing knowledge. Beebe's principal contributions were the observations on living birds made for the first time by a naturalist on many of the least known species.

Delacour during his remarkable career has been able to combine to an unusual extent the field and museum researches of an ornithologist with the patient study of a careful and recording aviculturist. Too few ornithologists have had any practical or first-hand experience with birds kept under observation in aviaries or at semi-liberty. Too few aviculturists are sufficiently trained or interested to keep records and observe various characteristics of the birds in their possession. It is the blending of work in the field, the museum, and the aviary that has given Mr. Delacour an unrivalled opportunity to study pheasants. It seems to me that such experience is a necessary requisite in any definitive study of these rare, secretive, and yet manageable birds.

The plan of this volume is admirable. Mr. Delacour has worked out what seems to this writer a practical and convenient systematic arrangement of the various genera and species, emphasizing relationships rather than diversity (presumably the aim of systematics). He has included under each genus a general discussion of range, field notes, and, in many cases, an important amount of material on the occurrences of these forms in captivity, their breeding, food habits and the like. Following this is a more detailed discussion of the species or subspecies, concise and to the point, which serves to make the amateur feel as much at home among the groups under discussion as the professional. Particularly serviceable in this connection is a detailed discussion of the forms of the true pheasants, *Phasianus*. Delacour recognizes two species and his break-downs into smaller groups and excellent distribution maps serve to create order out of what had been a chaos of races of these plastic birds. If the true pheasants are today still over-split, taxonomically speaking, at least we know now where to begin.

One of the most important aspects of this book is its emphasis on aviculture as an auxiliary aspect of ornithology. Although much is known, and that at least summarized in this volume, about conditions of keeping and rearing many kinds of pheasants, it becomes apparent from a perusal of this work that much remains unknown about the behavior of pheasants. The field is open to the behavior student to whom large aviaries may be available to study mating habits, pair formation, the relationships between adults and young, and a host of other psychological attributes of these relatively easily managed birds. The problem of territory could probably be readily studied among aviary birds. Variations within species would be particularly interesting in this connection. Perhaps the notably bad temper exhibited by species of *Syrnaticus* is directly explainable through a study of their territorial requirements. This is a poignant question to me as the only cock Ijima's Copper Pheasant (*S. soemmerringi ijimae*) I ever possessed was so incredib-

ly bad-tempered that immediately after mating with a hen of a closely-related subspecies, *S. s. soemmerringi*, he reached forward and broke her neck with a swift twist of his bill.

In short this is a magnificent book and must find its way into the library of every serious student of game birds, whether ornithologist, aviculturist, or sportsman. I cannot praise it highly enough as a many faceted accomplishment of one man. It seems unjust to carp about small details and I will not beyond saying that the spelling of some of the geographical names, particularly in the region of India, is not always according to current practice. Nor is the Barail Range (mentioned on p. 69) anywhere except *in* Cachar and the Naga Hills, rather than outside of these districts as implied. But this is quibbling. The plates by Mr. J. C. Harrison are excellent, even imparting a rough tweedy feeling to the birds as if they were being watched out of doors on a cold bracing day. A few are entirely too rough, however. The Sonnerat's Junglefowl is not done justice to by any means, and, at least in my copy, Rheinart's Crested Argus seems far too washed-out, and the Congo Peacock altogether too bright. However, these could easily be faults of the printing, quite out of the hands of the artist. In any monograph of this sort it might have been well to have listed, along with the scientific description of the bird, a citation of when, if ever, it had been illustrated in a publication.

Suffice it to say in any case that this volume is a "must" and well merits the great success and popularity it is bound to achieve.—S. Dillon Ripley.

ECOLOGICAL ANIMAL GEOGRAPHY. By W. C. Allee and K. P. Schmidt. Revised second edition, 1951. (Based on *Tiergeographie auf oekologischer Grundlage*. R. Hesse). John Wiley & Sons, Inc., N. Y., 5¾ × 9 in., xiv + 715 pp., 142 figs. \$9.50.

Appearing fourteen years after the first (1937) edition, this useful work has been thoroughly revised and brought up to date. The 597 pages of the original edition have been expanded to 715. The improvements, as stated by the authors, are: "a greatly simplified terminology; a suitable background, without undue emphasis, for modern interest in conservation on a world-wide scale; expansion and revision of a large amount of material; expanded chapter bibliographies, including pertinent recent publications." With these changes the present edition is still more independent of the German original published in 1924, but even so large blocks of the original remain, as the authors acknowledge. The organization and chapter headings remain virtually unchanged. Even the separate paragraphs follow those of the first edition in their organization and contents, but new sentences have been added and phrasing altered to incorporate the large amount of new material that has been skilfully integrated with the old.

The bibliographic citations are fuller than in the earlier edition; titles are included and papers are arranged alphabetically by authors at the end of each chapter. Approximately one-seventh of the papers cited are new ones published since 1937. The authors state that age alone is little indication of the value of a given report, but that older papers may have special value when they accurately describe conditions of existence that were present years ago.

More than a dozen subjects are mentioned in the preface as illustrating the nature and scope of the revisions and additions in this second edition. One of these is "the concept of the biome, with a schematic map showing the biomes of the world." Discussion of the biome concept, however, is limited to one short paragraph. This brief discussion serves mainly to point out that the biome system cuts across Hesse's useful classification of the habitable world, the "biosphere," with successive divisions, into biocycles, superbiochores, biochores, subbiochores, biotopes and facies, a classification based primarily on physical

environmental features. The map mentioned (the same previously published in *Principles of Animal Ecology*, 1949, by Allee, Emerson, Park, Park & Schmidt) is on the inside of the cover, and shows not the biomes but the more inclusive "biome-types," seven of which are recognized. These are: Tundra, Taiga, Temperate Deciduous Forest, Grassland, Desert, Tropical Forest, and Temperate Rain Forest.

The last chapter, "The effect of man on the distribution of other animals," has been altered more than most others and contains much new material under the headings Deforestation; Controlled forests; Orchards, gardens, and parks; Buildings; Tropical regions; Aquatic life; Pollution of streams; Intentional and unintentional transport by man; Direct eradications; Disease and facilitation of its spread; Conservation. There are numerous references to birds, and changes in their ecology and distribution wrought by man's influence on the environment, with special emphasis on those found in the United States, but with many allusions to birds of other continents. Dependence for nesting sites on "artificial cliffs" provided by eaves of barns, is mentioned as characteristic of both Old World and North American barn swallows. These are referred to respectively as *Hirundo rustica* and *H. erythrogaster*, although their conspecificity has been recognized in recent years. Many other outdated scientific names of birds are used.

Among the sections that are of greatest interest to ornithologists is that containing the discussion of coastal birds, in the chapter "Animal Life of Swamps and of Shores." The works of many eminent authorities in this field are drawn upon. The statement (p. 582) that "Like the auks, penguins have only a single egg (rarely two) . . ." seems to minimize the fairly wide range of reproductive potential found among the sphenisciform birds. In another chapter, the penguins as a group are used to illustrate the Bergmann Rule of thermal economy by increase in body bulk in colder climates. Among the twelve species of four genera listed, there is a well-defined trend toward increasing size farther south, from the diminutive Galapagos penguin, to the giant emperor penguin of the Antarctic. However, the illustration seems not altogether appropriate, because the Bergmann Rule applies primarily to intraspecific trends.

Obviously many minor points of this nature could be raised in a review of any work involving such extensive compilation. But in general the source material has been well selected and carefully appraised to attain a high degree of accuracy. By their thoroughgoing revision and modernization of this important work, the authors have assured its continuing usefulness as a text and reference for many years to come.—H. S. Fitch.

WATERFOWL AND THEIR FOOD HABITS IN WASHINGTON. By Charles F. Yocum. University of Washington Press, Seattle, Washington, 1951:6 × 9 in., xvi + 272 pp., 48 plates, 63 figs. (including 5 maps), 47 tables. \$5.00.

The author's stated objective (p. 2) is "to lay the groundwork for future research on waterfowl in Washington." In view of this objective, emphasis is placed on compiling pertinent information, with a minimum of interpretation. References to the literature are frequent and the bibliography of 90 titles is an adequate guide for the future researcher.

As the title indicates, the subject matter is divided into two fields—waterfowl and their foods. Geography and climate of Washington are briefly reviewed. Data relevant to migration, wintering, and nesting of two species of swans, ten kinds of geese, and 31 kinds of ducks and mergansers are recorded. Major waterfowl wintering grounds in Washington are outlined. The results of two summers' study of waterfowl found breeding in Washington are presented and there is a brief review of migration, effects of hunting, parasites and disease, and management.

Chapter 8, concerned with sex ratios of ducks in Washington, is especially good. Means of gathering sex ratio data are critically considered, with the conclusion that such data gathered from one locality or at one time are apt to be inadequate, and that the most reliable data are obtained from counts of birds in the field compared to live-trapping or hunters' kill data.

The chapters on food habits and food and cover plants (chapters 12 and 13) are more thorough than are the remaining ones. A relatively complete review of the literature is made and the original data are cross-tabulated by species, regions, and food items for ready comparison to other data. The original data are weak, as is frequently true for game species, in that little information was gathered except during the hunting season. The chapter on food and cover plants is excellent, with keys, illustrations, and distribution maps for the important food and cover plants of the state. A separate index to this chapter is appended.

In general, the make-up and printing are good and conducive to easy reading. The author's style is easy without being light, but is weakened by too frequent use of such words as "undoubtedly" and "probably." References are made to rather vague records of occurrence of waterfowl, but sole reliance is not placed on them. Unusual application of words such as "vulnerable" (p. 172), and unusual words such as "epizooty" (p. 132) are grammatically correct but do not contribute to clarity. The reviewer finds no justification for "speciate" (p. 16) when used to mean the identification of species.

Future students will be fortunate to have this groundwork for waterfowl studies in Washington.—Maurice F. Baker.

BEGINNER'S GUIDE TO ATTRACTING BIRDS. By Leon A. Hausman. G. P. Putnam's Sons, New York, 1951: 127 pp., 27 pp. of text figures. \$2.00.

In this little handbook we have a work with a clearly defined purpose: to point out to people who know little about birds the advantages and pleasures to be derived from having them around our homes, and then to outline some ways of supplying the necessary items for attracting them. With its low price, convenient size, and readability, it will admirably serve this purpose for many real or potential bird lovers. The illustrated suggestions for nest-boxes and feeding stations, particularly in their emphasis on naturalness and simplicity, seem to me excellent. The table of favored foods for various purposes is helpful—I wondered why nutmeats, however, did not receive the praise due them. Listing of food-producing vines and shrubs will be of interest and value to many, while discussions of such easily forgotten attractions as warm water, grit, dust, salt (for northern finches), and perches and shelters of several sorts, add much to the book's usefulness. The author's attitude toward English Sparrows, Starlings, and prowling cats seems a little over-benevolent at times; and there are passages in which birds are made to sound all but omnipotent as weed-seed and insect destroyers; but these things do not detract seriously. In trying to construct a non-technical key in a form so very abbreviated, using only a selected few "Home Grounds Birds," I feel Hausman has literally attempted the impossible. The key, which could scarcely be used as such at all, becomes little more than a series of thumbnail sketches of common birds (perhaps quite helpful in themselves). Classing a Pine Siskin as "gray" and a female Purple Finch as "brown or brownish," or placing such dissimilar birds as a Cedar Waxwing and a Brown Creeper almost adjacent, illustrates to me the uselessness of gross color and size as bases of separation. The choice of species is questionable, three *Hylocichla* thrushes being included, for example, and all wrens omitted from the key. The matter of geographic

coverage, while considered to some extent, would still be very confusing to a novice who did not happen to live in the Northeast. The ink sketches of birds, while sometimes crude, yet manage to capture enough of the species' personality that they could be very helpful. I would have preferred that more of them be used, and the descriptive matter not attempted at all. The good appended bibliography of other published material (a glaring typographical error cites Forbush and May: "*National*" *History of the Birds . . .*), should lead readers to adequate sources when they are ready to extend their knowledge of birds. It would be surprising if this book did not encourage a great many to do so. —William A. Lunk.

PRESERVE OR PLAYGROUND?

Within the last few generations, governments in the United States and Canada have created many public parks for the purpose of preserving areas of natural beauty and of particular floral and faunal significance. These have been enthusiastically accepted by the public which, encouraged by travel publicity, now throngs to such areas in ever-increasing numbers. Indeed, in some of our smaller parks, it now seems likely that the public, by sheer weight of numbers, is threatening to destroy some of the very things the parks were intended to preserve.

Consider, in microcosm, the example of Point Pelee National Park, Ontario, Canada. From the north shore of the western end of Lake Erie, Point Pelee extends southward for some nine miles in the form of a gracefully symmetrical isosceles triangle. Long sand dunes form the two sides of this attenuated triangle, and much of the interior is, or was, marsh land. About three miles from the end of the point, the marsh gives way to sandy soil able to support tall hardwoods. As the soil becomes thinner, red cedars are more prominent. Alongside the beaches and near the terminal sandbar, the vegetation becomes a tangle of shrubs and vines. The eastern sand dune is much less luxuriantly vegetated than the western one, particularly where it borders the marsh.

Point Pelee has long been of interest and concern to the Wilson Ornithological Club. In the early part of this century, members of the club from both Canada and the United States made many visits to study its natural history. Their ornithological findings were published at length in *The Wilson Bulletin* (Taverner and Swales, 1907-1908: No. 59, pp. 37-54; No. 60, pp. 82-89; No. 61, pp. 133-153; No. 63, pp. 79-96; No. 64, pp. 107-124; Wood, 1910, 22:63-78).

It was, in fact, a member of the club, the late Mr. P. A. Taverner, who, in his official capacity with the Geological Survey of Canada, drew up the original recommendation that the area be made a national park. The reasons for doing so were: (1) the point was an area of natural beauty which should be preserved; (2) as the southernmost part of the mainland of Canada, it supported a wide variety of Carolinian forms of flora and fauna not found elsewhere in Canada; (3) the large marsh on the point was one of the few waterfowl breeding-grounds of importance remaining in southern Ontario; (4) the area was a focal point on one of the most important migration highways in America, where almost incredible numbers of small migrant birds gathered in spring and fall.

In due course this recommendation took effect and, in 1918, Point Pelee National Park came into being by Order-in-Council. The park so formed comprises slightly more than six square miles of the more terminal portion of the point. In deference to local opinion and established custom, the government did not acquire private property existing within the limits of the newly formed park. This concession was contrary to the original recommendation made by Mr. Taverner, and the problems arising from these private holdings have increased rather than diminished.

In the period between the two wars, naturalists derived immense pleasure and satisfaction from studying the unique flora and fauna of the park, and from watching the pageant of migration each spring and fall. The foresight of Mr. Taverner and his associates had served to preserve all four important features of the point.

In the late 1930's, however, there were indications that the trend of civilization threatened to upset this satisfactory state of affairs. Improved highways and automobiles brought the park within a few hours' drive of the increasingly crowded cities adjacent to Lake Erie, and of a host of smaller towns in southern Ontario and nearby states. Simultaneously, more and more water frontage on Lake Erie was being withdrawn from public usage. The fame of the park's beaches and natural beauty spread rapidly. Several owners of property within the park subdivided their land for summer cottagers. The number of visitors to the park rose first to a gratifying, and then to an alarmingly high level. The physical impact of so many visitors began to make itself evident in the wooded portions of the park.

In 1939, Dr. Harrison F. Lewis, Chief of the Canadian Wildlife Service, and a member of this club, played a prominent part in an on-the-spot investigation. As a result, a block of the finest part of the original forest cover was enclosed by a fence to form a wilderness preserve which the public was not permitted to enter. The problem was then further deferred by the Second World War which, with its attendant travel restrictions and gasoline rationing, reduced the number of visitors to the park to a small fraction of what it had been.

Since the end of the war, all those forces making for a greater number of visitors have sharply intensified. This is clearly shown by the following figures for visitors in the six-month period from April to September: 1946, 74,000; 1948, 120,000; 1950, 207,000. In 1950, this meant an average of 1,100 visitors per day, over a period of six months. The peak figure for one day is in excess of 17,000 persons!

These people must be accommodated in an area of six square miles. Yet even this by no means presents the true picture. Nearly five of these square miles are marsh land. The fenced preserve takes a not inconsequential portion of the remainder. Thus the public is confined chiefly to the road margins, the western sand dunes, and the terminal portion of the point.

The physical impact of 200,000 people in an area of little more than a square mile must necessarily have a pronounced effect on the vegetation and wildlife of that area. How does this affect the purposes for which the park was established? The one most vitally affected concerns the migratory birds. The funnel-like shape of the point seems to have the effect of causing them to accumulate near the end of the point in immense numbers. Consequently, they require a correspondingly large amount of food and shelter. Under natural conditions these exist there. But with the advent of so many human visitors, also drawn as by a magnet to the end of the point, there have been considerable changes: the establishment of a large parking area, the removal of ground cover to form clearings, the removal of the understory beneath trees for convenience of picnickers, and some removal of trees and shrubs along the shoreline. The search for firewood has brought about the disappearance of old stumps, logs, and parts of living trees. There are even swings and a merry-go-round.

The trend is thus towards clearings instead of tangles, wind-blown space beneath the trees instead of undergrowth providing food and shelter. Less and less soil-forming material accumulates where it is needed to bind the sand and deter erosion by wind and water.

Inevitably, those who must administer the park are in a most difficult position. They are fully aware of the original ideas behind the creation of the park. They also know that the park is attracting 200,000 visitors a year, many of whom come primarily to swim, picnic, play ball, and enjoy community games. These people are not reluctant to voice their opinion that the recreational facilities are still largely inadequate, and they naturally receive support from among local business people to whom this influx forms a most welcome bonanza. Since it is, after all, a public park, they say, cannot more consideration be given to the comfort and requirements of the people who visit it? Should the welfare of the birds be safeguarded to the exclusion of the welfare of the people?

The answer to this question would never be final, yet it is frequently asked when nature and civilization come into conflict. We believe that the welfare of both man and bird can be safeguarded by careful planning. Public recreational areas are a primary need if people are to be able to enjoy their increasing leisure time. It is important, however, not to confuse the provision of recreational areas with the preservation of natural areas. They are requirements that can well exist side by side, but neither will function as both for very long.

In this instance, the migrant birds require a relatively undisturbed natural area, particularly at the end of the point. To them, Point Pelee is one very small but very important place where they gather from many regions for a brief but critical part of their lives. The number of suitable natural areas available to them as stop-over points has steadily declined. Point Pelee's importance to migrants is thus very great in relation to its size, and every acre assumes a tremendous significance. It would be virtually impossible to set up successfully alternate facilities for them elsewhere.

On the other hand, human requirements here are less complicated and more amenable to direction. Visitors who are sincerely interested in conservation and natural history should provide no problem either by their actions or by their numbers—let them be made welcome at the park by all means. The problem thus resolves itself into one of providing more adequate facilities for visitors interested primarily in other forms of recreation. Perhaps such facilities could be furnished in an attractive form to the north of the present park boundary. Failing this, we ask the National Parks Service if it would not be possible to acquire for this purpose some of the private holdings now existing within the more northern part of the park, and now being used as sites for the less attractive types of summer cottages. As a last resort, we would even be in favor of opening up the northern part of the east beach to the public. Any of these measures would assist in de-emphasizing the end of the point, much of which could then be permitted to return to natural cover.

With particular regard to Point Pelee National Park, there are also certain specific things which you, as a club member, can do if you wish. First, we suggest that, if you have not already visited the park in migration time, you owe it to yourself as an ornithologist to do so, even if only as a precaution, lest change should mar its future effectiveness. Second, for those who do visit it, we suggest that you look up the superintendent or his assistant, and let him know that you are visiting the park *as a naturalist*. Naturalists form a relatively small minority of all visitors, but their interests are catered to and it is well that they should pay their respects in order that the minority may not seem smaller than it actually is. Third, if you wish to express your impressions as to the value of the park as a preserve, we feel certain that your letters will receive courteous consideration from either the National Parks Service or the Canadian Wildlife Service, in Ottawa. There are sufficient members from this club who visit the park regularly to provide an impressive cross-section of ornithologists' viewpoints.

Finally, we make bold to hold out one further suggestion to the National Parks Service and the Canadian Wildlife Service. This involves the installation of a park naturalist. We know that park naturalists are being established in national parks in Canada as funds become available. But we suspect that, because of its small size, Point Pelee ranks far down on that list. We respectfully suggest that Point Pelee should be considered primarily from the viewpoint of the number of visitors it has. On that basis, the park is surely one of the most fertile spots on the continent for public education in natural history and the value of conservation. Let us have a park naturalist there *soon*, to demonstrate to visitors the reasons why the park was established, and to safeguard its wildlife resources. — WILLIAM W. H. GUNN AND HENRY S. MOSBY.

GRADUATE RESEARCH IN ORNITHOLOGY

The compilation of ornithological research in progress by graduate students which was published in *The Wilson Bulletin* in March, 1951 (vol. 63:62—64) was considered to be of value to enough readers that the Editor has asked us to repeat it. Inquiries were sent to some 40 American and Canadian universities where we thought there *might* be graduate students conducting their thesis investigations on ornithological topics.

The list should not be considered complete, however. Despite our care, we may have failed to reach all institutions, and a number did not respond. Furthermore, some limitations were imposed to keep the list within bounds. Studies concerned with the management, life histories, or ecology of game birds are not included here because they are noted elsewhere. *The Wildlife Review* lists such theses upon completion if the titles are filed with the Editor, Neil Hotchkiss, Patuxent Research Refuge, Laurel, Maryland. In June 1951, the Fish and Wildlife Service issued a list of current ornithological investigations at the 15 Cooperative Wildlife Research Units. This may be secured from the Service upon request.

Persons contacted were asked to list only those thesis investigations which were in progress during the fall of 1951, when the inquiry was made, and to indicate the degree for which the student was a candidate. Readers noting omissions are asked to notify us.

California, University of

Bowers, Darl (Ph.D.)—Correlation of color differentiation in Wren-tits with light factors in chaparral environment.

Bowman, Robert I. (Ph.D.)—Skeletal and muscular anatomy and adaptations of Galapagos finches.

Childs, Henry E. (Ph.D.)—Population studies of the Brown Towhee (*Pipilo fuscus*).

Cogswell, Howard L. (Ph.D.)—Size of territory in chaparral birds in relation to vegetation.

Dixon, Keith L. (Ph.D.)—Comparative ecology and behavior of sympatric and hybridizing species of titmice.

Johnston, David (Ph.D.)—Gonad cycle and histology in immatures and adults of the California Gull.

Norris, Robert A. (Ph.D.)—A comparative study of the biology of the nuthatches *Sitta pygmaea* and *Sitta pusilla*.

Richards, Lawrence P. (Ph.D.)—Morphologic adaptations in the drepaniids of Hawaii.

Cornell, University of

Dilger, William C. (Ph.D.)—A study of the thrushes of the genus *Hylocichla*.

Fischer, Richard B. (Ph.D.)—Life history of the Chimney Swift (*Chaetura pelagica*).

- Goodwin, Robert E. (M.S.)—A study of the Black Tern.
Parkes, Kenneth C. (Ph.D.)—Speciation in the breeding birds of New York State.
Reilly, Edgar M. (Ph.D.)—The origin of North American birds, based on studies for the new A. O. U. Check-List.

Florida, University of

- Adams, Claude T. (M.S.)—Osteology of the Ardeidae.
Baumel, Julian J. (Ph.D.)—Comparative osteology of the genus *Corvus*.
Briggs, Marjorie A. (M.S.)—Anatomy of the Sylviidae.
Burns, Bartley J. (M.S.)—Birds of Newnans Lake, Florida.
Fehon, Jaek H. (M.S.)—Comparative osteology of King and Clapper Rails (*Rallus elegans* and *R. longirostris*).
Fogle, Orin G. (M.S.)—Body temperature of hawks and owls.
Karraker, David O. (M.S.)—Birds of Lake Alice, Florida.
Nelson, Gideon E., Jr. (Ph.D.)—Generic relationships in the Fringillidae.

Georgia, University of

- Jenkins, James H. (Ph.D.)—Physiological ecology of the Mourning Dove; a study of age and seasonal changes in feathers, gonad histology and lipid deposition.
Johnston, David W. (M.S.)—Breeding bird populations in relation to plant succession on the Piedmont of Georgia.
Kuenzler, Edward J. (M.S.)—Population density of breeding birds in relation to plot size on a Savannah River area.
Major, James C. (M.S.)—The effect of high and low fat diet on photoperiod-induced lipid deposition in the White-throated Sparrow.

Illinois, University of

- Calef, Robert T. (Ph.D.)—Breeding bird census and biotic community.
Davis, Earle A., Jr. (Ph.D.)—Seasonal variation in the energy balance of birds as affected by photoperiod and temperature.
Durham, Leonard (Ph.D.)—The relationship between populations of fishes and predatory birds feeding upon them.
Eyster, Marshall B. (Ph.D.)—Influence of temperature and photoperiod on innate activity in birds.
Goodman, Donald C. (Ph.D.)—Myological and osteological adaptations in the feeding apparatus of ducks.
James, Douglas A. (Ph.D.)—Experimental measurement of perception and intelligence in passerine birds.
Martin, Norman D. (Ph.D.)—Life history of the Screech Owl and experimental study of photoperiods in this nocturnal species.
Miller, Ross J. (A. M.)—Measurement of breeding bird populations.
Pearson, Robert W. (A. M.)—Breeding bird censuses of the forest edge.
Robertson, William B. (Ph.D.)—Breeding bird populations in relation to succession and geographic origin.
Stubbs, Robert K. (Ph.D.)—Energy balance in the Bobwhite at different temperatures and photoperiods.
Van Horn, Donald H. (A. M.)—Breeding bird censuses.
Weise, Charles M. (Ph.D.)—Experimental measurement of the effect of gonads on migratory impulse and fat formation in birds.

Iowa State College

- Bliese, John C. W. (Ph.D.)—The roosting of Bronzed Grackles and their associates, and related phenomena, at Ames, Iowa.

Kansas, University of

Stallcup, William B. (Ph.D.)—Soft anatomy of fringillids.

Michigan State College

Eyer, Lester E. (Ph.D.)—Natural history of the Bronzed Grackle.

Michigan, University of

Batts, H. Lewis, Jr. (Ph.D.)—An ecological study of a 60-acre portion of the Newcomb Tract, near Ann Arbor, Michigan, with special reference to the nesting birds.

Hofslund, Pershing B. (Ph.D.)—A life-history study of the Yellow-throat (*Geothlypis trichas*).

Humphrey, Philip S. (Ph.D.)—Analysis of the Mergini.

Lunk, William A. (Ph.D.)—Life history of the Rough-winged Swallow (*Stelgidopteryx ruficollis*).

Mengel, Robert M. (Ph.D.)—Birds of Kentucky.

Owre, Oscar T. (Ph.D.)—A study of the Anhinga.

Minnesota, University of

Harrell, Byron E. (Ph.D.)—Ecological zoogeography of the birds of the Mexican oak-sweet gum forests.

Pospichal, Leo (M.S.)—An ecological study of the Sora and Virginia Rails on some Minnesota marshes.

Rustad, Orwin (M.A.)—A survey of the birds of Rice County, Minnesota.

Northwestern University

Shank, Max (Ph.D.)—Experimental study of the refractory period in the Junco and the White-throated Sparrow.

Ohio State University

Garrett, Lois (Ph.D.)—The life history of the Indigo Bunting.

Glenny, Fred (Ph.D.)—Some significant changes in the aortic arches and their derivatives and their ultimate fate in birds.

Good, Eugene (Ph.D.)—The life history of the Eastern Crow.

Land, Hugh (M.S.)—The seasonal shifting of behavior patterns related to territorialism in the Cardinal.

Miskimen, Mildred (Ph.D.)—The role of weather in bird migration.

Reese, Carl R. (Ph.D.)—A study of the relationship of inorganic and protein-bound blood iodine to the diurnal body temperature cycle of birds.

Swinebroad, Jeff (Ph.D.)—Bird populations in a cut-over woods.

Pennsylvania State College

Dowling, Paul B. (M.S.)—Auditory and vocal ranges in certain birds with special regard for economic applications.

Myers, Betty B. (M.S.)—The volume of birds.

Texas A. and M. College

Lord, Rexford (M.S.)—Anatomy of the avian eye.

Scroggins, Joe B. (M.S.)—Birds of the Mexican State of Hidalgo.

Washington State College

King, James R. (M.S.)—Breeding birds of the Pullman area (Washington).

Mewaldt, L. R. (Ph.D.)—Reproductive cycle of Clark's Nutcracker.

Trivette, Edward G. (M.S.)—Comparative study of the pelvic muscles of the Lari and Alcae (Charadriiformes).

West Virginia University

Hundley, Marion L. (M.Sc.)—A winter distribution study of the Cardinal (*Richmondia cardinalis cardinalis*).

Wisconsin, University of

Lanyon, Wesley E. (Ph.D.)—A study of the ethology of the genus *Sturnella* in Wisconsin.

Nero, Robert (Ph.D.)—Breeding behavior and territory in the Redwing (*Agelaius phoeniceus*).

Peterson, Arnold (Ph.D.)—Breeding biology and behavior of the Bank Swallow (*Riparia riparia*).

Yale University

Huntington, C. E. (Ph.D.)—Speciation in *Quiscalus*.

Paynter, R. A., Jr. (Ph.D.)—Avian biology of Quintana Roo, Mexico.

—AARON M. BAGG AND GUSTAV A. SWANSON

NEW LIFE MEMBER



Oakleigh Thorne, II, was born October 12, 1928, at New York City. In 1951, he received the degree of Bachelor of Science (in Biology) from Yale University where he is at present continuing his studies toward the degree of Master of Science (in Conservation). His principal interests are in field research and in wildlife photography. Especially is he interested in the production of films to aid in conservation education. He has done population studies and has worked for the National Audubon Society at Greenwich, Connecticut. He is a member of the A. O. U., Cooper Ornithological Club, National Audubon Society, Massachusetts Audubon Society, Hawk Mountain Sanctuary Association, Linnaean Society of New York, New York Zoological Society, Federation of New York State Bird Clubs, Eastern and Western Bird Banding Associations, and the American

Forestry Association. The results of his population studies have been published in *Audubon Field Notes*.

The actual dates of publication of the four numbers of *The Wilson Bulletin* in 1951 were: April 19, July 2, September 26, and December 21.

This number was published on March 15, 1952.

EDITOR OF THE WILSON BULLETIN

HARRISON B. TORDOFF

Museum of Natural History
University of Kansas
Lawrence, Kansas

ASSOCIATE EDITOR

KEITH R. KELSON

CHAIRMAN OF THE ILLUSTRATIONS COMMITTEE

ROBERT M. MENGEL

SUGGESTIONS TO AUTHORS

Manuscripts intended for publication in *The Wilson Bulletin* should be neatly typewritten, double-spaced, and on one side only of good quality white paper. Tables should be typed on separate sheets. Before preparing these, carefully consider whether the material is best presented in tabular form. Where the value of quantitative data can be enhanced by use of appropriate statistical methods, these should be used. Follow the A. O. U. Check-List (fourth edition) and supplements thereto insofar as scientific names of United States and Canadian birds are concerned unless a satisfactory explanation is offered for doing otherwise. Use species names (binomials) unless specimens have actually been handled and subspecifically identified. Summaries of major papers should be brief but quotable. Where fewer than five papers are cited, the citations may be included in the text. All citations in "General Notes" should be included in the text. Follow carefully the style used in this issue in listing the literature cited. Photographs for illustrations should be sharp, have good contrast, and be on glossy paper. Submit prints unmounted and attach to each a brief but adequate legend. Do not write heavily on the backs of photographs. Diagrams and line drawings should be in black ink and their lettering large enough to permit reduction. The Illustrations Committee will prepare drawings, following authors' directions, at a charge of \$1 an hour, the money to go into the color-plate fund. Authors are requested to return proof promptly. Extensive alterations in copy after the type has been set must be charged to the author.

A WORD TO MEMBERS

The Wilson Bulletin is not as large as we want it to be. It will become larger as funds for publication increase. The Club loses money, and the size of the *Bulletin* is cut down accordingly, each time a member fails to pay dues and is put on the 'suspended list.' Postage is used in notifying the publisher of this suspension. More postage is used in notifying the member and urging him to pay his dues. When he does finally pay he must be reinstated on the mailing list and there is a publisher's charge for this service. The *Bulletin* will become larger if members will make a point of paying their dues promptly.

NOTICE OF CHANGE OF ADDRESS

If your address changes, notify the Club immediately. Send your complete new address to the Treasurer, Leonard C. Brecher, 1900 Spring Drive, Louisville 5, Kentucky. He in turn will notify the publisher and editor.

THIRTY-THIRD ANNUAL MEETING
of the
WILSON ORNITHOLOGICAL CLUB
GATLINBURG, TENNESSEE, FRIDAY AND SATURDAY,
APRIL 25 - 26, 1952
Organized Field Trips on Sunday, April 27

The location of this meeting, at the gateway to the Great Smokies, offers unusual attractions to people interested in nature. Papers sessions will begin at 10:30 a.m. to allow time for informal field trips each morning. The scenic area and the availability of cabins should make this meeting especially attractive to family groups. For complete details, see the *Bulletin* for December, 1951.

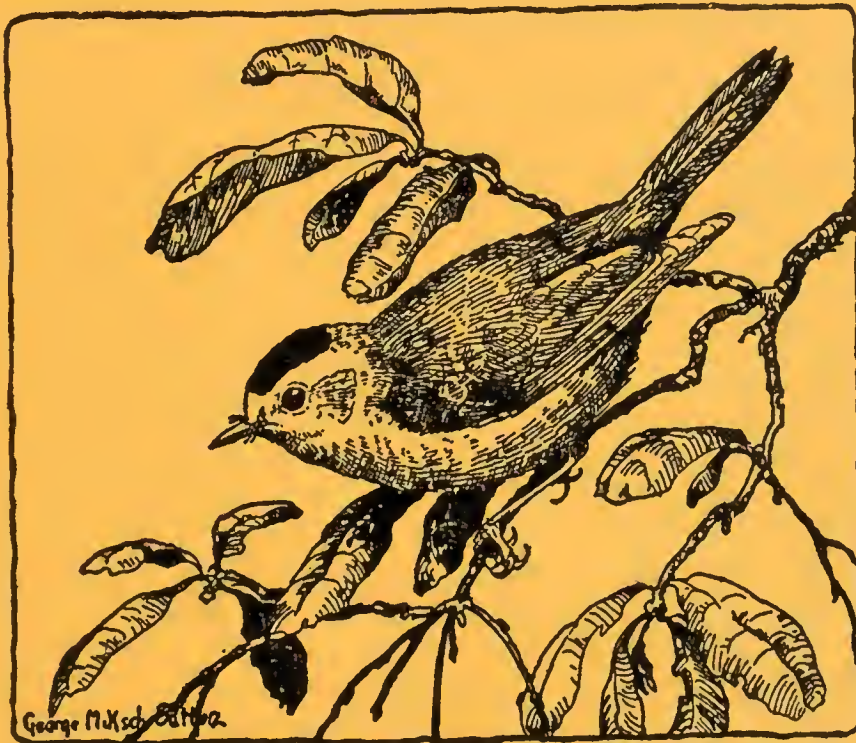
Members are reminded of the Club's urgent need of spare issues of Numbers 1, 2, and 3 of the 1951 volume of the *Bulletin*. For further details, see Editorial section of this issue.

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THE PRESIDENT'S PAGE

Previous W. O. C. presidents writing in this page have pointed out the various phases of bird study that are open to advanced amateur observers and have outlined the values derived from different branches of ornithology. We might well observe that in order to continue to enjoy field observation of birds or to be in a position to contribute to ornithology, we must have birds to observe and this in turn requires good bird habitat. Would it not be wise for us to divert a little more of our energies from actual bird observing to the work of preserving from destruction our birding habitats that are basic to our continued interest in birds?

One hears much about large state and federal game refuges, and state and national parks, which are excellent conservers of certain species of wildlife. I want to call your attention more especially, however, to the small, local birding places. I am keenly conscious that around Minneapolis nearly every spring we are forced to abandon some favorite place for class field observation for a less desirable place or one much farther away.

In some localities there are conservation-minded groups already organized which sponsor preservation of small natural areas. For example, the Minnesota Academy of Science sponsored the acquisition of 500-odd acres of the Cedar Creek Forest near Minneapolis and St. Paul. The Academy later turned it over to the University of Minnesota for research use by the colleges of the state. Bird watchers, either in groups or as individuals, should search out these local groups and support their efforts to rescue at least a few of our local birding areas before they are taken over by taverns, manufacturing plants, housing projects, or intensive cultivation. We, of course, cannot stand in the way of legitimate housing or agricultural developments, but most communities can afford to restrict such growth in at least a few choice natural areas if the right local forces will sponsor the imposing of such restrictions. Most state departments of conservation now have large sums of Pittman-Robertson money and more recently assigned Dingle-Johnson funds specifically set apart for, among other purposes, habitat improvement for game and fish. Direct personal appeal to, and cooperation with, the directors of these projects can result in the preserving of many fine bits of local wilderness. Direct personal contact with park board members, highway department directing personnel and such officials often pays off well in preventing so-called "development" in already preserved natural areas.

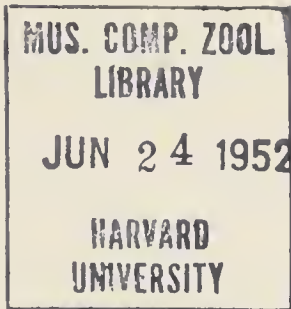
Each community has its own special problems in conserving choice birding spots and each has its own local organizations to which appeals might most profitably be directed. Considerable ingenuity and initiative must be exercised by persons making these efforts, but I am sure that very satisfying local preservation work can be done by small groups or even individuals if the right contacts are made. And, after all, most of us derive our major enjoyment from the local birds we can observe from day to day about our homes or on Saturday or Sunday morning hikes near home.

W. J. BRECKENRIDGE



LITTLE PENGUIN
(*Eudyptula minor*)

Adult and young at nest cavity on Phillip Island, Victoria, Australia.
Sketched from life in watercolor by Richard P. Grossenheider,
November, 1943.



LITTLE PENGUIN

BY RICHARD P. GROSSENHEIDER

THE Little Penguin (*Eudyptula minor*), also known as the Blue, Fairy, or Little Blue Penguin, is 14 to 18 inches long, the smallest of its singular group. During a furlough in Australia in November, 1943, I regretted greatly that I could spend only two days and nights with these birds in the rookeries on Phillip Island, Bass Strait, Victoria. Fortunately the breeding season was in full swing. Nesting sites varied, with few more than 180 yards from shore, and all above reach of high water. Some nests were scooped out under tussocks of vegetation, some in holes under or between rocks, others in sandy areas, and one was located in Stygian darkness beneath a guest house on high ground. *Mesembrianthemum* (pictured) formed extensive mats in rocky nesting areas and was quite slippery underfoot. A few penguins nested in burrows in the sand in an area where Short-tailed Shearwaters (*Puffinus tenuirostris*) also had nest holes.

During the nesting season, from September to March, the Little Penguin occurs along the coasts from southwestern Australia to southern Queensland, and in Tasmania and New Zealand. The remainder of the year is spent in adjacent marine waters. My observations on nesting add little to the extensive information compiled by L. E. Richdale (1940. *Emu*, 40:180-217), A. J. Campbell (1901. "Nests and eggs of Australian birds," part 2: 1010-1013, privately published), and others. Available dry vegetation is used for nest lining. Two roundish eggs, measuring about 2.2×1.6 inches, are laid. The shells are slightly coarse, with some gloss, and are white with a faint touch of green when freshly laid (Campbell, *op. cit.*). The incubation period is about 39 days. Young begin coming outside the burrow at four weeks of age. The chicks pictured were probably about 28 days old, as the egg tooth is lost at that age (Richdale, *op. cit.*).

Domestic duties, from nest-building to rearing the young, are shared by both parents. When one parent is in attendance at the nest, the other is usually at sea. That is, until after the young are four weeks old, when both parents are simultaneously in the water or with the young. The birds are nocturnal on land.

During my stay, adults returned after dark from marine excursions, in groups of about 30 to 60. A compact gathering or two would be seen by flashlight to bob to the surface 100 yards out. Again submerging, they would reappear in the shallows and walk up on the landing beach beyond reach of the surf. There they shook off water and preened for about 10 minutes. Then one or more started up a main trail toward the nesting sites and the rest followed closely. The characteristic posture is not as upright as in other penguins.

Above one well-used landing spot was a rising sandy beach with large, scattered tussocks of grass. The main route up this slope was a well-worn penguin path five to seven feet wide, and eight to ten inches deep. What a strange experience it was to sit very still with my feet out in this aisle, and have these startlingly man-like creatures scrambling over my ankles and legs! The penguins paid little attention to the new obstacles.

The penguins turned off along smaller pathways which led to their respective nesting areas. They soon relieved their mates and fed offspring by regurgitation. From then till daylight their "conversation" could be heard—a weird mingling of resonant groans, inspiration and expiration noises, sharp barking sounds, and pleasant piping notes.

UNIVERSITY OF MICHIGAN MUSEUM OF ZOOLOGY, ANN ARBOR, APRIL 10, 1952

NOTES ON THE LIFE HISTORY OF *AMAZILIA FIMBRIATA* IN SURINAM

BY FR. HAVERSCHMIDT

LESSON'S Emerald is a medium-sized hummingbird with a rounded tail. Above it is bronze-green, darker on the head and tail, brighter and more glittering on the under surface. The bill is almost straight. Three males that I collected in Surinam weighed 4.5, 4.8, and 5.8 grams; two females weighed 4.9 and 5.8 grams. The sexes are indistinguishable in the field.

The species occurs from northern Venezuela to southeastern Brazil. Peters (1945:64-65) recognizes eight races. The subspecies here reported on, *A. f. fimbriata*, occurs in eastern Venezuela and the three Guianas (Zimmer, 1950). In coastal Surinam, Lesson's Emerald is the commonest hummingbird, even in the gardens in the town of Paramaribo.

THE BREEDING SEASON

The main breeding season seems to be in July and August, at the end of the long rainy season and the beginning of the long dry season.

On July 21, 1951, in my garden in Paramaribo, two birds were constructing nests on horizontal branches. Nest A was two meters above the ground in a *Lagerstroemia*; nest B was five meters from the ground in a tree. Nest A was deserted a few days later but a new nest (by the same female?) was under construction on August 4, only a few centimeters from the deserted nest and on the same branch. The new nest also was deserted, on August 11, after I had weighed and measured the eggs. A third nest, probably built by the same bird, was found on August 13, in a nearby tree.

Nest B was deserted on July 28, when it was almost completed. On August 12, I found another nest about one meter from nest B and on the same branch. The (apparently) two females involved in nests A and B and subsequent nests mentioned above were incubating eggs on August 20.

Lesson's Emerald breeds also at the end of the year at the start of the short rainy season and in the following short dry season. I found a nest with one egg on November 3, 1951, and another nest with two young on November 17, 1948. These young left the nest on December 3. On December 30, 1949, I saw a bird building a nest, and on January 17, 1952, a hummer was incubating two eggs in a nest in my garden. Further, I found a hummingbird incubating two eggs on March 8, 1952. The latter date is in the short dry season.

In July, 1950, a nest was built in a *Bougainvillea* in my garden at a height of approximately 1.5 meters. This nest was just in front of one of my windows and thus offered an excellent opportunity to observe the birds during the entire breeding cycle.

I saw no courtship or territorial behavior. Only one adult was seen at the nest and I assume that this bird was a female, since male hummingbirds usually do not participate in nesting activities.

NEST-BUILDING

On July 25, I discovered, on a horizontal branch, the foundation of the nest last mentioned. On July 27, I saw the bird shaping the small nest cup by trampling with its feet as it stood in the nest and by pressing the underside of its bill and throat on the outer wall of the nest. On this date, the shallow cup was composed of white vegetable material. There were no lichens on the outer wall.

On July 28, between 15:25 and 15:42, the bird came to the nest eight times with nesting material. Again, it shaped the nest by trampling. During the trampling, the bird's entire body seemed to tremble. As the bird turned around in the nest, it often leaned to one side, at which time the movements of the foot on the opposite side could be seen distinctly. Nest-building ceased when a rain shower started.

On July 31, the first egg was laid (hour unknown) but nest-building was continued most energetically. The bird sat on the nest from 12:15 to 12:40; detailed notes taken between 13:30 and 14:30 follow.

The bird worked on the nest from 13:30 to 13:31; returned at 13:35, worked until 13:38; it then sat on the nest until 13:41; it left at 13:43. Returning at 13:44, it built until 13:45 and then flew away. I saw then that it was picking "wool" from an unidentified plant a short distance from the nest. It returned to the nest with a large piece of "wool," built, went back to the same plant, and returned to the nest with more "wool." At 13:47, the bird disappeared. It returned at 13:55, built until 13:57, left, returned at 13:58 for one minute, left again in one-half minute to make two quick trips for "wool." The bird left at 14:00 but returned almost immediately and worked on the nest; it sat and trampled. The bill was open although the nest was in shade. The bird left in half a minute and was back at 14:01, built, left, returned at 14:02, and departed in half a minute. It returned at 14:03, left at 14:04, and was building again at 14:05. It then remained on the nest until 14:09, then left. It returned with a large piece of "wool" at 14:10 and built for one-half minute and left. It was back again at 14:11, built, and left at 14:14; it returned in one-half minute. From 14:17 to 14:24, the bird worked on the nest. It then sat as though incubating until 14:27; it trampled in the nest until 14:29.

In one hour of observation, the hummingbird came to the nest 19 times with nesting material.

On August 1, the nest still held only one egg. The bird sat on the nest from 9:45 to 9:53. Between 11:05 and 11:30, it spent 23 minutes sitting on the nest and was absent four times in this period. The interval from the start of nest-building to the laying of the first egg was one week. As noted, however, nest-building continued through the day of laying of the first egg (see also below, under incubation).

That hummingbirds steal material from other nests is well-known. Skutch (1931) gives some examples of the destruction of nests of *Amazilia tzacatl* by other individuals of the same species. Fortunately, the nest I observed in 1950 did not suffer damage, although *Amazilia fimbriata* does steal nesting material from other birds.



FIG. 1. Lesson's Emerald (*Amazilia fimbriata*) at its nest. Photographed near Paramaribo, Surinam, on September 1, 1950, by Fr. Haverschmidt.

In December, 1949, I had under observation in my garden a nest of a flycatcher, *Camptostoma obsoletum*, in which two young had hatched on December 22. At 13:59 on December 30, I saw an *Amazilia fimbriata* alight at the side entrance to the domed nest, reach in and take some white "wool" from the inside of the nest, and fly with this material to its own nest, which was under construction rather high in a nearby tree. The hummingbird soon returned to the flycatcher's nest but was chased away by one of the parent birds. A little later the hummer visited the nest for the third time and took a rather large clump of "wool" from the inside. On December 31, I found the flycatcher nest in a deplorable state with the nest-lining much disrupted and the young gone. The *Amazilia* came three times in quick succession to

TABLE I

ATTENDANCE OF *A. fimbriata* AT NEST. Letter "N" preceding time on nest indicates that adult returned at that time with nesting material.

DATE	TIME OF OBSERVATION	TIME ON NEST	TIME OFF NEST
August 2	7:18- 8:18 13:25-14:25	7:18- 7:42 7:51- 8:18 13:25-14:25	7:42- 7:51
August 3	13:15-14:15	13:18-13:33 N13:35-13:43 N13:44-13:45 N13:46- N13:47-13:48 N13:50-13:56 N13:58-14:03 N14:04-14:06 14:08-14:13	13:15-13:18 13:33-13:35 13:43-13:44 13:45-13:46 13:46-13:47 13:48-13:50 13:56-13:58 14:03-14:04 14:06-14:08 14:13-14:15
August 4	13:55-14:55 15:50-16:50	13:55-14:55 15:50-15:54 N16:02-16:13 N16:17-16:19 N16:20-16:27 N16:31-16:37 N16:42-16:50	15:54-16:02 16:13-16:17 16:19-16:20 16:27-16:31 16:37-16:42
August 5	6:40- 7:40	6:40- 6:49 6:55- 7:22 7:28- 7:40	6:49- 6:55 7:22- 7:28
August 6	6:28- 7:28	N 6:28- 6:38 N 6:45- 7:05 N 7:13- 7:28	6:38- 6:45 7:05- 7:13
August 7	13:20-14:20	13:20-13:58	13:58-14:20
August 8	8:50- 9:50	8:50- 8:59 N 9:00- 9:01 N 9:02- 9:04 N 9:05- 9:07 N 9:10- 9:12 N 9:13- 9:24 9:28- 9:29 N 9:31- 9:39 9:41- 9:43 9:49- 9:50	8:59- 9:00 9:01- 9:02 9:04- 9:05 9:07- 9:10 9:12- 9:13 9:24- 9:28 9:29- 9:31 9:39- 9:41 9:43- 9:49
August 9	14:25-16:15	14:25-14:28 N14:46-15:22 N15:32-15:33 N15:38-16:15	14:28-14:46 15:22-15:32 15:33-15:38
August 10	14:25-15:25	14:25-14:30 N14:31-14:33 N14:42-15:25	14:30-14:31 14:33-14:42
August 11	15:13-16:38	15:13-15:41 N16:06-16:10 N16:38-	15:41-16:06 16:10-16:38
August 12	15:00-16:30	15:17-15:55 N16:03-16:30	15:00-15:17 15:55-16:03
August 13	7:55- 8:55	7:55- 8:32 N 8:45- 8:55	8:32- 8:45
August 15	7:25- 8:25	7:25- 7:55 N 8:06- 8:25	7:55- 8:06

steal material for its own nest. On one visit the hummingbird was chased away by an adult *Camptostoma*.

EGG LAYING

The eggs of Lesson's Emerald apparently are laid on alternate days. In the nest which I observed in 1950, the first egg was laid on July 31, the second on August 2. In a nest built in my garden in 1951, the first egg was laid on August 8, and the second on August 10. In another, the first egg was laid November 3, the second November 5, and in still another nest, the first egg was laid March 6, the second March 8. The measurements of the eggs in the second nest mentioned were: 13.3×8.5 , and 13×8.4 mm. These eggs weighed 0.55 and 0.50 grams, respectively.

INCUBATION

Building and maintenance of the nest studied in 1950 continued through the incubation period up to the day of hatching of the first egg. Not only did the maintenance of the inner and outer walls of the nest continue through incubation, but it was during this period especially that the adult plastered the outside of the nest with pieces of light green lichens. There were few lichens on the nest at the start of incubation. At the end, the entire outer wall was covered with lichens. The bird often returned after a break in incubation with either a piece of white "wool" or of lichen, although it never carried more than one piece at a time.

Table 1 summarizes my observations of the bird's behavior over one-hour periods during incubation.

While incubating, the bird was restless. It often altered its position when sitting. To illustrate its behavior, I give here an extract from my notes on one hour of observation on August 13:

At 7:55, bird sits with head turned to right (in reference to me) and tramples with its feet; 8:00, tramples, turns counter-clockwise until its back is toward me; 8:07, turns counter-clockwise and sits with head toward me; 8:25, tramples, and nibbles with bill at piece of lichen on the outside of the nest; 8:32, leaves nest, is back at 8:45, with a piece of green lichen which it fastens on the upper part of the outer wall of the nest, sits with head toward me; 8:48, turns counter-clockwise, nibbles at wall of nest, sits with back toward me; 8:51, turns counter-clockwise until head is toward me, tramples and nibbles wall of nest while turning; 8:54, still constantly trampling and nibbling and turning counter-clockwise; 8:55, still incubating.

During rain showers, the incubating bird "spread out" in the nest and pointed its head obliquely upwards so that the rain fell from its plumage. When the nest was in full sunshine, at about noon, the bird stood up in the nest with its bill open and its wings pressed closely to the body.

When incubating, the bird seemed constantly alert; only once, on August 9, at 15:12, did I observe it to stretch its wings, after which it yawned several times and dozed with closed eyes. It awoke at 15:20 and stretched its wings again.

Incubation started with the laying of the first egg (on July 31). The first young hatched on August 16, 16 days later. Incubation does not always start with the laying of the first egg. In a nest in my garden in March, 1952, the first egg was laid on the 6th, the second on the 8th. The adult did not start incubating until March 8. The first egg laid hatched on March 22 at 15:00, when the shells were still in the nest. The second egg hatched before 6:45 on March 24. In this case, the incubation period was 15 to 16 days. This agrees with the incubation period of *Amazilia tzacatl* as determined by Skutch (1931:500 and 1945:16). Muir's (1925:651) observations on *Amazilia tobaci erythronotos* in Trinidad give a much longer period of 21 days. It is clear from Muir's notes that incubation did not start for some time after laying of the first egg.

REARING OF THE YOUNG

I did not see the second egg hatched since I was absent from my home from August 17 to August 21. Throughout the nestling stage, the two young differed markedly in size and they did not leave the nest on the same day.

The newly-hatched nestling is pinkish below and blackish above with a little golden-colored down on its back and head. The mouth-lining is orange, similar in color to the pulp of the fruit of the papaya, *Carica papaya*.

Table 2 gives the weights of the young from August 22 to fledging. Also, the weight of the first nestling on the day of hatching is given.

When the young were small, the adult brooded them after feeding and during the night. Brooding was last seen on August 27, when the larger nestling was 11 days old. At this time, the adult could scarcely cover the young. When the sun shone directly on the young, the adult stood straight up in the nest with its neck stretched upward and its bill held horizontal and opened widely. The wings drooped; the feathers of the back and rump were ruffled, giving the bird a rough appearance. When brooding during rain, the adult sat with its head and bill turned obliquely upward and with its feathers tightly appressed to the body.

The young sat tightly in the nest, clinging to the bottom with their claws. This was important since the branch bearing the nest was often swept to and fro in the wind.

Individual nestlings were fed only when they begged by gaping; the adult invariably fed only the gaping nestling. Figure 1 shows the characteristic posture of the young while begging. Note that the back of the head rests on

TABLE 2
DAILY WEIGHT OF THE YOUNG IN GRAMS

DATE	NESTLING 1	NESTLING 2
August 16	0.4	
August 22	2.55	1.7
August 23	2.58	1.96
August 24	2.75	2.3
August 25	3.13	2.67
August 26	3.1	2.66
August 27	3.28	2.91
August 28	3.52	3.1
August 29	3.8	3.53
August 30	3.98	3.8
August 31	3.97	3.7
September 1	3.92	3.65
September 2	3.9	3.75
September 3	3.8	3.7
September 4	4.0	3.65
September 5	4.0	3.92
	leaves nest	
September 6		3.7
September 7		4.0
		leaves nest

the back of the young bird during gaping. The nestlings often turned around in the nest, at times facing in the same direction, at other times in opposite directions.

Table 3 gives records of feeding of the young during one-hour periods of observation. These records show that frequently the nestlings are fed more than once on each feeding trip by the adult.

I first saw defecation by the young on August 23, when the larger nestling was seven days old. The young bird shuffled to the edge of the nest, pointed its anus upward, forcibly expelled a spray of colorless, fluid feces a considerable distance from the nest, and shuffled back into the nest cup. On August 26, I observed that the feces, for the first time, although exuded in the manner described above, contained of a semi-solid black substance. Muir (1925) observed in Trinidad that an adult *Amazilia tobaci* cleaned the nest of feces from the start of the nestling period. I have not seen nest-cleaning by adults of *Amazilia fimbriata*.

On August 30, when the older nestling was 14 days old, I first saw wing-exercising by the young. One nestling stood in the nest and buzzed its tiny wings in characteristic hummingbird manner. Thereafter wing-exercising, and also preening, became a regular pastime. I noted also that frequently the young hummingbirds scratched their heads with their feet. They did this

TABLE 3
FEEDING OF THE YOUNG

DATE	TIME	NUMBER OF FEEDING VISITS	PORTIONS FED TO:	
			NESTLING 1	NESTLING 2
August 22	15:10-16:10	1	1	0
August 23	6:30- 7:30	2	3	1
	14:18-16:18	7	5	3
			5	0
			1	1
			1	2
			1	1
			1	0
August 24	6:13- 7:13	2	1	1
			2	2
	14:35-15:35	4	3	1
			1	1
			3	2
August 25	7:20- 8:20	2	2	2
			3	1
	14:40-15:40	2	3	2
			3	0
August 26	16:10-17:10	2	3	2
August 27	11:00-13:00	6	3	2
			4	5
			2	2
			2	2
			2	2
August 28	14:40-15:40	1	4	0
August 29	15:16-16:16	2	2	2
			2	1
August 30	15:25-16:25	2	3	0
			1	1
September 1	15:00-16:00	1	2	2
September 2	15:25-16:25	2	1	1
			1	0
September 3	13:15-14:15	2	3	1
			2	2
September 4	14:30-15:30	1	1	1

September 5, nestling 1 leaves nest at about 15:00.

September 7, nestling 2 leaves nest at about 13:00.

“over the wing,” as I have observed to be the case in the hummingbirds *Anthracothorax nigricollis* and *A. viridigula*. In a half hour period on September 4, one day before the oldest young left the nest, I made the following observations relative to exercising.

At 14:33 older nestling stands in the nest and buzzes with its wings, as does the other one while sitting; 14:35, older nestling again wing-exercising then both young preening; 14:37, wing-exercising of smaller young while standing in the nest; 14:39, older nestling scratches its head with its foot over its wing; 14:50, smaller nestling does same; 14:52, both young busily buzzing with their wings after having been fed by the parent, older young standing on the wall of the nest; 14:59, older nestling wing-exercising; 15:04, smaller young does the same, then scratches its head.



FIG. 2. Nineteen-day-old nestling of *Amazilia fimbriata*, one day before leaving the nest. Photographed near Paramaribo, Surinam, on September 4, 1950, by Fr. Haverschmidt.

On September 4, I photographed the older nestling (fig. 2). When I held it, it buzzed vertically upward from my hand.

When the young hummers leave the nest they are duller in color than the adults, especially on the underparts, which are brownish instead of bright green. The bill of the young at this time is strikingly shorter than in the adults (compare figs. 1 and 2).

The older young left the nest on September 5, at approximately 15:00. I found it sitting at a height of three meters on a branch of a coffee shrub about ten meters from the nest. The adult fed the fledged young in the shrub after first feeding the young in the nest. At 15:30, the nestling had left the shrub

and was perched on a wire near the house at a height of six meters. Here it spent the night and was still on the wire at 8:00 the next morning. The other nestling left the nest at about 13:00 on September 7, when I found it sitting on the same wire. On September 10, I again saw the adult feeding one young near the nesting site. On October 10, I watched a young Lesson's Emerald as it was fed by an adult near the nest, but I am not sure that this young was from the brood described above.

The young, according to my records, leave the nest only when they can fly well. The nestling period in the brood that I studied was about 20 days.

BATHING AND SUNNING

Lesson's Emeralds bathe regularly. I observed two general methods of bathing, the most common of which is a shower-bath in the rain, a type of bathing indulged in by many other birds in this region. During a rain shower, the hummer perches in an exposed spot with its tail widely spread and its body feathers ruffled. The neck and head are held vertically. While perched in the rain, the bird flaps its wings, opens and shuts its bill, preens, scratches (over the wing), waggles its tail, and frequently wipes its bill on its perch.

The second method of bathing I have called the "rubbing bath." This I first saw on September 14, 1946, when, during a heavy rain-shower, a Lesson's Emerald in flight rubbed its breast and belly over the drenched foliage of a *Terminalia catappa*, the leaves of which are large and leathery. The bird repeated the rubbing again and again until its underparts were thoroughly wet.

While sunning, the hummers sit facing away from the sun, wings closed, but with the body feathers ruffled and the primaries spread.

FOOD

Amazilia fimbriata feeds from flowers not only while hovering but also while perched. In addition to nectar-feeding, I have twice seen *Amazilia* apparently taking sand. On December 11, 1951, and again on January 13, 1952, I saw a hummer hovering only a few centimeters over a patch of fine dry sand near my house in Paramaribo. The bird touched the ground a few times with its bill. Although I could not actually see the bird pick up sand, it seemingly was doing so. I could find no insects on the sandy patch.

FIGHTING

Amazilia fimbriata, like other hummingbirds, is quarrelsome with birds venturing near its nest. On July 23, 1951, a juvenile kite, *Milvago chimachima*, alighted on a branch near a hummer's nest in my garden. Immediately, the hummingbird began diving at the large hawk; the latter ducked its head

at each dive and it soon departed. On September 25, 1950, I saw an adult *A. fimbriata* hotly pursuing a *Buteo magnirostris* through my garden. Small birds such as thrushes (*Turdus leucomelas*) usually immediately retreat from an attack by hummers.

SUMMARY

The foundation of a nest of Lesson's Emerald was found on July 25, 1950. Nest-building lasted for about a week, except that maintenance and plastering of the nest with lichens continued until the first egg hatched.

Incubation began with the laying of the first egg on July 31. The second egg was laid on August 2. The incubation period was approximately 16 days.

The adult made one to four feeding trips per hour, but fed several portions at each trip.

The young left the nest at 20 days; at this age they could fly well.

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A NEW RAIL FROM THE PLEISTOCENE OF FLORIDA

BY PIERCE BRODKORB

AMONG recently collected bird material from Pleistocene deposits in Florida are three humeri of a tiny rail of the genus *Laterallus*. The modern species of this genus are rare in collections, and this has been a handicap in determining the affinities of the fossil form. Fortunately this genus does not exhibit the marked sexual dimorphism in size shown by some other rails. Skeletal material of recent species of *Laterallus* was examined through the kindness of the curators of the Chicago Natural History Museum, United States National Museum, and the University of California Museum of Vertebrate Zoology. The drawings (Fig. 1) were made by Miss Esther Coogle.

Laterallus guti, new species

Type.—Nearly complete left humerus; collection of Pierce Brodkorb; Pleistocene at Dixie Lime Products Company quarry, one mile south of Reddick, Marion County, Florida; collected by H. James Gut, June 4, 1951.

Description.—Bone agreeing in general conformity with that of other species of *Laterallus*. Head of humerus rounded in outline, with slight indication of external tubercle; anconal surface relatively flat, with no pneumatic foramen; capital groove broad and deep and set at an angle of about 45 degrees to the shaft; proximal margin of bone faintly scalloped in region of capital groove; internal tuberosity broken off in type, but its internal margin not abruptly deflected from head; deltoid crest partly broken in type, but rising abruptly from palmar surface; ligamental furrow present but rather shallow; bicipital furrow obscure; shaft robust, bent inward at a slight angle above middle, and with a ridge along midline of proximal portion of anconal surface; a slight ectepicondylar prominence; internal condyle nearly the same length as entepicondyle, and both extended beyond external condyle; brachial depression pronounced and undivided. Color pale brownish.

Comparisons.—Of the species of *Laterallus* available for comparison, the fossil most closely resembles *L. jamaicensis* (Gmelin) of North America. The humerus of the fossil is only slightly longer than that of *L. jamaicensis* but is decidedly more robust. The capital groove is deeper, with its margin slightly more produced and less sinuate. The internal tuberosity is larger and has more nearly flat articular surface. The shaft is bent more strongly inward. The ectepicondylar prominence is larger and is concave distally where its lateral margin meets the external condyle. The internal condyle is larger in *L. guti*. The external distal border of the brachial depression is more raised. The olecranal fossa is deeper.

The fossil differs from *L. ruber* (Sclater and Salvin) of Middle America in lesser breadth of the distal end, although the width of the shaft is the same. The entepicondyle is not produced so far beyond the internal condyle in the fossil, and the internal condyle is smaller. The brachial depression is notice-



FIG. 1. Humerus of *Laterallus*. Left and third from left, *L. guti*. Second from left and right, *L. jamaicensis*. About three times natural size.

ably shallower than in *L. ruber*. The proximal end of the humerus of *L. ruber* is unfortunately not available.

From *L. viridis* (Müller) of South America, the fossil differs in having a decidedly smaller humerus in all measurements. The caput humeri of *L. guti* is more attenuate and less broad. The articular surface of the internal tuberosity is more nearly flat in the fossil, and there is less sinuation at the proximal border of the capital groove. The entepicondyle of the fossil is less

produced. In *L. viridis* the brachial depression is divided diagonally by a ridge.

From *L. leucopyrrhus* (Vieillot) of South America, the fossil differs in being smaller throughout. Further, the external tuberosity is much less pronounced, the external tricripital groove is shallower, the ectepicondylar prominence is larger, and the entepicondyle is not extended so far beyond the internal condyle.

I have also examined a partial skeleton of the Central and South American *L. melanophaius* (Vieillot). The humerus was not included, but the other skeletal elements indicate a bird nearly as large as *L. viridis*.

Referred material.—In addition to the type, two fragmentary humeri are available from the same locality. I collected the proximal portion of a right humerus on June 4 and the distal portion of a right humerus on June 24. At least two, and probably three, individuals are represented by the three specimens.

Measurements.—Measurements in millimeters of the fossil species and those of allied species are given below. For each measurement that of the type of *L. guti* is given first.

	<i>guti</i>	<i>jama- icensis</i>	<i>ruber</i>	<i>viridis</i>	<i>leucopyr- rhus</i>
Length of humerus....	24.2	23.5	---	28.2	---
Width of proximal end	4.5, 4.8	4.0	---	5.7	5.6
Width of distal end....	3.3, 3.3	3.1	4.2	4.2	4.1
Width of shaft.....	1.5, 1.5, 1.6	1.2	1.5	1.8	1.7

DEPARTMENT OF BIOLOGY, UNIVERSITY OF FLORIDA, GAINESVILLE, FLORIDA,
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THE DISPLAYS AND CALLS OF THE AMERICAN COOT¹

BY GORDON W. GULLION²

DISPLAYS and calls are of paramount importance in the social behavior of birds. A call or the exposure of some bright plumage spot may serve as a social releaser to communicate one bird's attitude or intentions to other birds, whether aggressive or friendly. This being the case, it seemed desirable to investigate in some detail the displays and calls of the American Coot (*Fulica americana*) in order to understand properly the breeding behavior of this species. This paper presents a segment of thesis research conducted at the Museum of Vertebrate Zoology, University of California, at Berkeley, on coot breeding behavior. Some other aspects have been published or are in press (Gullion, 1950b, 1951a, 1951b, 1952).

The greater part of this study was made in the San Francisco Bay area of California, with two lakes figuring prominently—Lake Temescal, a 12.0 acre lake at the western base of the Berkeley Hills in Oakland, Alameda County, and Jewel Lake, a 2.7 acre pond in Tilden Regional Park, Contra Costa County.

DISPLAY MECHANISMS

The American Coot is highly territorial in behavior, perhaps more so than most other birds, and must constantly fend off the invasion threats of other coots. Among resident birds this is true even during the winter season. Displays and calls constitute the aggressive behavior which serves to establish and maintain territorial security.

Displays by the coot consist of five elements used in various combinations. These elements are as follows:

Body posture.—Three different postures constitute the bases for coot displays. The normal posture with head and neck erect is the basis for amiable displays. But a coot with its head depressed is in a posture characteristic of any one of the several aggressive displays. The third posture, that of a bowed head, constitutes the basic form of courtship and mating displays.

Under tail coverts.—Several of the American Coot's displays are based upon the use of the white under tail coverts as "social releasers" (*cf.* Tinbergen, 1948). These coverts may be expanded to present an extensive area of white or they may remain in the inconspicuous normal condition presenting only a small patch of white. The position of the tail, whether normal, depressed, or

¹ A contribution of the Museum of Vertebrate Zoology, University of California, Berkeley.

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raised, increases the usefulness of these coverts by further increasing or decreasing the amount of white visible.

Wing arching.—This element is important in most displays. It often is the difference between a certain body posture indicating either an anti-social or a definitely sociable attitude. In the typical wing arch, the wings are held stiffly erect and apart from the body (see figs. 1D, 1E, 2C and 2D). Whether or not the white tips on the secondaries play a part in the recognition of this arch is not known.

The ruff.—In all aggressive displays the neck feathers are erected to form a ruff (see fig. 2A). The effect is one of increased neck size, forming a black background for the conspicuous red and white frontal shield. It was found that males are capable of forming a much larger ruff than their mates and when a pair is displaying together, as in nest defense, the sexes can be distinguished on this basis. With one exception, the ruff is not erected in friendly or courtship displays.

Frontal shield.—This structure, a fleshy protuberance extending dorso-posteriorly onto the forehead from the upper mandible, plays an important role in the social life of the coot. Since a paper devoted to a study of this structure is in print (Gullion, 1951b), further consideration of it will not be given here.

Although calls and displays are used to supplement one another in the field, for the sake of clarity they will be discussed separately.

DISPLAYS

American Coots combine the five elements discussed above to form fourteen distinct displays in addition to the normal position. Apparently each display has a certain social significance. Five are intra-specific aggressive displays and two are inter-specific aggressive displays concerned with territorialism; five more are involved in courtship; one is a general warning display; and one, a display given by young begging food from adults.

Normal posture.—This is the posture held by a coot when foraging undisturbed (see fig. 1A). The head is erect, the tail is held horizontally with the under tail coverts inconspicuous. The wings are held close to the body. As the coot swims in an unhurried manner, its head bobs, applying the principle of parallax to its feeding (*cf.* Grinnell, 1921). Head-bobbing of the coot is not necessarily in unison with the movements of the feet. When the bird is feeding on plant material this head movement is fairly slow, but it is quickened when insects are being hunted on the water's surface.

Patrolling.—Seemingly, whenever a coot has reason to believe some aggressive action may be necessary against other coots approaching its territory,



A. NORMAL POSTURE



G. BOWING AND NIBBLING



B. PATROLLING



H. BRACING



C. CHARGING



I. ARCHING



D. PAIRED DISPLAY



E. SWANNING



J. SPLATTERING



F. WARNING



K. BEGGING

FIG. 1. Display postures of the American Coot.

it pulls its head down and slightly forward, the neck feathers are erected to form the ruff, the tail is slightly depressed and a patrol against invasion commences (see figs. 1B and 2A).

A bird may proceed to further aggressive display or retire to the normal

posture from this position. Other coots, but not other species (except the Ruddy Duck, *Oxyura jamaicensis*), respect this display and often no further display is necessary to defend territory intra-specifically. The patrol is seldom accompanied by call notes.

Charging.—If an intruder enters a territory before the resident bird can go into patrol the defender generally moves toward the invader in a charge (see figs. 1C and 2B). In this display the neck is extended forward on a horizontal plane, the tail and wings are held in the normal position, but the ruff is erected and the frontal shield is prominent. The bird swims rapidly leaving a noticeable wake.

All species of ducks and small geese occurring in the San Francisco Bay area react to this display and other coots often take evasive action while still 100 feet from the charging bird.

Splattering.—This display is a rapid charge. The bird retains essentially the same head posture as in the charge while it runs over the water with flapping wings (see fig. 1J). The attacked bird very often flees in like manner, but holds its head erect rather than on a nearly horizontal plane (see fig. 2F). Splattering normally begins as a charge, the bird gradually increasing its speed, but occasionally, if the circumstances require it, a splatter may commence directly from the normal posture.

This form of attack may be pressed against other species of waterfowl as well as coots and because of the intensity of the attack it generally succeeds in its purpose. Frequently a fleeing coot when closely pursued will dive to escape its attacker.

It should be pointed out that splattering is used also as a means of escaping danger when flight is not necessary. It then is not a display and the head is not held at the low angle of the display (see fig. 2F).

Paired display.—This display is used entirely in intra-specific territorial activity, and always occurs in connection with strife and usually along territorial borders. This display is normally the final action of aggression and regularly follows charging and splattering. In paired display the head is held low, the wings are arched high above the back, often with tips crossing, and the tail is held vertically, or even tilted over the back, bringing the expanded white under tail coverts into prominence (see fig. 1D). The ruff is erected and the frontal shield is prominent.

It must involve two or more coots if it is to be more than a fleeting display, with the birds presenting their tails to one another as they pivot close together (see fig. 2C). Non-territorial birds engage in this display infrequently but the border disputes between territorial birds often involve repeated displays lasting several minutes at a time. As many as seven coots have been seen in mutual display. Generally like sexes reciprocate in display, but frequently a

pair will display against a single bird. This latter incident occurs most frequently when a chase carries the pursuing bird into the pursued bird's territory.

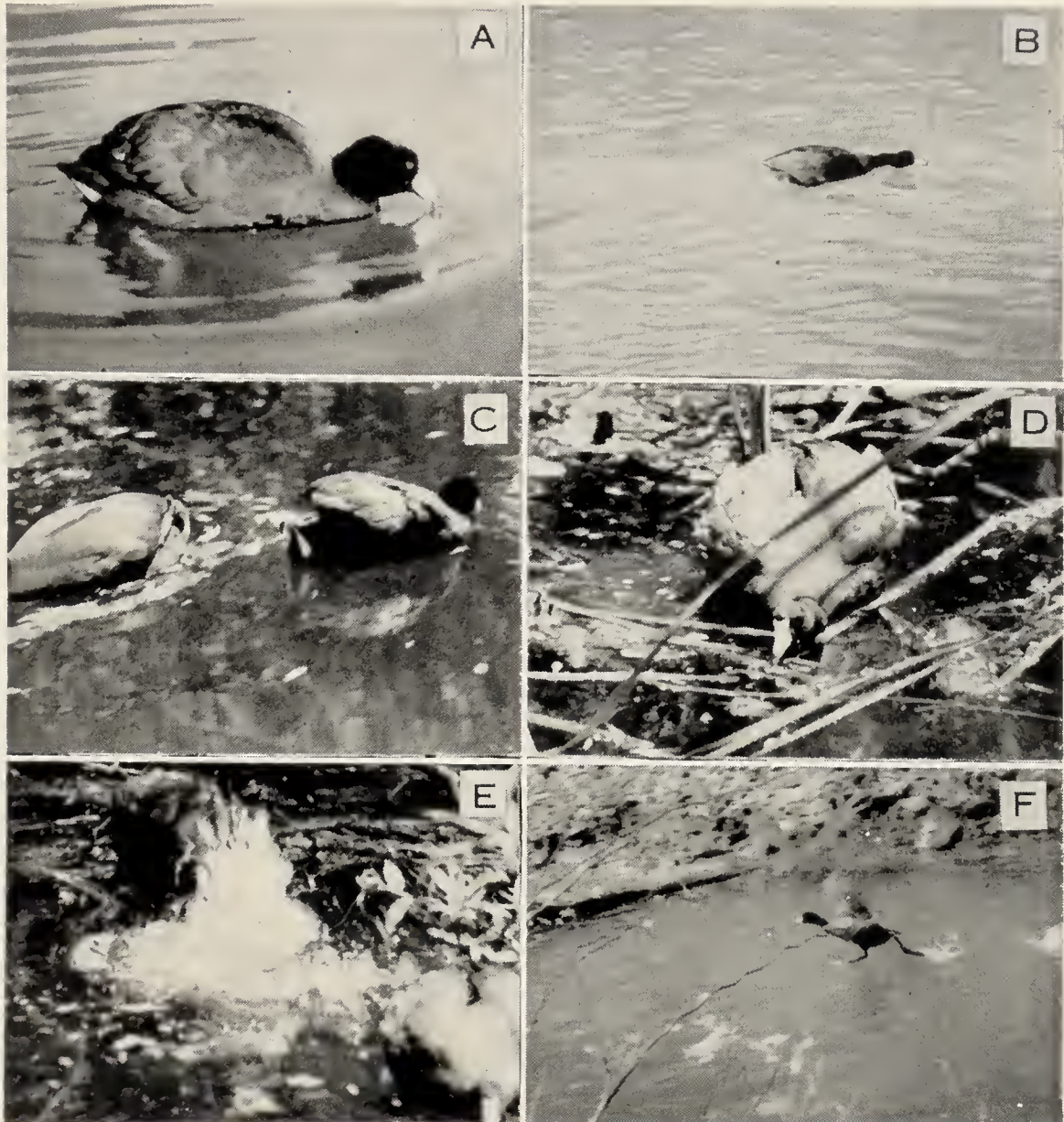


FIG. 2. A. A coot patrolling—note the ruff; B. A coot charging; C. A paired display with two coots pivoting tail to tail; D. A coot swanning; E. A male coot churning while his mate swans nearby; F. A coot splattering to escape its pursuer.

Paired display often is interspersed with fighting and nearly always follows a fight; it in turn is generally followed by “displacement feeding and preening” (Armstrong, 1947:110), the separated birds preening and diving for food which is seldom eaten but is dabbled nervously. During displacement activity the opposing birds slowly work apart, each moving into its own home area.

Paired display is not sexual behavior as believed by many authors (*cf.* Wetmore, 1920:395; Dawson, 1923:1559; Townsend, 1925:6; Walker, 1932:322 and Breckenridge *in* Roberts, 1932:457).

Fighting.—The climax of aggressive action is actual combat. In coots this is vicious and has been known to result in the death of the vanquished bird (Henshaw, 1918). In most disputes between neighboring pairs the fighting is interspersed with paired display, the latter act consuming much the greater part of the effort. Previous display does not always occur before fighting starts, especially if the issue is territory and the intruding bird is determined to secure it.

When birds are about evenly matched in determination, the fight starts with both birds sitting on their tails, propped against their wings on the water. Their adversary is grasped by the breast with the long claws of one foot, leaving the other foot free to slap the opponent. Frequent quick jabs with the bill are made to knock the opposing bird off balance but usually result only in a bill full of feathers. As the fight progresses the weaker bird is slowly forced onto its back. If possible, the stronger bird will hold the loser under water, leisurely plucking out feathers. The vanquished coot often escapes by swimming long distances under water.

Strange coots caught in territorial waters without a disposition to fight are frequently subjected to sub-surface mauling. Defending birds will hit other coots directly from flight without landing first and have been seen diving after an intruder directly from full flight. Underwater fighting certainly occurs but what form it takes is not known.

Infrequently as many as four birds may be engaged in one fight. The typical fighting posture has been observed in coots only four days old.

Swanning.—This is distinctly an inter-specific display given against such diverse objects as thrown stones, fishing plugs, turtles, snakes, ducks, Black Phoebes (*Sayornis nigricans*), dogs, and man. It seems to be employed almost exclusively in defense of nests or young.

Unlike paired display, the wings play a dominant role in swanning, being not only arched over the back, but also expanded laterally with the primaries touching the water. The tail is not lifted to expose the under tail coverts but the head is extended as in paired display, the ruff is erected and the frontal shield is prominent (see fig 1E). The whole effect makes a coot appear at least twice its normal size (see fig. 2D). Occasionally during times of extreme anxiety a bird defending a nest will lapse into a momentary paired display.

Churning.—This display is intimately related to the four combative displays just described. Bent (1926:364) gives the best description of this activity when he says, "it often 'backs water' vigorously with both feet, raising

the body backwards out of the water" (see fig. 2E). The feet are used alternately in this action.

Churning is primarily a displacement activity arising from two different circumstances. Most frequently it occurs when swanning or some other effort fails in the defense of the nest or young. Churning occurs also when success in aggressive action is attained so rapidly that the bird seems to be left with a surplus of aroused energy and 'lets off steam' by this action.

Warning.—Whereas the preceding displays are anti-social, the warning display is sociable, warning other coots of danger. An alarmed bird lifts its tail exhibiting the white under tail coverts but not expanding them (see fig. 1F). This seems to be the only general alarm signal given by coots. It is seen when a low-flying hawk, vulture, or airplane is overhead, when a dog, cat, or man suddenly appears close by on the shore, or when the coot is some distance away from, but in the general line of attack of, a charging coot. It probably is given as a result of any general alarm and it may be momentary, or repeated at frequent intervals if conditions change rapidly, or it may be maintained continuously if the cause for alarm persists. There is no indication that other species respond to this display.

Billing, bowing and nibbling.—These displays, though separate entities, are so closely related that it seems best to treat them together.

Billing, as the name implies, consists of two birds touching bills upon meeting. It apparently is used between potential mates during pair formation and for recognition of young by parents.

Bowing follows billing, the submissive bird going into a bow (see fig. 1G, left bird) and presenting its head and neck to the nibbling activities of the dominant bird. The nibbling bird works its bill through the feathers of the other bird, often burying its entire bill among the breast and back feathers.

Since these actions are important in pair formation and courtship they will be discussed in detail in a later paper (see also Gullion, 1950a:74-75).

Bracing.—The brace is not completely understood. It was observed on relatively few occasions and each time it immediately followed a meeting after a period of separation. It has been observed only among paired coots; both sexes participating in it. Bracing consists of a swimming bird raising the forepart of its body high in the water with the ruff erected and the head stiffly erect (see fig. 1H).

It occurs when one bird meets its mate returning to the nesting area, both birds approaching in a charge, dipping their bills as they pass and then bracing. Bracing also occurs, and more frequently, during change in incubation. Then the female braces and cackles as the male, often giving a high "kuk-kuk-kuk-kuk-kuk," closely pursues her. I am not sure, however, that the

brace executed on this occasion is exactly comparable with that display performed when two charging birds of the same pair meet. The brace may be given also by the female as she precedes the male to a platform when copulation is imminent.

Arching.—This display consists of three parts. After the pair is formed and territory secured, the female commences displaying her under tail coverts when swimming immediately ahead of her mate. This display, the *swimming arch*, is much like paired display but the wings are not arched nor is the ruff erected. It is only given by the female and she often leads the male towards the display platform while giving it. At first this is an infrequent and momentary display but later in the season it becomes more frequent and persistent.

The display given on a platform when copulation is not imminent is the *standing arch*. It is performed by the female standing with her head lowered, her tail elevated and the white under tail coverts expanded. She gives a low "tuk" or "punt" at about two-second intervals and often slaps the platform with one foot.

The final and climactic display in the long series of courtship displays is the *squat arch* (see fig. 11). This is given by the female on the platform when the male is nearby and copulation appears imminent. The female squats, with her tail erect (as in the standing arch), her head lowered (even under water), and she may call as in the standing arch.

Although arching seems to be primarily a female display one captive male was observed in a squat arch. On several occasions males were seen standing on display platforms in an upright position and giving a steadily-repeated "puhk." Generally they preened and often slapped the platform with one foot while their mates swam nearby.

Begging.—This display is first given by young coots when they are a few hours old and they continue to give it as long as their parents react favorably to it. It is a simple display, the hind quarters being elevated, the neck depressed and the head turned up at a sharp angle (see fig. 1K). The wings are outspread and generally quiver. Begging does not seem to be a forerunner of any adult display.

The role of the sexes.—Males take the lead in aggressive displays; normally they attack intruding males first and then return to drive out any invading females. Curiously, this is true even when the attack is pressed against a pair of Mallards (*Anas platyrhynchos*) or Ruddy Ducks. However, if the male coot is not available when the territory of a pair is invaded, the female will assume aggressive displays, attacking females first and males second. The courtship displays are often unisexual as described, while the alarm display may be given by either sex.

CALL NOTES

The calls of coots are not of musical quality, the calls being variously described as growls, cackles, and squawks. Calls are important in the life of coots in warning other birds of territorial rights or mutual dangers, in locating and recognizing mates and young, and in defending nests or brooding sites. Attempts to transcribe bird calls into phonetic symbols are never entirely successful, since various persons may interpret the same sounds differently. Nevertheless, an attempt was made to record and interpret the principal calls of coots in my study areas. The several types of calls fall into several categories as described in the following paragraphs.

Recognition notes.—The notes exchanged between birds of a pair or between parents and young are simple and rather uniform throughout the population. Between adults, the male gives a high, clear “*puhk*” and the female replies with a low, nasal “*punk*.” When calling or dealing with young the male gives a clear “*puht*” while the female gives a nasal “*punt*.”

Courtship notes.—In courtship the vocal efforts of the male are limited to a cough, given while chasing the female in precopulatory activity. In some males this cough becomes a sharp “*perk*” or “*kerk*” repeated at very close intervals. If, during a chase, the female is not amenable to mating activity, she faces the male and gives a saucy, cackling “*tack-tack, tack-tack*” which halts the affair. When the female is displaying on a platform, calling for the male to join her, she gives a note that varies from a low, nasal “*punt, punt*” or “*put, put*” to a sharp, clear “*tuk, tuk*.”

Alarm notes.—The normal alarm note for a disturbed male is a “*puhllk*,” while the female gives a “*poonk*.” Whereas the recognition notes involve no vigorous movement, alarm notes are given with a vigorous forward thrust of the head. In time of stress the young are sent to shelter by an explosive “*chuck*” or “*chook*” note of the male or the quick nasal “*punt-unt*” of the female.

When the nest is approached by an intruder or young cannot be moved away rapidly enough, both parents may “growl” at the intruder, sounding much like a dog growling over a bone. This is normally accompanied by swanning and churning.

Perturbation notes.—During times of high nervous tension, as when territory-seeking pairs are trying to seize existing defended areas, calls are given which are not heard at other times. These calls are given by the defending birds as they retire from repulsing one onslaught and nervously await the next. The call given by the male is a plaintive, crowing “*puhk-cowah*” or “*pow-ur*” while the female gives a simpler “*cooah*.”

A male at Jewel Lake in 1950, following the unexplained disappearance of

his mate, wandered around the pond several days giving a wailing "cow-wah" before disappearing himself.

Warning notes.—Vocal efforts are used extensively in the protection of nesting areas and to warn birds when they are violating or about to violate another coot's territory. These calls are highly variable, but in the male they may be described as a quick "puhk-ut," "puhk-uhk," "puhk-uk," "puhk-kuk" or "pit-tuck." The female variations are "punk-unk," "punk-uh," "punk-unk-uh" and "punk-tunk-tunk," all nasal in tone.

Intimidation notes.—A paired coot often moves to the limits of his territory and crows. This is seemingly a challenge to other males to violate his territory. The crow is basically three-parted, loud, and not often repeated. It may be transcribed as a "puhk-kuh-kuk," "puh-koo-oot," "kuh-kuh-kuk" or "cook-uh-ook." Frequently a male from an adjoining territory will accept the challenge and move quietly but quickly to engage the crowing male in battle.

Females give a comparable call, which is a hollow crowing sound that varies from "kaw-pow" and "kah-kow" to "kra-kow." This is seldom a challenge; at least, a fight has never been seen to ensue and usually the call is given following crowing by a male elsewhere on the lake.

Sexual dimorphism in vocal apparatus.—Since the morphological basis of sexual differences in voice indicated above is the subject of a previous paper (Gullion, 1950b), it will not be discussed further here.

DISCUSSION

Perhaps the displays of the American Coot have been less understood than any other part of the behavior of this species. The patrol activity seems to have been entirely overlooked by earlier authors. Wetmore (1920:395) describes bracing, Bent (1926:364) describes swanning, and Dawson (1923:1557 and 1560) describes the alarm signal and churning. Nearly everyone who has written about the coot describes splattering. The same may be said for the paired display, but invariably it has been wrongly associated with courtship. Wetmore (1920:395) discusses billing, while Breckenridge (*in* Roberts, 1932:457) and Sooter (1941:38) both correctly describe arching as a precopulatory display on a platform. Sooter also accurately describes the swimming arch in Iowa coots.

Displays and calls of other Rallidae.—Nylund (1945:108) shows four displays of the Black Coot (*Fulica atra*), illustrating (1) paired display, (2) the male following his mate in precopulatory display, (3) a young coot begging, and (4) a begging young too old to stimulate parental feeding being attacked by a parent. These illustrations appear to be identical with the cor-

responding displays of the American Coot. Later, in his English summary (p. 121), Nylund states: "The coots show no marked display behavior," a statement which hardly agrees with his earlier discussion or the findings of others studying the Black Coot.

Witherby *et al.* (1947:205) describe paired display, bowing, and nibbling in the Black Coot while Cramp (1947) describes spluttering in addition to these other three displays. A swimming arch immediately preceding copulation in the Black Coot was reported by Höhn (1949:209). Tinbergen and Moynham (1952:21), discussing some displays by birds, state: "A male Coot, for instance, threatens other Coots by facing them with the head pointing forward and downward. This movement displays the white frontal plate . . ." They also describe a "friendly gesture," which may correspond to the patrol, in which the conspicuous white bill and frontal shield are hidden.

Wetmore (1926:121) describes fighting in the White-winged Coot (*Fulica leucoptera*) in Argentina which is like fighting of the American Coot, while Sclater and Hudson (1889:158) describe a similar alarm display in the White-winged Coot. The display of the Red-gartered Coot (*Fulica armillata*) attributed by Wetmore (1926:118) to mating, sounds much like paired display since it involved wing arching and the display of the white under tail coverts. He may, however, be describing the swimming arch.

This general use of conspicuous under tail coverts by the members of the genus *Fulica*, and perhaps also in the several genera of gallinules, is of interest. The question arises as to the value derived by the exhibition of under tail coverts in the Black Coot and Red-knobbed Coot (*Fulica cristata*) when those coverts are as dark as the rest of the bird (Dresser, 1903). Still, the Black Coot, at least, gives many of the same displays as the white-covert American Coot. The South American species of *Fulica* all possess the white coverts with the black median area as in the American Coot (*cf.* Sharpe, 1894:209-225).

The displays of the Black Gallinule (*Gallinula chloropus*) seem to be remarkably similar to those of the American Coot. The platform activity of the Black Gallinule or Water-Hen as described and figured by Howard (1940:40) is identical with the arching of the American Coot. In fact, figures 1 and 2 of the plate facing page 40 (Howard, *op. cit.*) could as well refer to the American Coot as the Water-Hen, at least insofar as the posture is concerned. Howard (*op. cit.*) further describes bowing and nibbling in the gallinule similar to that occurring in the American Coot. Miller (1946:14) describes churning and swanning in the Black Gallinule which closely resembles the corresponding display of the coot (he calls it injury-feigning, but is probably incorrect in doing so). Fighting in the Black Gallinule, as described by Witherby *et al.* (1947:199), is like that of the coot. Pennock (*in* Bent, 1926:347) describes wing arching and the exposing of conspicuous white tail

coverts in this gallinule, believing it to be courtship activity, and Morley (1936:121) describes Black Gallinules charging in a manner similar to that of an American Coot.

Other rallids possess coot-like displays to varying degrees. The Corn-Crake (*Crex crex*) erects its tail feathers in a fan-shaped manner in both courting and territorial displays (Witherby *et al.*, 1947:176) while the Water-Cock (*Gallinula cinerea*) raises its tail when alarmed (Deignan, 1945:107), much as the coot does. In fact, the practice of raising the tail when alarmed seems to be general among the Rallidae. Deignan (*op. cit.*:110) also describes the use of white under tail coverts in the courtship display of the Blue Reed-Hen (*Porphyrio poliocephalus*). The Virginia Rail (*Rallus limicola*) runs around the vicinity of its disturbed nest "with drooping wings" (Walkinshaw, 1937:473), thus resembling the swanning of the coot. Nibbling occurs in the Water-Rail, *Rallus aquaticus* (Witherby *et al.*, 1947:194).

Little comparison can be made between the calls of the various rails, especially as transcribed by a number of different persons. However, it is worth noting that the sexual dimorphism found in the voice of the American Coot is also known in both the Black Coot and Black Gallinule, and perhaps occurs in other species. Rüppell (1933) found a sexual difference in the voice and the syrinx in the Black Coot and noted a difference in the voices of the sexes in the Black Gallinule, but did not examine the syrinx of the latter species. Later, Grimeyer (1943) stated that the only reliable field differentiation between sexes in the Black Coot is based upon voice characters.

Injury-feigning.—The instinct that is so common among waterfowl and shore-birds to feign injury does not seem to exist in the coot. Not once in the several hundred times I have chased coots off nests or away from young have I seen any indication of injury-feigning. Nor have any references to this behavior in the genus *Fulica* been found in the literature. Perhaps this behavior is rare in the family Rallidae since the only unquestionable instances recorded are for the genus *Rallus*. Grinnell *et al.* (1918:287) and Kozicky and Schmidt (1949:359) report injury-feigning in the Clapper Rail (*Rallus longirostris*) and Witherby *et al.* (1947:194) report the same behavior in the closely related Water-Rail.

SUMMARY AND CONCLUSIONS

The strict territorialism exhibited by the American Coot is associated with an array of displays and calls. All anti-social displays have certain features in common, *i.e.*, the neck ruff and the prominent shield. These two features are supplemented by wing arching and the exposure of conspicuous white under tail coverts when more aggressive displays are required.

The response of other coots varies with their own internal state. If the

shield of an intruder is flat and its pugnacity at a low ebb, a call or at most a moderate display by the defending bird causes the intruder to retreat; if, however, the shield is swollen and the intruder is seeking territory, the defender uses the gamut of anti-social displays, even including actual combat, in its attempts to repulse the invader.

While each sex has a definite tonal quality to its calls, there seems to be a great deal of individual variation among birds of each sex. Certain of the notes seem fairly uniform throughout the population, *i.e.*, the alarm and growling notes, but the notes associated with normal activities vary from bird to bird, being similar only in sequence and mode of delivery.

The sexual difference that exists in the calls of adult coots makes it relatively easy to ascertain the sex of birds in the field. It is surprising that this difference in call notes of the American Coot has not been pointed out by earlier authors.

ACKNOWLEDGMENTS

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Figure 2F is by Stephen A. Fenton and Al Jonez, of the Nevada Fish and Game Commission; all other figures are by the author (figs. 2A and 2B are reproduced from Kodachrome transparencies).

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624 AVENUE I, BOULDER CITY, NEVADA, MARCH 9, 1952

NESTING BEHAVIOR OF A PURPLE-THROATED FRUIT-CROW

BY HAZEL R. ELLIS

ON BARRO COLORADO Island, Panama Canal Zone, June 28, 1951, Eugene Eisenmann called my attention to a Purple-throated Fruit-crow (*Querula purpurata*) carrying nesting material. Since this interesting cotinga has received only casual attention in the literature, I devoted many hours from June 28 to July 16 in observing it.

The Purple-throated Fruit-crow is a conspicuous member of the sub-oscine family Cotingidae in the humid lowland forests. Its range is from Costa Rica through northern and Amazonian South America. The species is not one of the brilliantly colored representatives of the group but its persistent and melodious call notes, interspersed by harsh caws, announce its presence. Carriker (1910. *Ann. Carnegie Mus.*, 6:662) says: "They have a peculiar soft, liquid, musical note, very difficult to describe, which sounds a great deal like the cooing of a dove, only much sweeter and clearer." All records that I have examined mention this species as seen either singly or in small, noisy parties.

The common name, Purple-throated Fruit-crow, seems apt because the bird somewhat resembles a small Crow (*Corvus brachyrhynchos*). It is about ten inches long, is wholly black except for a gray bill and, in the male, a glossy, magenta throat-patch. Its manner of "catching" fruit doubtless accounts for a part of its name.

Stone (1928. *Proc. Acad. Nat. Sci. Philadelphia*, 80:169) reported that the natives called the Fruit-crow, "mae de Tucano," mother of the Toucan, on the theory that they always associate with the latter. He further wrote, however, that de Schauensee found this alleged constant association not to be the case although toucans and Fruit-crows were found together in some instances.

Fr. Haverschmidt has written me that the Indians of Dutch Guiana claim that the Fruit-crow nests in hollow trees. The pair of birds I observed built a shallow nest of branches and vines in the dense foliage of a tree¹ at the edge of an extension to the clearing made for a new laboratory building. The nest was at the junction of steeply ascending branches about 75 feet from the ground. Although the nest was well concealed from below by the dense foliage, from one position I could see that it was a shallow platform or saucer through which light could be seen. When the nest was completed it extended only

¹ From a comparison of leaves of this tree with herbarium specimens, it appeared to be *Cordia alliodora*. This is a common species in the tropical forests, but since flowers and fruits were not present and the tree was taller than the 40-60 feet reported for the species, it seems best to identify it only tentatively.

slightly beyond the body of the incubating bird. It was possible to see the head or tail of the bird when she was on the nest. I think that the nest was as well hidden from above as from below.

It is of interest to note that the bird was nesting during the rainy season, which corresponds with a report of the Penards (1910. "De Vogels van Guyana," Marinius Nijhoff, The Hague, 2:174) that the species breeds during the small rainy season in Surinam. According to Haverschmidt this period is from about February 15 to about April 15.

I began close observation at 9 a.m. on June 28. The pair made six trips to the nest in the next three hours. On four of the trips the male carried vines and twigs. The female always accompanied her mate and once I saw her fly to a perch with a twig and try to remove its leaves by passing the stem through her bill. She gave up her efforts and flew to the nest to arrange the material that the male had brought. Although the male brought much of the nesting material, the female appeared to do all of the construction and shaping of the nest.

During their cooperative nest-building activities one bird frequently uttered two or more soft *coos* that were answered by two or more harsh *caws* from its mate. The only evidence of courting that I saw was the male puffing out his throat-patch so that it projected laterally beyond the sides of the neck like a hummingbird's gorget. Mr. Eisenmann saw a male, presumably the same individual, do this in front of a female in a nearby tree on June 21, a week before the nest was found.

On June 29, the second day of my observations, the Fruit-crows showed greater activity. I observed eleven trips with nesting material in a four-hour period in the morning. Mornings seemed to be the time for work. The Fruit-crows often made extended trips away from the nest in the afternoon, returning for short visits. With the increased building activity, both birds carried in longer vines and twigs and once I saw the male get a piece of vine entangled in the branches of the nesting tree. He dropped it and then tried, but failed, to recover it before it reached the ground. Once both birds carried a vine about three feet long for a short distance. The female first appeared with the piece which was giving her some difficulty. The male flew to the dangling end and picked it up in mid-air and flew with it to within a few feet of the nest. He then dropped the end he was carrying and the female carried it to the nest.

On June 30, I observed the nest from 7:10 a.m. until noon. The pair made six trips to the nest but carried nesting material on only three trips. Apparently the nest was about completed and the egg-laying period was approaching. The birds were more vocal than they had been for two days and

they stayed in the area. The female spent a longer time on the nest when she entered it and occupied herself by shaping the nesting material.

The next two days the Fruit-crows stayed in the area and visited the nest less frequently. On two trips on July 2, I saw the male bringing in small pieces of nesting material. There was little courting and I never saw the birds taking food, although they visited the cecropia trees each day and worked among the branches.

I made no visits to the nest again until July 9. There was no activity after I arrived at mid-morning and I feared that the nest had been broken up by toucans or other predators, but I was mistaken. I heard the birds in the vicinity uttering the soft cooing that bespoke a harmonious existence. The next four mornings the birds were seen early near the nest. The female went to the nest and remained for a short time. After that they left and stayed away for a long period. Doubtless these four days comprised the egg-laying period but I was unable to determine the number of eggs in the clutch or to see an egg. I have found no reference in the literature to Fruit-crow eggs.

There was a change in behavior on July 14. The female was seen on the nest for several periods of thirty to fifty minutes each. She was still on the nest at 5:00 p.m. which was the latest in a day that I had observed. My judgment is that incubation began that day because the next morning the bird was on at 6:30 a.m., when I arrived, and remained for most of that day. The male was perched near and made short flights away from the area but I never saw him go to the nest.

I left Barro Colorado Island on July 16, and was not able to follow the fate of the Fruit-crow's nest.

I believe there were several pairs nesting on the island during my stay, for on one occasion I heard two pairs calling at the same time from different directions. Other times I encountered small groups of five or six. One wonders whether these small bands were family groups.

Birds that frequented the nesting area were sometimes tolerated and sometimes driven away if they came close to the nest. I never saw the Fruit-crows show great ferocity. The bird that excited them most was the Chestnut-mandibled Toucan (*Ramphastos swainsonii*).

I am indebted to Dean Amadon, American Museum of Natural History, and to Eugene Eisenmann for searching the literature on egg collections of neotropical birds. Fr. Haverschmidt and Alexander Skutch both shared with me their knowledge of *Querula purpurata*.

KEUKA COLLEGE, KEUKA PARK, NEW YORK, NOVEMBER 21, 1951

GENERAL NOTES

Birds seen on a trip to Labrador.—For three weeks in the autumn of 1950, I was a passenger on the Canadian National Railways ship, *S. S. Kyle*, as it made its last trip of the season to ports in Labrador. The *Kyle* left St. John's, Newfoundland, on October 14, and stopped at Newfoundland ports of Carbonear, Catalina, Wesleyville, Twillingate, and St. Anthony. We then sailed north, passing west of Belle Isle, to reach the Labrador coast at Battle Harbour. Numerous small ports as far north as Hopedale were visited. On the return trip, we sailed up Lake Melville to call at Northwest River and Goose Bay before returning to the Atlantic Ocean and going south. As a rule, the *Kyle* moved close to shore, usually within several hundred yards of land, and went especially close to land when entering the many small harbors in Labrador or when threading its way among the numerous rocky islands and shoals which lie off the coast of Labrador. However, we were several miles from land when crossing Conception Bay, Trinity Bay, Bonavista Bay, Notre Dame Bay, the open sea east of the Grey Islands, the strait of Belle Isle, and Hamilton Inlet. The wind was generally moderate to strong; it blew from the west or northwest except for a severe easterly gale on two days (Oct. 21 and 22). Daytime air temperatures were 30-40° F. in Newfoundland waters and 20-30° on the Labrador coast. There was snow on the ground after the first day in Labrador.

I devoted about five hours a day to observing the birds of the region. Except for the stop at Cartwright, Labrador, I made my observations from the ship since it was usually difficult or impossible to go ashore. Seven-power (7×50) binoculars were used in scanning the water and shore. I have summarized the results in Table 1. Exact determination of species was not always possible for a variety of reasons, including poor light, distance, snow flurries, and rough water. The larger and rounded-off numbers in Table 1 are, of course, mostly estimated values.

Nearly all of the Fulmars (*Fulmarus glacialis*) seen were within a few miles of Hawke Harbour, Labrador, the site of a whaling factory. They were especially numerous in Hawke Harbour itself. I saw over a hundred there on each of two occasions, some on the water but most in flight about the harbor.

The unidentified ducks were nearly all female eiders; exceptions were the ducks seen on Lake Melville, 12 on Oct. 26 (probably White-winged Scoters [*Melanitta fusca*], according to a missionary at Northwest River) and 80 on Oct. 30 (apparently Goldeneyes [*Glaucionetta clangula* or *G. islandica*] but very far distant). I saw no Black Ducks (*Anas rubripes*), Old-squaws (*Clangula hyemalis*), Harlequin Ducks (*Histrionicus histrionicus*), Surf Scoters (*Melanitta perspicillata*), or Red-breasted Mergansers (*Mergus serrator*). They might reasonably have been expected since they all appear to breed in Labrador and the recorded late dates of their departure are close to the time that I was in the region (Austin, 1932. *Mem. Nuttall Ornith. Club*, No. 7: 40-61; Bent, 1923. *U. S. Natl. Mus. Bull.* 126:1-68; 1925. *Ibid.* 130:1-151).

I saw no Gyrfalcons (*Falco rusticolus*) although I was informed by a resident of southern Labrador that Gyrfalcons become fairly common there in December and that many are killed in pole traps in winter. I saw only one Duck Hawk (*Falco peregrinus*). It flew shorewards across our bows when we were several miles off the Grey Islands. This bird was probably a migrant from Labrador where it is a common summer resident (Austin, *op. cit.*: 69). Peters and Burleigh (1951. "The birds of Newfoundland," Hough-

Iceland Gull (<i>Larus leucopterus</i>)	4	12	8	14	4	4	2	8	20	26	20	25	3	14	200	20
Great Black-backed Gull (<i>Larus marinus</i>)	20	40	1	12	23	29	9	8	11	75	8	4	5	20	9	13
Herring Gull (<i>Larus argentatus</i>)	30	40	27	140	140	120	110	25	30	90	75	100	20	65	160	15
Kittiwake (<i>Rissa tridactyla</i>)	200	23	5	1	20	30	1	31	150	8			5	2	4	31
Razor-billed Auk (<i>Alca torda</i>)						3							1	1	2	5
Atlantic Murre (<i>Uria aalge</i>)													2	1	2	20
Brünnich's Murre (<i>Uria lomvia</i>)							1,	1	1	1			5	3	12	135
Dovekie (<i>Plautus alle</i>)	1	4	280	35	110	1000	90	10	10	300	25		100	210	360	140
Black Guillemot (<i>Cephus grylle</i>)													30	26	7	1
Atlantic Puffin (<i>Fratercula arctica</i>)							3	1	1	12	200	11			1	2
Unidentified alcids																
Snowy Owl (<i>Nyctea scandiaca</i>)													3	7	10	23
Raven (<i>Corvus corax</i>)																
Snow Bunting (<i>Plectrophenax nivalis</i>)																

Localities visited during daily periods of observation.—Oct. 14, St. John's to Carbonear. Oct. 15, Catalina to Cape Freels. Oct. 16, the Grey Islands to Belle Isle. Oct. 17, Battle Harbour to Francis Harbour. Oct. 18, Francis Harbour to Comfort Bight. Oct. 19, Comfort Bight to Cartwright. Oct. 20, Cartwright to Run-by-Guess Island. Oct. 21-22, anchored at Run-by-Guess Island while a strong gale blew from the east. Oct. 23, Run-by-Guess Island to Maccovik. Oct. 24, Turnavik to Hopedale and back to Turnavik. Oct. 25, Holton Harbour to Emily Harbour, back to Holton Harbour and returning to Emily Harbour. Oct. 26, Northwest River to Goose Bay. Oct. 27, 28, 29, anchored at Goose Bay; only Iceland and Herring Gulls were seen, in about same numbers as on Oct. 26. It was not possible to go ashore. Oct. 30, Goose Bay to Rigolet. Oct. 31, Indian Tickle to Rocky Bay. Nov. 1, Spotted Island to Comfort Bight. Nov. 2, Comfort Bight to Williams Harbour. Nov. 3, Battle Harbour to St. Anthony.

ton Mifflin Co., Boston, p. 146) describe the Duck Hawk as a rare summer resident and transient in Newfoundland. They give only four records of this species.

The late occurrence of shore-birds in Labrador was interesting. These birds were apparently not merely stragglers since I saw 115 White-rumped Sandpipers (*Erolia fuscicollis*) in a walk along a two-mile stretch of the rocky beach at Cartwright on Oct. 20; the water was then thinly frozen over in the shallow places. It is apparent from Table 1 that the migration of White-rumped Sandpipers from Labrador was still taking place in November. Bent (1927. *U. S. Natl. Mus. Bull.* 142:192) gives the late date of this species at Battle Harbour as Oct. 29. Austin (*op. cit.*: 98) states that scattered individuals linger on in Labrador through October although most birds have passed through by the end of September. Hantzsch (quoted by Austin, *loc. cit.*) observed a White-rumped Sandpiper at Hopedale on Nov. 2, 1906. I found both White-rumped Sandpipers and Sanderlings (*Crocethia alba*) to be rather common on Nov. 10, 1950 at Searston in southwestern Newfoundland. Peters and Burleigh (*op. cit.*:199) give Nov. 22 as the late date for White-rumped Sandpipers at St. Anthony. They also give (*op. cit.*: 209) Oct. 1 as the late date for Sanderlings in Newfoundland. I saw no Purple Sandpipers (*Erolia maritima*) on the trip although we passed much apparently ideal habitat. Since the winter range of Purple Sandpipers extends as far north as Greenland (Austin, *op. cit.*: 95; Bent, 1927:151), it might be presumed that relatively few migrants of this species had reached Labrador and Newfoundland by Nov. 3. Peters and Burleigh (*op. cit.*: 197) described the Purple Sandpiper as an uncommon winter resident and transient in Newfoundland. The unidentified small shore-birds I saw were neither Purple Sandpipers nor White-rumped Sandpipers; they appeared to be other species of the genus *Erolia*.

The scarcity of Glaucous Gulls (*Larus hyperboreus*) was somewhat surprising. Coues (quoted by Austin, *op. cit.*: 111), who spent July and August, 1860, on the coast of southern Labrador, thought Glaucous Gulls were rather rare in this region. Others (cited by Austin, *loc. cit.*) reported them common throughout the interior and north of Cape Harrison. Austin says that Glaucous Gulls are most common between Hamilton Inlet and Naehvak but are never so common as Herring Gulls (*Larus argentatus*) and Great Black-backed Gulls (*Larus marinus*). It should be kept in mind that these reports were made by persons present in Labrador only during the summer months. Peters and Burleigh (*op. cit.*: 221) state that Glaucous Gulls are fairly common winter residents in Newfoundland, becoming most common in fall, winter, and spring when drift ice is just offshore. Austin gives only one record of an Iceland Gull (*Larus leucopterus*) for Labrador. As he remarked, this is doubtless due to the absence of observers during the autumn, winter, and spring months, when this species would be expected. Peters and Burleigh (*op. cit.*: 223) describe the Iceland Gull as an uncommon winter visitant in Newfoundland. I found that the white-winged gulls in Labrador always occurred with Herring Gulls and, in salt water, with Great Black-backed Gulls also. Because of this, I was able to estimate comparative wing-spread and relative heaviness of bills, critical field marks for the separation of Glaucous Gulls from Iceland Gulls. On the basis of these observations, the species identifications of Table 1 were assigned. It will be noted that the only white-winged gulls seen on Lake Melville and Goose Bay were apparently Iceland Gulls and that only two Glaucous Gulls were seen on the coast of Labrador.

A man living near Hawke Harbour told me that Glaucous Gulls (apparently known locally as "slob gulls") do not become common there until December, when ice is forming in large amounts in the ocean. Since he seemed to have observed wild life closely and

with interest, I felt that his statements were accurate. I also gathered from his remarks that Ivory Gulls ("ice partridges"; *Pagophila eburnea*) are seen at Hawke Harbour with the appearance of sea-ice in December.

The difference in habitat of the various alcids was rather sharply marked. Black Guillemots (*Cepphus grylle*) were seen in the sheltered harbors and close to shore, Dovekies (*Plautus alle*) in deeper and less sheltered waters and the Murres (*Uria aalge* and *U. lomvia*) and Razor-billed Auks (*Alca torda*) in still deeper water and further from shore. Puffins (*Fratercula arctica*) were either uncommon in Labrador at the time or else prefer regions further from shore than the *Kyle* ordinarily sailed, for I saw very few of these birds. Austin (*op. cit.*: 140) remarks that Puffins stay among the outer islands and almost never come into the bays, at least during summer, the time of his observations.

The migration of Snow Buntings (*Plectrophenax nivalis*) from Labrador was apparently complete after the fourth week in October, since I saw none of these birds after Oct. 20. According to Austin (*op. cit.*: 200), they are rarely found in Labrador during the winter.—JOHN G. ERICKSON, 611 North Lilac Drive, Minneapolis 22, Minnesota, September 18, 1951.

Closely associated nests of Bronzed Grackle and English Sparrow.—The Bronzed Grackle (*Quiscalus quiscula*) has been considered to be an enemy of nesting birds, destroying both the eggs and the young. Specifically, it has been recorded as killing and partly eating English Sparrows (*Passer domesticus*) (Forbush, 1929, "Birds of Mass. etc., Part 2," pp. 458-459). The English Sparrow is said to rob and kill many native birds, and destroy their nests, eggs, and young. Allegedly, sparrows have driven all the smaller hole-nesting birds from cities and villages, and many that nested among the branches of trees. Supposedly sparrows kill birds as large as the Robin (*Turdus migratorius*) or Flicker (*Colaptes auratus*) by attacking in numbers or follow native birds about until the latter leave the neighborhood (Forbush, *op. cit.*, Part 3:42).

This reported mutual antipathy makes it advisable to record an example of extreme tolerance. In a trumpet vine on our garage in Chesterton, Indiana, in 1948, an English Sparrow had its bulky, untidy, domed nest but a short distance below the eaves. In April, a grackle used this nest for the foundation of its own nest. When the nests were examined on May 8, each contained young. On May 16, when still poorly fledged, the first young grackle climbed out of the nest, along interlacing twigs and branches, and away into the trees. The last one left the nest on May 19. The young sparrows left the nest on May 20 and climbed and fluttered into the neighboring trees.

While the adult grackles appeared oblivious to the sparrows, the sparrows sometimes appeared perturbed when a grackle visited its nest, and waited until the grackle had left before going to their nest. Sometimes when a grackle flew to its nest when the sparrow was at its nest directly below, the sparrow flew out. But this was not always true, and sometimes the sparrow, at its nest entrance, would simply look up at the grackle arriving just above it.

Often on their way to or from their nests, both adult sparrows and grackles perched close together in a nearby elm tree and completely ignored each other.

This is a case of two species, each ordinarily thought of as antagonistic to other nesting birds, raising their young in nests in close proximity. The grackles apparently built on top of the sparrows' nest because it offered a suitable, solid foundation. The total lack of interest of each species in the young of the other was striking and surprising.

The close nesting of two aggressive predatory species, however, or of a predator and a

weaker or a prey species is not uncommon, indicating that about nests there is sometimes a change in interspecific intolerance. Bent (1938. *U. S. Natl. Mus. Bull.*, 170:22) quotes Decker and Bowles as reporting Ravens (*Corvus corax*) and Prairie Falcons (*Falco mexicanus*) nesting on the same cliff without discord. Murphy (1936. "Oceanic Birds of South America, Vol. 2, p. 933) notes that boobies (*Sula*) and man-o-war-birds (*Fregata*) nesting a meter or two apart pay less attention to each other than either does to members of its own species. The change in behavior when the boobies are returning to the nesting grounds well laden with fish is most extraordinary, for then apparently the man-o-war-birds rob the boobies. Barnacle Geese (*Branta leucopsis*) have been recorded nesting undisturbed close to a Gyrfalcon's (*Falco rusticolus*) nest (Bent, *op. cit.*:4).

Nests of English Sparrows, Starlings (*Sturnus vulgaris*), or grackles are commonly built in convenient niches among the sticks of Osprey's (*Pandion haliaetus*) bulky nests, and even House Wrens (*Troglodytes aëdon*) and the possibly competing Black-crowned Night Herons (*Nycticorax nycticorax*) have been admitted by Ospreys as "basement tenants" (Bent, 1937. *U. S. Natl. Mus. Bull.*, 167:370-371).

Other examples of a less aggressive species nesting near a more aggressive species, in India, have been given by Major General Hutson (1947. *Ibis*, 89:569-576). Durango (1949. *Ibis*, 91:140-143) has reviewed at some length the nesting associations of birds of different species with many additional examples, especially from Europe. In his opinion several factors which often reinforce one another may be involved as follows: (1) Similar or identical habitat preferences; (2) The nest of one species is a suitable nesting site for another; (3) Food available in nests or territories of certain species encourages other specialized feeders to nest there; (4) Sociability; (5) Protection afforded by the more aggressive species. Factor 2 seems to have been the important one in the grackle-sparrow instance. Durango also points out that some birds of prey appear to avoid disturbances in the vicinity of their own nest, a point that Brewster (1937. "Concord River," p. 177) after noting a Blue Jay (*Cyanocitta cristata*), Robin (*Turdus migratorius*), and Red-eyed Vireo (*Vireo olivaceus*) in fairly close proximity, wrote as follows: "I begin to believe that there is some truth in the statement (made originally by I know not whom) that predaceous animals seek their victims at some distance from their own homes."—A. L. AND R. M. RAND, *Chicago Natural History Museum*, February 17, 1950.

Songs of the Western Meadowlark.—To those fortunate folk who have lived in almost daily association with the Western Meadowlark (*Sturnella neglecta*) there are several matters regarding its song that become pretty well established. In addition to its incomparable joyousness one will soon recognize a certain format to each performance, *i.e.*, it is a form song. Unlike the song of many birds, the Meadowlark's station song (but not its soaring song) is one that is commonly repeated as exactly as though it were a phonographic recording (unhappy simile). To be sure there may be quite an album of discs and I have closely watched a single performer change to a new disc without clatter or prolonged delay, still each recording seems to be pretty sharply cut upon the wax of his psychic complex. Individual birds certainly have their favorite "arias" which are rendered often enough to characterize the singer and his territorial stage setting. Furthermore, I have not actually traced more than three discs to a single performer though color banding might extend this number appreciably. Within the combined territories of a number of individuals, however, the variety becomes quite extensive.

Another fact that soon becomes evident to the "bird listener" is the impossibility of

transcribing the song in the clumsy medium of musical notation. Like a violin virtuoso, he does things that set the five line staff completely at a loss. Nor is it necessary that he conform to a man-made sequence of whole and half tones which our system of musical notation is designed to express (not all peoples' do). Still, there may be recognized in some of the bird's performances a sequence of intervals that do fairly closely conform. With a degree of compression and resultant distortion, the fundamental structure of the song may be noted on the musical staff. The result is a mere "black and white still" of a rainbow-colored fountain of sound that defies capture and imprisonment, but the record does aid the memory and perhaps it will extend our appreciation of its variety.



One spring my class in biology had a goodly sprinkling of music majors among its members. The project of notation of Meadowlark songs was therefore undertaken as a scheme for "correlation of subjects" in the curriculum. One of my colleagues has strongly urged that some of the results of this effort be made public. Hence the following notes are offered. Observations were made during the spring semester and were restricted to an area of approximately forty acres in a newly annexed district of level land within the city of Los Angeles. Open fields and native vegetation were but slightly modified—just enough to supply ideal "singing posts" for an abundant Meadowlark population. Nine distinct "melodies" were noted (see figure).

On two occasions during my own contacts with the species I have heard perfect melodic sequences that suffered no distortion when spread upon the musical staff. In both cases there was extreme simplification through reduction of grace notes and glides. They are recorded in Nos. 10 and 11 of the figure. Both were delivered at the height of the breeding season and were therefore presumably birds of at least one year's age. One of the records is the simplest Meadowlark song that has come into my experience.—LOYE MILLER, *University of California, Berkeley, May 13, 1951.*

The song of the Alder Flycatcher.—I have known the Alder Flycatcher (*Empidonax traillii traillii*) for many years—since 1885, when I called it Traill's Flycatcher, to be exact—and I have heard its song as recently as this summer of 1951. I was much interested in Mr. McCabe's description of its flight song in *The Wilson Bulletin* (1951,

63:89-98)—something I have never been so fortunate as to hear. I was also interested in his discussion of the regular song, and, not being acquainted with it as it is given by Midwestern birds, I have no reason to disbelieve in his main thesis as to the difference between Eastern and Midwestern singers. My observations have been confined to the East—Massachusetts, Vermont, New Hampshire, Maine, New Brunswick, Nova Scotia, and Quebec Labrador—but I think I am in a position to criticize McCabe's table of phonetic expressions of the song because I have paid particular attention to the syllabification of birds' songs since 1895. In that year my journal recorded that hitherto I had been content with William Brewster's *ké-wing* (perhaps learned in conversation with Mr. Brewster), but on hearing the song near at hand in June at Londonderry, Vt., I found Dr. Dwight's rendering in Chapman's "Handbook of Birds . . ." very nearly exact, though I amended it to *wee-zeé-up* with the *up* very faint. I recorded this in *The Auk* (1902. 19:84-85). I also summarized this note in a communication to Bent's "Life Histories" (1942. *U. S. Natl. Mus. Bull.* 179:210). In McCabe's search for published "phonetic expressions," which was by no means exhaustive, it is not strange that this note of mine should have been overlooked. I mention it here only because I think it important to note that the final so-called syllable is faintly uttered.

This leads me to ask just what constitutes a syllable in a bird's song. In studying McCabe's table I could not help thinking that the difference between his three-syllable and two-syllable songs was sometimes a mere matter of the use of a hyphen by the human recorder. As an example, there is Saunders' *tick-weeah*, which McCabe calls a two-syllable song, though if the describer had happened to insert a hyphen after the *ee*—where one would really have expected to find one, *weeah* not constituting a normal syllable in the English language—he would have placed it in the three-syllable category. It seems to me that these so-called third syllables of this bird's song are really only downward inflections in the second syllables. In almost every case quoted this so-called syllable begins with a vowel, without the sharp break that would be indicated by a consonant, such as we hear in the *chick-a-dee-dee* of *Parus atricapillus*.

I am convinced that as most of us hear the Alder Flycatcher's song it is largely a matter of distance how we render it. On the island of Cape Breton, N. S., in the summer of 1951 I heard this song many times. It seemed to be always a two-syllable song, but it was too far away and in a place too difficult of access for me to hear it distinctly, and I feel pretty sure that if I had been nearer, I should have heard that downward inflection that some have called a third syllable.

Another element enters into the situation. In all syllabifications of birds' songs the personal equation enters, and McCabe sums this up very well in the first paragraph of his Summary. It has always seemed to me that some syllabifiers are too prone to rest content with what strikes them at first as a fairly good rendering, and do not listen again and again to the song to make sure they cannot improve upon it. This was my own case in my earlier years of observation. As a matter of fact, of course, birds do not sing in human syllables. Their consonants do not begin or end what we call syllables. When they exist at all, they run all the way through them. Nevertheless, this syllabification is an important adjunct to our descriptions of certain songs. Our attempts at imitation of the originals will assist our own memories and may often help other observers.

Unfortunately there is a rather disturbing number of inaccuracies in McCabe's table of "Phonetic Expressions." Some of these are in the localities named, where he seems to have assumed that the place of publication or the residence of the authority was the locality of observation. In other cases he has failed to go back to the original record, and

in still other cases no explanation is evident. I am not sure that I have caught them all, but such as I have detected with the help of my own small library I must note here. The authority for *ee-zee-e-ŭp* is really Dwight in Chapman's "Handbook of Birds . . ." (1895 and later editions) and the locality must have been New York or New England or both, not Washington, D. C. The Minot reference should be to H. D. Minot's "Land-Birds and Game-Birds of New England" (1876, Salem, Mass., and second edition edited by Brewster, 1895, Houghton, Mifflin & Co., Boston and New York), with New England for locality. Widmann's locality was presumably Missouri, where he lived, instead of Indiana. The *greadeal* of Miller should be *grea'deal* (with the apostrophe), and his original publication of it was in *The Auk* (1903. 20:68), where he says he adopted it from P. B. Peabody, who lived in Minnesota, while Miller himself lived in New Jersey. Silloway's post of observation at the time seems to have been Illinois, not Massachusetts. Saunders' locality must have included New England as well as New York. Hoffmann's name is misspelled, and his locality was New England, where he lived, as well as New York. Bent lives in Massachusetts, but his ornithological work has not been confined to that state.

I am sorry to have to call attention to these minor errors. I leave it to readers of McCabe's paper to consider how seriously they affect his general conclusions if at all. To my mind they are of little importance in comparison with my more fundamental criticism of this part of his paper, but their occurrence in what seems to be an important contribution to ornithology needs notice as a warning to readers—and also as a warning to other workers in the vineyard!

To close these comments on an affirmative note, I should like to call attention to the renderings of the song by the describer of the subspecies *E. t. alnorum*, and author of the present vernacular name, William Brewster, in his posthumous "Birds of the Lake Umbagog Region of Maine," (1937. *Bull. Mus. Comp. Zool.*, 66 (pt. 3):496). Here we have *quee-quee* and *quee-queer*, and it should be remembered that Brewster was a New-Englander to whom the final *r* would be silent, contributing only the falling inflection to that second syllable. This might take the place of the *ké-wing* attributed to Brewster earlier in this note. And it is interesting that these records of Brewster's were made in the type locality of the subspecies that may have to be restored to the Check-List.—FRANCIS H. ALLEN, 9 Francis Ave., Cambridge 38, Massachusetts, October 22, 1951.

Swainson's Warbler in Prospect Park, Kings County, New York.—In recent years Swainson's Warbler (*Limnothlypis swainsonii*) has been recorded as breeding in Maryland (Stewart and Robbins, 1947. *Auk*, 64:272), Delaware (Meanley, 1950. *Wilson Bulletin*, 62:93-94), and West Virginia (Brooks and Legg, 1942. *Auk*, 59:76-86). As with many other species, the extension of a breeding range is frequently concurrent with casual observations in areas where the bird has never before appeared. I wish to report the bird from southeastern New York.

On May 5, 1950, during a drizzling rain, Geoffrey Carleton discovered a Swainson's Warbler on the muddy margin of a small pond in Prospect Park, Brooklyn. Knowing that it was an unusual species, he watched it for some time. In its search for food it turned up dead leaves in the manner of a Rusty Blackbird (*Euphagus carolinus*). Carleton telephoned Dr. W. T. Helmuth 3rd, who rushed to the scene and observed the interesting bird from about 6:30 p.m. until dark. The warbler infrequently gave a thin, sweet *tsip* but it did not sing.

The following morning several observers carefully searched for the bird in the immediate vicinity of the pond. Eventually, Robert Grant and I relocated it about 500 yards

away, at the base of a bushy slope. To us its behavior seemed like that of a Worm-eating Warbler (*Helmitheros vermivorus*) as it investigated the leaves, twigs, and other debris beneath the thick brush. We had a chance to observe it for about fifteen minutes when a passing truck frightened it into flight. No one could find it again.

The weather on May 5 and 6 was mild and rainy. On the 6th there was considerable fog. Weather reports described winds of hurricane force in the Midwest on May 5. The area affected by a large cyclonic low the night before included southern Indiana and West Virginia, a part of the northern edge of the Swainson's Warbler's breeding range.—IRWIN M. ALPERIN, *Linnaean Society of New York, 2845 Ocean Avenue, Brooklyn 35, New York, January 1, 1951.*

Clay-colored Sparrow in Massachusetts.—The Clay-colored Sparrow (*Spizella pallida*) was added to the list of birds known from Massachusetts when two specimens were collected by Oliver L. Austin, Jr., on September 20, 1930. Since that time, two more Clay-colored Sparrows have been collected and twelve have been banded. All of these records are listed below. Eleven sight records, from 1940 to 1951, have not been included below because the difficulty of identifying fall Clay-colored Sparrows makes sight records unreliable. These sight records were published in *Records of New England Birds*. I am indebted to Oliver L. Austin, Jr., Dorothy E. Snyder, Curator of Natural History at the Peabody Museum, Salem, Massachusetts, and Aaron M. Bagg for their help in gathering the records presented here.

SPECIMENS

September 20, 1930. Two adult males collected by Oliver L. Austin, Jr. (1931. *Auk*, 48:126-127), at North Eastham. Specimens now Nos. 17837 and 17838 in the Boston Museum of Science. Identification checked in 1951, by James L. Peters, Museum of Comparative Zoology, Cambridge, Massachusetts.

March 24, 1950. An immature, sex unknown, was taken by James Baird at Amherst. The bird was first observed at Amherst by Robert Smart at his feeder on January 17, 1950. The identification was confirmed by J. L. Peters. It is now No. 231 in the collection of the University of Massachusetts at Amherst.

September 20, 1950. One immature male taken by Oscar M. Root at North Andover. The specimen, identified by J. L. Peters, is now in the Peabody Museum, Salem.

BIRDS BANDED

The first 11 of the following 12 birds listed were banded at the Austin Ornithological Research Station, North Eastham.

October 11, 1930. One adult, C80003, by O. L. Austin, Jr. Repeated October 11 and 12 (twice), 1930 (Austin, *loc. cit.*).

November 3, 1930. One immature, C80542, by O. L. Austin, Jr. Repeated November 3, 4, and 5, 1930 (Austin, *loc. cit.*).

September 29, 1934. One immature, L64783, by O. L. Austin, Jr. and Seth H. Low. Repeated October 3, 4, 5, 7, 8, 10, 13, 14, 15, and 16, 1934.

October 3, 1934. One adult, L64913, by O. L. Austin, Jr. and S. H. Low. Repeated October 4, 5, 7, and 8, 1934.

October 3, 1934. One immature, L64918, by S. H. Low. Repeated October 3 and 4, 1934.

October 17, 1934. One adult, 34-81301, by S. H. Low. Repeated October 17, 1934.

October 19, 1936. One, 37-24055, by L. J. Brewer. Repeated October 21, 1936.

October 20, 1936. One, 37-24059, by L. J. Brewer.

October 18, 1940. One, 239-6821, by L. J. Brewer. Repeated October 23, 24, and November 19, 1940.

September 20, 1941. Two, 140-20987 and 140-20992, by L. J. Brewer.

November 21, 1940. One immature, 139-56997, by George J. Wallace, at Lenox.

The Clay-colored Sparrow has been known to be a summer resident in southern Ontario since 1924. In 1950, it was found breeding there by T. Swift, D. Scovell, and D. West (Baillie, James L., 1950. *Audubon Field Notes*, 4:274). Perhaps the birds recorded in Massachusetts in fall are migrants or wanderers from the southern Ontario population. Because of the difficulty of identifying the Clay-colored Sparrow in fall plumage in the field, it may be more regular in autumn in Massachusetts than the records given above would indicate.—OSCAR M. ROOT, *Brooks School, North Andover, Massachusetts, March 15, 1952.*

Notes on nesting Traill's Flycatcher in eastern Arkansas.—During the summer of 1951 I had the opportunity to observe the nesting of Traill's Flycatcher (*Empidonax traillii*) in the Grand Prairie region of central-eastern Arkansas. It may be recalled that it was along the prairies of the Arkansas River that Audubon collected the type specimen of Traill's Flycatcher (see discussion by Aldrich, 1951. *Wilson Bulletin*, 63:193-194); in fact the type specimen was actually taken at the Fort of Arkansas on April 17, 1822 (Arthur, 1937. "Audubon: An Intimate Life of the American Woodsman," p. 251). The Fort of Arkansas, located about 50 miles south of Stuttgart, was better known in Audubon's time as it is today, as Arkansas Post, and was the territorial capital of the state at the time of Audubon's first visit there. Audubon reported in his "Ornithological Biography" (Edinburg, 1831:236) that although he was unable to discover the nest in that area, he suspected that the species nested there. A female collected by him contained five eggs "about the size of green pease" in the ovary. While it does seem unusual that the species would be nesting as early as April in this area, in early summer it is a common breeding bird wherever suitable habitat occurs on the prairie.

Arthur H. Howell (1911. *U. S. Biol. Surv. Bull.* 38:54), collecting near Stuttgart in May, 1910, found Traill's Flycatcher "fairly common, living in orchards, dooryards, and about small clumps of trees on the prairie."

The northern boundary of the Grand Prairie is somewhat tangent to a line drawn from Memphis, Tennessee, to Little Rock, Arkansas, while its southern boundary borders the Arkansas River. It is the major rice producing area of the state, with the city of Stuttgart in its center. Ecologically it is a true prairie land and was the home of the Prairie Chicken (*Tympanuchus cupido*) before the introduction of rice in the early 1900's.

Traill's Flycatchers observed by Howell were probably representative of the local breeding population; however, the first definite evidence of breeding from this area is based on the writer's record of two fledglings just out of the nest and being fed by a parent bird on July 18, 1951. Other nesting records from the state are reported by Baerg (1951. "Birds of Arkansas," *Univ. Arkansas Coll. Agric. Bull.* 258:98-99).

Traill's Flycatcher nests mainly in two habitat types on the Grand Prairie: (1) slashy thickets bordering drainage areas, and (2) "islands" of scrub vegetation, usually small trees, out on the prairie. The area selected for nesting studies in 1951 was an 18-acre thicket of haw (*Crataegus*) and persimmon (*Diospyros virginiana*) with openings, all surrounded by rice and lespedeza fields.

I saw the first pair of summer resident Traill's Flycatchers in the study area on May 10, on which date they had already established territory. By June 1, 17 pairs had established territories on the 18-acre tract of thickets. On May 28, I found three nests ready for eggs, and on May 31, one of these three nests held two eggs. In all, I found 15 nests in the territories of nine pairs of flycatchers. This indicates that individual pairs of Traill's Flycatchers in this study area were either renesting or attempting to raise a second brood in a new nest after successfully completing the first hatch. In one individual territory this second or later constructed nest was only 23 feet from the first nest. The average clutch for the 15 nests was 3.0 eggs, and the maximum number of eggs found in any nest was 4. The average number of young fledged per nest was 2.2, and at least one bird was fledged from each of 11 nests.

The locations of the 15 nests were as follows: 13 in haw trees, 1 in a persimmon, and 1 in a dogwood (*Cornus*). The "Yellow Warbler (*Dendroica petechia*) type" of nest was placed at an average of 7.5 feet from the ground. Fifteen of the 17 territories were located on the edge of the study area (18-acre tract of thickets), ten nests being on its western side. The nests of three pairs, each on individual territories, were located in a single acre of the 18-acre study area. Two pairs of young still in the "stub-tail" stage were noted near their nests on August 10.—BROOKE MEANLEY, *U. S. Fish and Wildlife Service, Stuttgart, Arkansas, October 15, 1951.*

Notes on Mexican bird distribution.—A comparison of the data contained in a "Distributional Check-List of the Birds of Mexico" (Friedmann, Griscom, and Moore, 1950. *Pacific Coast Avifauna*, No. 29, Part I), with my field notes on Mexican birds revealed that some of my observations extend the known ranges, as given in the Avifauna.

I submitted a list of probable species range extensions to Mr. L. Irby Davis for review. He informed me that most of the ranges, though unpublished, have been known for some time to many persons studying Mexican birds, but that four of the records (Wood Duck, Whooping Crane, Bonaparte Gull, and Black-billed Cuckoo) should be of interest to many field workers. These four records probably are the major contributions among the following data.

Black-bellied Tree Duck (*Dendrocygna autumnalis*).—Six were flying up the Río Naranjo at El Salto, San Luis Potosí, early on the morning of February 25, 1951. They returned downstream about one hour later. The elevation here is about 1500 feet above sea level. On March 5, 1951, one was standing beside a small reservoir in southern Coahuila along the railroad between Saltillo in Coahuila and Avalos in Zacatecas.

Green-winged Teal (*Anas crecca*).—One pair on the Río Naranjo, downstream from El Salto, San Luis Potosí, at an elevation of about 1300 feet, February 24, 1951.

Wood Duck (*Aix sponsa*).—One female was on a roadside pond 73 miles southwest of Matamoras, Tamaulipas, along the highway to Victoria, February 23, 1951.

Canvasback (*Aythya valisineria*).—On March 6, 1951, one was flying over an ore mill tailing dump which contained water at Terminal, northern Zacatecas. Local hunters stated that Canvasbacks were sometimes shot during the hunting season in this area, although the Green-winged Teal was the most common duck.

Black Vulture (*Coragyps atratus*).—In Hidalgo, north of Jacala, one was found at an elevation of about 5000 feet, February 28, 1951; in Chihuahua, there were several between Hidalgo Parral and Chihuahua, March 9, 1951.

Gray Hawk (*Buteo nitidus*).—One northeast of Saltillo, at Ramos Arizpe, Coahuila, March 4, 1951.

Harris Hawk (*Parabuteo unicinctus*).—On February 24, 1951, one at El Salto, on the Río Naranjo, San Luis Potosí. On March 9, 1951, one between Jiménez and Chihuahua, Chihuahua.

Caracara (*Caracara cheriway*).—Three south of Saltillo, southern Coahuila, March 5, 1951, and one about 15 miles south of Hidalgo Parral, Chihuahua, March 9, 1951.

Peregrine Falcon (*Falco peregrinus*).—We watched one, of two, obtain a White-collared Swift from the evening flight to the falls at El Salto, San Luis Potosí, February 24, 1951. Also, one falcon at Terminal, northern Zacatecas, March 6, 1951.

White-throated Falcon (*Falco albigularis*).—One between Guerrero and Ebano, San Luis Potosí, February 28, 1951.

Pigeon hawk (*Falco columbarius*).—Two at an elevation of about 5000 feet along the Pan-American Highway north of Jacala, Hidalgo, February 28, 1951.

Whooping Crane (*Grus americana*).—On February 23, 1951, about 58 miles southwest of Matamoras, Tamaulipas, one pair was seen flying north at a height of 300 to 400 feet, occasionally calling as they passed.

Coot (*Fulica americana*).—One on the Río Naranjo below El Salto, San Luis Potosí, February 24, 1951.

Hudsonian Curlew (*Numenius phaeopus*).—Between Gomez Palacio and Bermejillo, Durango, one was in an irrigated alfalfa field near the highway, March 9, 1951.

Bonaparte Gull (*Larus philadelphia*).—One was flying over, and resting on, the waters of the Gulf of Mexico, off the end of the Río Panuco jetty, Tampico (Madera), Tamaulipas, March 1, 1951.

Ground Dove (*Columbigallina passerina*).—One or two at Terminal, northern Zacatecas, March 5 and 8, 1951.

Black-billed Cuckoo (*Coccyzus erythrophthalmus*).—One was active early on the morning of February 26, 1951, at Tamazunchale, San Luis Potosí.

White-collared Swift (*Streptoprocne zonaris*).—A few along the Pan-American Highway in Hidalgo, to the southwest of Tamazunchale, San Luis Potosí, at an elevation of about 3500 feet, February 26, 1951.

White-throated Swift (*Aëronautes saxatalis*).—Several near the north base of Mt. Timarosa, northern Zacatecas, at an elevation of about 7300 feet, March 7, 1951.—FRED G. EVENDEN, JR., Sacramento, California, October 14, 1951.

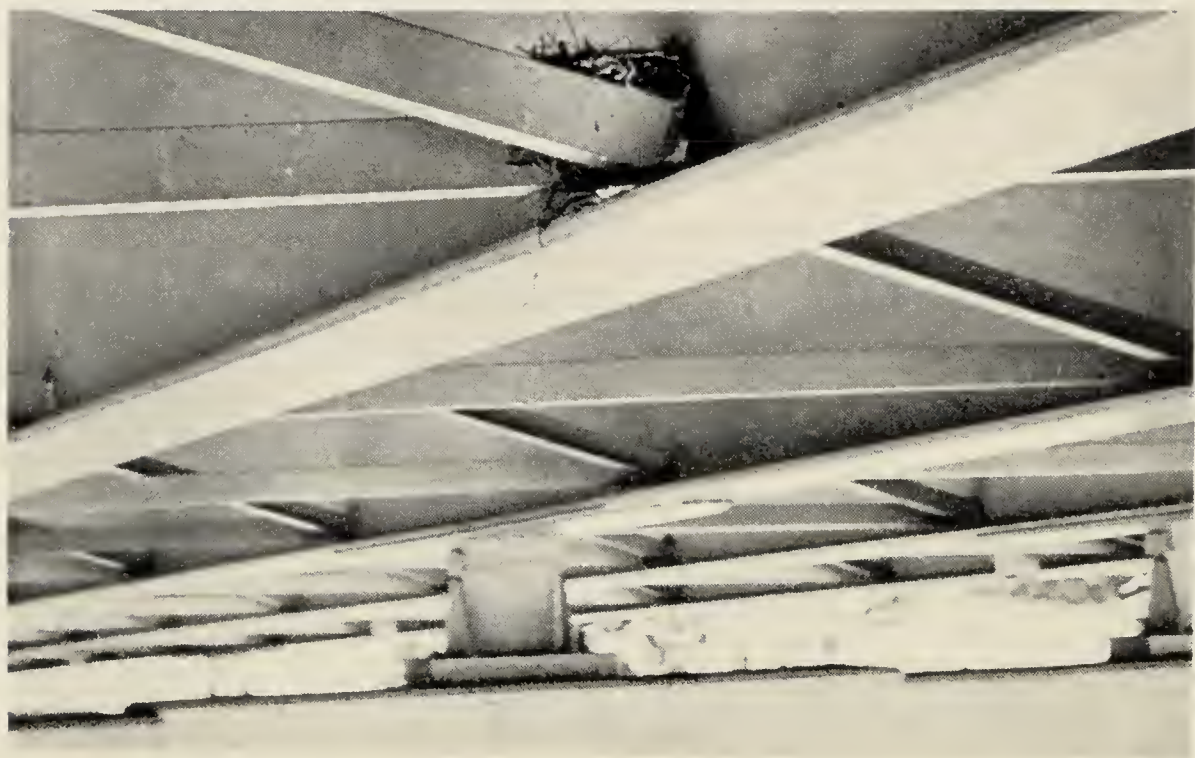
Ducks killed during a storm at Hot Springs, South Dakota.—Newspaper accounts of wildfowl striking wet pavements, buildings, or other obstructions in a city are common, but it is unusual to be able to verify the statements. According to the local paper of Hot Springs, Fall River County, South Dakota, about 500 ducks were killed or injured on the night of October 25, 1951, when fog, rain, and snow prevailed. Through the courtesy of Harry R. Woodward, Naturalist, and Superintendent of Schools at Hot Springs, the following information was received:

Ducks are frequently killed at Hot Springs when certain weather conditions prevail. Hot Springs is unusual in that it has a warm stream running the full length of the city. The water never freezes and when the atmospheric temperature is low, the water steams a great deal. About 100 Mallards (*Anas platyrhynchos*) live on the river permanently.

The main paved street of Hot Springs is lighted and when a snowfall occurs the lighted street appears like the stream itself. The ducks apparently do not see the main stream on account of the fog and the quacking of the local ducks seems to add to their

confusion. As a result they try to alight in the street. In attempting to alight on the concrete pavement, they fly into the adjacent buildings, nearby bluffs, telephone poles and wires, trees, or other obstructions. Many ducks are stunned or killed. I estimated that of the ducks killed during the storm of October 25 about 75 per cent were Red-heads (*Aythya americana*), 10 per cent Mallards, and the remainder Scaups (*Aythya* sp.), Shovellers (*Spatula clypeata*), and Ruddy Ducks (*Oxyura jamaicensis*).—A. W. SCHORGER,, *Department of Wildlife Management, University of Wisconsin, Madison, November 29, 1951.*

Mourning Dove nests in unusual site.—On July 14, 1950. Charles C. Carpenter, David E. Delzell, John D. Goodman, and I observed an adult Mourning Dove (*Zenaidura macroura*) on a nest which appeared unusually large for this species. After flushing the



bird I noticed that the nest containing two eggs was built on top of an empty Robin (*Turdus migratorius*) nest which apparently was at least a year old.

The nest was partly between and partly on top of two steel bracing beams, one horizontal and one upward diagonal, where they met the vertical side of a main steel support beam under a concrete highway bridge across Alvin Creek about five miles southeast of Delaware, Ohio.

Reports of Mourning Doves building nests near or over water and their use of old Robin nests as supports are frequent in the literature, but this Phoebe-like situation appears unusual to me.—H. LEWIS BATTS, JR., *Biology Department, Kalamazoo College, Kalamazoo, Michigan, September 6, 1951.*

Breeding status of the White-necked Raven in Kansas.—Although the White-necked Raven (*Corvus cryptoleucus*) was alleged to have disappeared from Kansas many years ago (see A.O.U. Check-List, 1931, p. 226; Long, 1940. *Trans. Kansas Acad. Sci.*, 43:448; and Goodrich, 1946. *Rpt. Kansas State Bd. Agric.*, 44, No. 267:247) this bird is

now a fairly common nesting resident on the high wheatland plains of western Kansas. Richard and Jean Graber (1950. *Wilson Bulletin*, 62:207) reported these birds in Hamilton and Kearny counties in the spring of 1950.

During the nesting season of 1951, I observed forty-six nests of this species in 14 western Kansas counties and was told that they nested in still another county. The number of nests observed in each county is as follows: Cheyenne, 3; Ford, ?; Finney, 12; Greeley, 1; Hamilton, 4; Haskell, 3; Hodgeman, 4; Kearny, 2; Rawlins, 1; Scott, 6; Sherman, 5; Stanton, 1; Thomas, 2; Wallace, 1; Wichita, 1.

In this area the nest is distinctive in that it is made almost entirely of wire mixed with a few coarse weed stems and lined with sheep wool. This nest almost invariably is placed in the open away from streams, wooded areas, and human dwellings. Twenty-one of the nests observed were in windmill towers, five were on highline or telephone poles, and the remaining twenty were in isolated trees. They varied from six to fifty feet in height above the ground. The first nest containing eggs was observed March 31; it contained four eggs.

Because White-necked Ravens closely resemble crows (*Corvus brachyrhynchos*) in many of their habits and actions, they are called crows by the local inhabitants. The differences between the two birds can be detected in the field by close observation. The ravens are somewhat larger than crows and their wingbeat is slower. The call is a hoarse *kraak* instead of a high-pitched *caw*. In the hand, White-necked Ravens are easily distinguished from crows by the white basal portions of the feathers of the neck, lower throat, and breast in the former. Further, the raven's bill is more massive and wider at the base.

Young White-necked Ravens, when nearly fledged, sit conspicuously on the edge of the nest and are often shot by gunners.—MARVIN D. SCHWILLING, *Kansas Forestry, Fish and Game Commission*, 310 Washington St., Garden City, Kansas, October 19, 1951.

***Pendulinus* a prior name for nectar-adapted orioles.**—Both Melvyn A. Traylor, Jr. and Kenneth C. Parkes have called my attention to an error on my part in designating *Bananivorus* Bonaparte, 1853 (type, by orig. desig., *Oriolus bouana* Linn.), as the first available generic name for the nectar-adapted orioles (Beecher, *Wilson Bull.*, 62:51-86). *Pendulinus* Vicillot, 1816 (type, by subsequent desig., *Oriolus spurius* Linn.), is clearly a prior name. It was not until long after I had fixed upon the availability of *Bananivorus* for the nectar-adapted line of orioles that I realized *spurius* belonged in it. The shift was made without focusing attention on the fact that it called for a change in the generic name.—WILLIAM J. BEECHER, *Chicago Natural History Museum, Chicago, Illinois, December 11, 1951.*

EDITORIAL

James Bond, of the Academy of Natural Sciences of Philadelphia, recently has been awarded a Musgrave Medal by the Board of Governors of the Institute of Jamaica, B.W.I., with the following citation: "In recognition of your contributions to West Indian ornithology, and particularly in recognition of the stimulus and assistance which you have given to the study of birds in Jamaica."

At the recent meeting in Gatlinburg, the Executive Council of the Wilson Ornithological Club decided that since the Canadian dollar has now come to parity, or better, with the United States dollar, the need has vanished for the Club to have a Canadian bank account and a Canadian assistant to the Treasurer for the service of Canadian members. The Council authorized discontinuance of the Canadian account. William W. H. Gunn, who served as Canadian assistant to the Treasurer, was thanked by the Council for helping out in this financial problem which existed only a few months ago.

The Illinois Audubon Society has established recently a Junior Wildlife Management Award. This will be awarded not only for a good plan for sound management practices but also for results obtained through putting the practices into effect.

Members are reminded again of the Club's urgent need for extra copies of the March, June, and September issues of *The Wilson Bulletin* for 1951. These copies should be sent to the Wilson Ornithological Club Library, Museum of Zoology, University of Michigan, Ann Arbor, Michigan. If you don't keep a file of the *Bulletin*, please help out the Club in this way.

Psittacosis at Cape Cod.—A recent article in the *Journal of the American Medical Association* (Chapman, 1951:1343-1344) reports a case of psittacosis in a human at Cape Cod, Massachusetts. The patient had had no direct contact with birds, but had twice cleaned a bird-feeding station; each time she had brushed disintegrated bird-droppings toward her with a whisk broom. "During the period when infection might have occurred, a family of purple finches were frequent visitors to the station. Finches are known to be carriers of psittacosis. In the course of the summer a catbird, a robin, and a finch were found dead but showed no signs of injury" (p. 1344).

The disease was characterized by a prolonged convalescent period after the disappearance of fever.—K.R.K.

REPORT OF TREASURER FOR 1951

Balance as shown by last report, dated December 31, 1950..... \$1,560.87

RECEIPTS

Dues:	
Associate	1,564.00
Active	2,287.00
Sustaining	775.00
Subscriptions to "The Wilson Bulletin"	222.50
Sale of back issues and reprints of "The Wilson Bulletin"	195.26

Gifts: Color Plate Fund.....	250.50
Mrs. Sarah L. Hilton Gift for Dr. David Clark Hilton Memorial Color Plate Fund.....	1,898.00
Henry J. Nunnemacher Gift for December Gertrude A. Nunne- macher Memorial Issue.....	1,250.00
Miscellaneous.....	67.41
Proceeds of auction of paintings at Davenport, Iowa, meeting.....	399.96
Transferred from Endowment Fund (interest on bonds, etc.).....	191.25
Total receipts.....	\$10,661.75

DISBURSEMENTS

"The Wilson Bulletin"—printing, engraving, mailing.....	\$5,408.99
Color plates for "The Wilson Bulletin".....	2,430.64
Editor's expense—printing, postage, secretarial aid.....	146.75
Secretary's expense—printing, postage, clerical aid.....	23.41
Treasurer's expense—printing, postage, clerical aid.....	427.49
Membership Committee expense—printing, postage.....	45.69
Annual Meeting expense.....	110.73
Purchase of books from Book Fund.....	5.50
Bank charges, foreign exchange, corporation papers and miscellan- eous expenses.....	8.64
Transferred to Endowment Fund a/c Edward L. Chalif and Special Research Grants.....	300.00
Total disbursements.....	\$ 8,907.84
Balance on hand in Citizens Fidelity Bank and Trust Company, Louis- ville, Kentucky, December 31, 1951.....	\$ 1,753.91

ENDOWMENT FUND

Cash balance in Savings Account December 31, 1950.....	\$ 668.65
<i>Received during year:</i>	
Interest on U. S. Bonds and on Savings Account.....	\$ 171.70
Life Membership payments.....	1,100.00
Gift of Edward L. Chalif for Research Grant.....	200.00
Transfer of Special Research Grants from checking account.....	100.00
Transfer of reserve from Louis Agassiz Fuertes Research Grant Fund (1951).....	100.00
Total receipts.....	\$2,340.35
<i>Disbursed during year:</i>	
Transferred to checking account (interest on bonds, etc.).....	\$ 191.25
Louis Agassiz Fuertes Research Grant payment.....	100.00
Edward L. Chalif Research Grant payment.....	200.00
Bank charges a/c State Tax.....	1.81
Total disbursements.....	\$ 493.06
Balance cash in Savings Account, December 31, 1951.....	\$1,847.29
<i>Securities Owned**</i>	
U. S. Postal Savings Coupon Bonds, dated July 1, 1935.....	\$ 780.00
U. S. Savings Bonds, Series "G", dated September 1, 1943 (matur- ity value \$1,000.00).....	967.00

U. S. Savings Bonds, Series "G", dated September 20, 1944 (maturity value \$1,500.00)	1,441.50
U. S. Savings Bonds, Series "G", dated June 1, 1945 (maturity value \$500.00)	479.00
U. S. Savings Bonds, Series "G", dated July 1, 1945 (maturity value \$900.00)	862.20
U. S. Savings Bonds, Series "G", dated October 1, 1945 (maturity value \$1,400.00)	1,337.00
U. S. Savings Bonds, Series "F", dated February 1, 1947 (maturity value \$2,000.00)	1,572.00
U. S. Savings Bonds, Series "F", dated April 1, 1948 (maturity value \$2,000.00)	1,534.00
U. S. Savings Bonds, Series "F", dated October 1, 1948 (maturity value \$1,450.00)	1,102.00
U. S. Savings Bonds, Series "F", dated April 1, 1950 (maturity value \$1,000.00)	745.00
Total securities owned**	<u>\$10,819.70</u>
Total Endowment Fund	<u>\$12,666.99</u>

** Bonds carried at redeemable value December 31, 1951.

In reserve:

Louis Agassiz Fuertes Research Grant Fund (special gift)	\$ 125.00
S. Morris Pell Fund (special gift)	75.00

Respectfully submitted,
LEONARD C. BRECHER, *Treasurer*

December 31, 1951

Approved by Auditing Committee:

BURT L. MONROE

MRS. HERBERT E. CARNES

FREDERICK V. HEBARD, *Chairman*.

THE WILSON ORNITHOLOGICAL CLUB LIBRARY

The following gifts have been recently received. From:

Elizabeth B. Beard—1 reprint	Margaret M. Nice—1 book, 8 reprints, 4 magazines
William H. Behle—8 reprints	
Ivan L. Boyd—6 magazines	Frank A. Pitelka—2 books, 11 reprints
John Davis—49 reprints	Hustace H. Poor—22 magazines
Ralph W. Dexter—7 reprints	T. Wayne Porter—1 reprint
Eugene Eisenmann—1 pamphlet	Georg Steinbacher—11 reprints
Betty Carnes—1 book	Josselyn Van Tyne—1 book
Henry S. Fitch—1 book	Alexander Wetmore—5 pamphlets
F. J. Freeman—9 magazines	L. R. Wolfe—21 pamphlets and reprints
Richard Graber—2 reprints	Howard Young—3 reprints
Karl W. Haller—1 book, 1 bulletin	Dale A. Zimmerman—1 reprint
Wm. A. Lunk—1 translation (of article from a German serial)	

ORNITHOLOGICAL LITERATURE

MEXICAN BIRDS . . . FIRST IMPRESSIONS . . . BASED UPON AN ORNITHOLOGICAL EXPEDITION TO TAMAULIPAS, NUEVO LEON, AND COAHUILA . . . WITH AN APPENDIX BRIEFLY DESCRIBING ALL MEXICAN BIRDS. By George Miksch Sutton. University of Oklahoma Press, Norman, 1951:7 × 10 in., xvi + 282 pp., with 16 color plates and 65 pen-and-ink drawings. \$10.00.

This attractively composed book is a record of Sutton's first field expedition to Mexico. The jacket-flap, with more than usual accuracy for jacket-flaps, states that "the first part is an informal account of the author's day-to-day experiences in the field, his intensely subjective thrill at finding a new species, and his cool, objective, and detailed descriptions of the birds he saw . . . Mr. Sutton has written *Mexican Birds* in the form of a personal narrative 'because students of Mexican birds will most likely go through much that I went through in adjusting myself to the fact that many birds there are the same as, or closely related to, those of the United States . . .'" The text is a diary-type account introducing the reader to several ecologic groupings of birds in northeastern Mexico. One of the high points is the experience with the Faisan Real (*Crax*), in which the reader gains insight into the bird *and* into the knowledgeable Mexican guides, the author, and the small drama of the hunt.

From the popular and explicit style of the text, I assume that the author addresses himself to readers with non-technical interest, and it therefore seems quite unnecessary to pepper the pages with scientific names. These are given again in the appendix anyway, along with vernacular names. The text would read more smoothly without the Latin names.

The author makes a considerable effort to suggest vernacular names for Middle American birds poorly named or as yet without such names. This he does in a constructive and sensible way. The topic is one always leaving room for difference of opinion, and recognizing this I would take exception to only one of his usages. Why should the familiar Carolina Wren, the species *Thryothorus ludovicianus*, be called Berlandier's Wren when one watches it in Nuevo León? This name is used by Hellmayr and, like so many others of his, should be ignored. Among other names used by Sutton, some very apt species vernaculars are suggested, and the reviewer believes ornithologists should try to use them.

The second part of this book, an appendix of 71 pages, is a summation of Mexican bird-life, with brief descriptions and clues to field identification, all especially useful now because no other guide is available. For the "tough" families, like the hummers, flycatchers, and finches, the appendix concisely reviews the fauna so that the student can meet the challenge of each family a little more optimistically. Although the title states that *all* "Mexican" birds are mentioned, at least the following are omitted: *Pipilo rutilus*, *Xenospiza baileyi*, *Aechmolophus mexicanus*, and *Amaurospiza relictus*. And of these, the first three are probably not so rare or so restricted in distribution as first thought to be. Sutton *does* list other poorly known species, such as *Neochloe brevipennis*. Certainly the omitted four ought to be included in the appendix if one bothers to mention, as Sutton does, *Vireo bairdi* from Cozumel Island or *Mimodes graysoni* from Socorro Island. Any traveller-ornithologist is less likely to go to some of these islands than to the heart of the mainland, where he stands a chance of meeting *Xenospiza* or *Aechmolophus*.

In the appendix, various problems of distribution and taxonomy are reflected from the

sources, such as Ridgway and Hellmayr, on which the author has relied, and he ventures opinions here and there which point up interesting problems. In the jays, I agree with his comments on *Psilorhinus*, but not with those on *Cissilopha*, in which the species *sambasiana* and *beecheii* occur together in Nayarit, a fact evidently not known to Sutton. To some extent Sutton has slighted, unintentionally I think, the southern part of Mexico, about whose geography his text is vague. He gives the impression that the term Mexican plateau applies to all highland Mexico west of the Isthmus of Tehuantepec. At any rate, *Atlapetes pileatus* is said to be "restricted to the Mexican plateau" (page 57), whereas it occurs in the Sierra Madre del Sur, south of the Mexican plateau proper, in Oaxaca and Guerrero. Both the Scrub and Mexican jays are said to occur "throughout most of the plateau" (page 232), whereas the former also occurs farther south, in the Sierra Madre del Sur.

Like the small boy saving a bit of decorative cake frosting till last, I come to the illustrations. These are superb. The color plates are well reproduced and display the high level of Sutton's ability and versatility. The pen-and-ink sketches catch the spirit of the living bird remarkably well. They have an ease and simplicity of line that indicates Sutton's first-hand, competent acquaintance with birds as subjects. The confidence shown by his drawings is fully justified.—Frank A. Pitelka.

THE DEVELOPMENT OF ORNITHOLOGY. FROM ARISTOTLE TO THE PRESENT. (DIE ENTWICKLUNG DER ORNITHOLOGIE. VON ARISTOTELES ZUM GEGENWART.) By Erwin Stresemann. F. W. Peters, Berlin W15, 1951: xiv + 431 pp., 15 plates. 32 DM.

For many years Dr. Stresemann has contributed articles to journals in his own and other countries on the history of ornithology. Now he presents the fruits of his extensive studies in an impressive and scholarly volume.

The first section of the book deals with the period from the foundations of ornithology to the seventeenth century, the second and longest section with the development of systematics and the study of evolution, and the final section with the development of bird biology.

Aristotle raised bird study to the level of a science; for two thousand years he remained the chief authority. No significant new contribution was made until the thirteenth century when Frederick II of Hohenstaufen composed his remarkable "Art of Falconry," which, to the great loss of ornithology, remained unknown due to the hostility of the Church. Albertus Magnus, in the Middle Ages, and Gesner, in the Renaissance, transcribed the information of their predecessors from the Ancients down; both possessed the spirit of inquiry and omitted or questioned much that was fabulous.

At first biology and systematics traveled together; from the time of Aristotle ornithologists had tried to classify birds according to biological characters and thus they learned much about ecology and habits. This system, however, became increasingly unsatisfactory, especially because of the exotic species that were being discovered. In 1676, Willughby and Ray presented their system based, not on function, but on form, namely, structure of bill and feet and size of body. The history of many schemes of classification from that time to the present is traced in fourteen chapters with much attention given to explorations and amassing of collections, special chapters being devoted to Levaillant, Temminck, Bonaparte, and Finsch. The profound effect of Darwin's "Origin of Species" is described. There is an outline of the history of trinomial nomenclature as it was instituted by Schlegel, adopted by the American Ornithologists' Union in 1885

through the influence of Baird, Ridgway, J. A. Allen, and Coues, then reintroduced into Europe, despite opposition, by Hartert.

Attention is drawn to two little known eighteenth-century pioneer students of the living bird, Pernau and Zorn. Both were teleologists, but teleology had given rise to more advances in knowledge than the causal school, because chemistry and physiology were largely undeveloped. It was Darwin who was able to reconcile Aristotelian teleology and mechanism; instincts were as important as bodily form and depended on inherited modification of the brain; inherited variation and selection brought about fitness. During the nineteenth century field study advanced, then stagnated again. The last chapter deals with present day research: the study of migration and populations with the aid of banding; study of life history and behavior with color banding; experiments on orientation and homing; laboratory experiments on physiology, metabolism, and the migratory impulse; ecological investigations and the researches in behavior of Lorenz. Systematists and geneticists are now occupying themselves with biological problems.

Dr. Stresemann has presented a vast amount of information, most interestingly written with quotations from works of the writers' and vivid characterizations of the different men. His book is far more than a narrative; the quality of an individual's work and its influence are appraised and the various philosophical points of view described. There are six pages of selected bibliography, thirty-five pages of appendix containing 126 notes, indices of subjects and persons, and fifteen well-chosen photographs.

This is a masterly work, an illuminating history of our science; it gives a background to present day students and an appreciation of the problems that confronted our predecessors. It will serve as an incentive to be worthy of our heritage, an inspiration to a keen and dedicated search for truth.—Margaret M. Nice.

CRIP, COME HOME. By Ruth Thomas. Harper & Brothers, New York, 1952: $5\frac{1}{4} \times 7\frac{1}{2}$ in., 175 pp., 1 plate. \$2.50.

This charming book is based on the most comprehensive study that has been made of the behavior of the Brown Thrasher (*Toxostoma rufum*). It contains much material not known previous to Mrs. Thomas' observations of color-banded individuals that returned to her home for many successive years. Written in part in diary form, it has warmth, pathos, and beauty. The reader glimpses the members of the household, the wildlings and domestic creatures, and the environment of a hill-top country home in Arkansas.

The narrative centers around Crip, the first Brown Thrasher the author banded in April 1937, and then watched through ten summers and four winters. For the first three seasons he returned with the same mate. In his fourth summer, he suffered a broken wing which healed in an abnormal position. Although he escaped predators and eventually regained awkward flight, he did not migrate the following two autumns (1940, 1941). He migrated in October of 1942 and 1943, returning in March. But he spent the winters of the next two years (1944, 1945) at the Thomas home, disappearing finally in October, 1946.

In addition to the detailed story of this remarkable bird, other Brown Thrashers that lived as neighbors or mates of Crip make pertinent bird history. Red, another male, lived on Crip's Hill five seasons; Greta also lived there five seasons, the first two as Crip's mate and the other three as Red's mate. In late summer, after nesting, she became a pre-migration companion of Crip in the latter years. Of particular interest is the final

Mrs. Crip who was his mate in 1944, 1945, and 1946. She was a late arrival each spring. In 1945 and 1946, Crip had already won a mate and was busy with nest-building when Mrs. Crip came from the south. In both years, she drove off the newcomer and resumed her place as Crip's mate on the old nesting territory. In 1945, she laid her eggs in the completed nest of the vanquished female.

Details of Brown Thrasher territorial and mating behavior, care of the young, severance of the pair bond in summer or early autumn, and arrival and departure dates are given.

Types of song are described including the introduction by Crip of songs of other species into his repertory, and the singing of the female. Also described is a territory-boundary-line maneuver or dance like that of the Mockingbird, the wing-lifting display of juveniles, and the wing-lifting of adults at sight of a dead snake.

The book may be read for enjoyment of a beautiful piece of nature writing, then used for study or reference. The frontispiece is a photograph of Crip; end papers show sketches of Crip's Hill.—Amelia R. Laskey.

AN ANALYSIS OF THE DISTRIBUTION OF THE BIRDS OF CALIFORNIA. By Alden H. Miller. University of California Publications in Zoology, Vol. 50, No. 6, University of California Press, Berkeley and Los Angeles, 1951: $6\frac{3}{4} \times 10\frac{1}{4}$ in., pp. 531-644, plates 32-40, 5 figs. in text. \$1.50.

The birds of California have been studied intensively over a period of several decades with a wealth of data having accumulated. The last summary of the distribution of the species geographically within the state was presented in 1944 by Grinnell and Miller (*Pacific Coast Avifauna*, No. 27:1-608). At that time it was projected that some generalizations and analyses arising from the work should be included. This, however, did not prove to be practicable. They appear at long last in the present publication. Incidentally, since the two are companion volumes, the names, both vernacular and scientific, are, with few exceptions, the same. A synopsis of the few changes in taxonomy and distribution is given in an appendix of the present work.

With respect to certain difficulties encountered in an effort to develop broad distributional principles, the author comments (p. 531) that "we are unable to resolve distributional patterns into a neat system comparable to the periodic table of chemistry, the chromosome map of genetics, or even the imperfect phyletic taxonomy of the systematist. There is no single sequential organization of distributional data. We are confronted with the end results of an array of delicate and complicated equilibria, in which the spatial balance of each species is a phenomenon peculiar to itself because of heritable differences interacting with the influences of many other species and of inorganic factors." The three general plans for handling distributional information on the terrestrial animals in North America are the life zone, biome, and biotic province systems. An evaluation is given of each of these and their applicability to California birds is considered at length. As a result some modifications of the plans are suggested and some coordination effected.

As pertains to life zones, 260 species are tabulated, being placed in the one or more zones where they are known to occur. Comparisons between the avifauna of the various adjoining zones are made on several bases. It is concluded that "for purposes of showing zonal relations and importance in California we may justifiably group the three cool zones (Canadian, Hudsonian, and Alpine-Arctic) as subzones of an inclusive Boreal Zone, as has frequently been done, but heretofore without well-defined basis." A major division occurs in California between the Upper Sonoran and Transition zones.

In classifying and describing avian distribution in terms of ecological formations there is the problem of the degree to which subdivisions would be useful. Miller has selected 21 situations which are intermediate between the broad plant formations or biomes and the plant associations. His selections are based more on the life form of the plant cover or physical aspects of rock and aquatic habitats than on succession. The characteristics of each formation and its zonal and geographical distribution in the state are given and those birds known to occur in each formation are listed. Based on known conditions of their summer habitat 274 species are so classified ecologically. Since most occur in more than one ecologic formation, all these formations that a particular bird is known to occur in are indicated by abbreviations of the name of the formation. Furthermore a superior number is used to show whether the affinity to the particular formation is of first, secondary, or lesser importance. The ratings are "based on the greatest concentrations of the species and on the provision of the most critical and limiting factor from the standpoint of existence of the bird concerned." The author fully realizes the subjective nature of the ratings and the lack of precise equivalence and comments that in the earlier book (Grinnell and Miller, *op. cit.*) the true picture of ecologic occurrence is given individually by species in the description of habitat. Miller has devised a relationship score to show something of the affinity of one formation to another with respect to their significance to birds. These are tabulated and expressed graphically as well as discussed. Comparisons are made of zones and formations from which Miller concludes that "zonal and formational systems are partly independent, each expressing a set of distributional facts, one often supplementing the other. For one group of species one appears more adequate than the other and for another group the opposite is true. More precision in general is registered by the formational system, partly because it is more finely divided, as here employed, and partly because it reflects climatic factors in addition to temperature; but its greater utility is not universally true. If, as contended, each system has its values and its set of factors to register or emphasize and the two are in a measure supplementary, there is little point in debating which is superior. The important thing is to know the values of each and to avoid improperly magnifying them."

In his discussion of faunal groups, the author refers to an earlier critique of the biotic province concept (Johnson, Bryant, and Miller, *Univ. Calif. Publ. Zool.*, 48, 1948:221-376). The present analysis is based on four major avifaunas "delimited admittedly somewhat arbitrarily, on the basis of strong or repeated association of species which have similar centers of distribution and probably often similar areas of origin." Three (Boreal, Great Basin, and Sonoran) center in areas beyond the state and are intrusive in California. The other, which he terms California, is endemic. Each of these groups contains subfaunas which occupy different areas within the state. The avifaunas of each are described and the species and races occurring in each are listed. The subfaunas are evaluated objectively by determining the actual degree of difference in make-up between them by matching lists of members of the fauna from two areas on a numerical basis. The total count is an index of difference reflecting not only limits of occurrence within boundaries but also the forms that have differentiated within the areas. This objective test of the distinctness of the geographic biotic provinces led to the recognition of different ranks of areal subdivision, so that provinces, districts and areas are units of decreasing importance. A list of species that do not fit into this scheme is attached. It includes chiefly species of marine environments and forms of continental or holarctic distribution.

In his concluding discussion, Miller relates the wealth of data pertaining to California

to the ultimate objective of the study of distribution which is to explain the mechanism of avian evolution. He correlates the zonal and formational ranges with differentiation, weighs the role of historic factors operative in California and discusses the factors of climate and isolation in relation to microevolution. Thus not only is this paper a summary and supplement to the earlier work on the distribution of the birds of California, but it contains a scholarly presentation of the concepts of evolution of birds in the state. Furthermore the data are expressed in an objective form that will allow comparisons with distributional features in other areas when such are similarly summarized.

All those ornithologists who have worked on the birds of California can take pride in this work, for even though it is a rare individual who has the comprehension and skill for such an undertaking, the summary is made possible only by the gradual accumulation of facts of distribution by many individuals over a long period of time. This treatise shows the complexity of the problem of distribution and the value in greater or lesser degree of the several distributional concepts. It would appear that extreme positions such as renouncing life zones are untenable.—William H. Behle.

GRÖNLANDS FUGLE. THE BIRDS OF GREENLAND. Part 3. By Finn Salomonsen. Ejnar Munksgaard, Copenhagen, 1951: 9 × 13 in., pp. 349–608, 15 color plates and numerous black and white sketches by Gitz-Johansen, and a separate map, 15½ × 22½ in., in color. \$42 for the three volumes and map. Decorative bindings obtainable at extra cost from the publisher.

This, the final part of Salomonsen's opus, contains full writeups on seven alcids, one eagle, two falcons, two owls, and ten passerine birds; a systematic list of all Greenland birds (224 numbered forms); an extensive bibliography; and an index of scientific, Danish, Eskimo, and English names. The writeups on the Great Auk (*Pinguinus impennis*), Atlantic Guillemot (*Uria a. aalge*), Short-eared Owl (*Asio f. flammeus*), Fieldfare (*Turdus pilaris*), American Water Pipit (*Anthus spinoletta rubescens*), Meadow Pipit (*A. pratensis*), and White Wagtail (*Motacilla a. alba*) are rather short—evidence that these birds have never been very common on the island. The last four of these actually breed in small numbers, however; *Uria aalge* also breeds very locally; and the Great Auk "possibly bred in mediaeval times." The Short-eared Owl, contrary to popular belief (see A.O.U. Check-List, 1931, p. 171), does not breed; the 33 records for it fall into spring (May-June) and autumn (October-December) groups, just as do records for the two races of Green-winged Teal (*Anas crecca*) and the two golden plovers, *Pluvialis apricaria* and *P. dominica*.

The author's treatment of *Acanthis flammea* is exceptional: although regarding all redpolls as one species he nevertheless presents a full writeup on each of the two subspecies found in Greenland—*Acanthis flammea rostrata* (Greenland Redpoll) and *A. f. hornemanni* (Hornemann's Redpoll). He believes that the "life habits . . . in the breeding season" of these two forms (of all redpolls, for that matter) "are identical." Calling them the same species does not, however, seem to satisfy him completely. He is aware of the fact that in certain other parts of the Arctic the range of the stub-billed, white-rumped form does not strictly complement that of the proportionately longer-billed, streaked-rumped form, and that in these areas the two birds "behave like sympatric species, breeding together in the same locality without interbreeding." Having witnessed this sympatric breeding myself at Churchill, Manitoba, I cannot help believing that the two are full species; that their ecology is not precisely the same; and that behavior differences will come to light as careful field observations continue. Salomonsen's treatment

of the gyrfalcons is quite different from that which he accords the redpolls. Although believing that three "phases" of *Falco rusticolus* inhabit the great island, he nevertheless discusses them all in one major writeup. Whether he considers these "phases" to be actual subspecies is not quite clear; he discusses the dark, gray, and white "phases" as, respectively, the *obsoletus*, *holboelli*, and *candicans* types. The dark and gray phases are southern, "being gradually replaced by the white phase to the north. However they do not form an ordinary cline, but what may be called a trimorph ratio cline."

As in Parts 1 and 2, much space is given details of distribution. Particularly is this true of the alcids. The whereabouts of virtually every Razor-bill (*Alca torda*), Little Auk (*Plotus alle*), Puffin (*Fratercula arctica*), and Brünnich's Guillemot (*Uria lomvia*) colony in Greenland is given, together with careful estimates as to the size of many of the colonies. The Black Guillemot (*Cephus grylle*) breeds so widely and often in such small colonies that it receives more general treatment. The Razor-bill, we are told, "always joins colonies of other sea-birds, either auks or gulls." In these mixed colonies there usually is no real competition for nest sites because the several species nest in different sorts of places—the Razor-bill in fissures, the Puffin in burrows in turf, the Little Auk among piles of rocks, the gulls on open ledges, etc.; but "on the coast of small islands, in rough talus of large blocks or in crevices in the firm rock, usually near the water's edge," *Alca*, *Plotus*, *Fratercula*, and *Cephus* all may breed "indiscriminately amongst each other, apparently without competition."

Of interest are the discussions of food habits—the strikingly different ways in which the various alcids bring food in for their young; the Gyrfalcon's virtually exclusive use of lemmings when that mammal is abundant; the Peregrine's (*Falco peregrinus*) method of holding a puffin back-down when feeding, and of leaving the wings (often also the head) untouched and attached to the clean-picked sternum.

It will surprise many readers to learn that young Brünnich's Guillemots, when about three weeks old and still wholly unable to fly, jump "out from the ledge at the call from the parents, which swim in the water below the cliff." Though the ledge may be three hundred feet high, down the young ones go. Usually they strike the water. Some "end the jump on rocks . . . but this does not apparently hurt them."

Regrettably, Salomonsen does not discuss the flightless period adult alcids presumably live through while undergoing their postnuptial molt. Having myself collected flightless Black Guillemots in northern Hudson Bay, I know something about the behavior of that species during this molt. But what of the Little Auk? Does it pass the flightless period in rafts composed of thousands of birds out at sea—or does it, indeed, become flightless at all? Another matter I had hoped to find information on: the behavior of resident birds at high latitudes in the dead of winter. The Black Guillemot, Gyrfalcon, Snowy Owl (*Nyctea scandiaca*), and Raven (*Corvus corax*) are known to winter, at least to some extent, very far north. How do they behave when darkness shuts down? What is their 'daily routine' at this season?

Finally, a word about the color plates. From the standpoint of technique I find them remarkably satisfying. Obviously primitive, they look as if they might have been drawn on the walls of caves. My enthusiasm for them must not be interpreted as professional generosity or mere broadmindedness. Some art critics glory in proclaiming their power to see beauty where the "layman" certainly cannot see it; balance where no weight of any sort seems to exist; "dynamic symmetry" where all one can see is a lot of meaningless shapes. This sort of mumbo-jumbo I abhor. But I do admire any artist with drive and bravery enough to put down unconventional concepts he considers worth recording. Gitz-

Johansen could never have done this long series of drawings without loving Greenland and its birds. With an eye for color and color-contrasts, and with great skill in laying down paint and keeping it fresh, he made these pictures *in Greenland*. As a group, I like them. But comparing them with "average" bird illustrations would be silly. They were not made as charts of birds, *i.e.*, detailed studies on which descriptions could be based. They are not bird portraits in any ordinary sense of the phrase. They are Greenland, seen by a lover of birds through Greenland air.—George Miksch Sutton.

PREDATOR CONTROL IN THE LIGHT OF RECENT WILDLIFE MANAGEMENT CONCEPTS

Control of predators, both avian and mammalian, has long been predicated on the hypothesis that a "good" predator was a dead predator and that each one killed meant the certain survival of additional numbers of the prey species for the everlasting enjoyment of the naturalist or the increased bag of the hunter. This belief dominates the thinking of many—both administrators and ornithologists—and controls the action policy of many state and federal agencies.

Let us examine three specific cases in point:

American mergansers gather in winter on waters providing the best fishing for them, and sometimes these are the best waters for man's fishing as well. Hence, thousands are to be found on the reservoirs of the arid Southwest. Their fish-eating activities on these bodies of water, especially Elephant Butte Reservoir in New Mexico, have caused the state department of conservation to secure federal permits to kill them by the thousands with shot guns fired from motor boats. This legalized slaughter of a species protected elsewhere as game has been justified by brief, unpublished studies of merganser food habits, which leave some doubt as to how conclusive are the data concerning the proportion of game fishes being taken, the ages of these fishes, and the significance of their numbers. With overwhelming evidence accruing on every side showing that most impoundments are teeming with slow-growing, stunted fishes resulting from overcrowding with fish too small to be catchable, the significance of fishes taken by such predators as mergansers, herons, and pelicans is completely changed. Perhaps the productivity of many waters would profit in actual pounds of catchable fish if significant predation on the lower age-classes could be induced. Evidence for this has been shown by George Bennett of the Illinois Natural History Survey (*Trans. 12th. North Amer. Wildl. Conf.*, pp. 276-285). He points out that Reelfoot Lake which has taken from it over 400,000 pounds of fish per year by birds alone also provides an average daily take per fisherman of five pounds, a yield exceeded by few, if any, other lakes in this country.

Perhaps in the future we may learn that to manage for an increase of fish-eating birds by attracting nesting colonies is also the best fish management.

It should further be pointed out that the merganser slaughter on Elephant Butte Reservoir has not accomplished any noticeable reduction in the number of mergansers found there. This means that more birds must be moving in and replacing the thousands killed. It then seems very doubtful that the control is accomplishing the claimed reduction in the numbers of fish eaten. Furthermore, what is the effect on the merganser population of the flyway? Is this lake, teeming with fish, to serve as a permanently baited trap to eliminate mergansers? Or, is this increased harvest more likely to stimulate the reproductive success of the mergansers so that the population may actually increase, or at least keep its present level of numbers?

This suggestion is not just a far-fetched possibility for it has been shown that among many populations of vertebrates the rate of increase following a breeding season is greatest when the species is in a low and that this rate of increase falls off in years when the species is in a high, or has an abundant spring breeding population. For a thorough review of the evidence concerning this concept of *inversivity* see Errington (*Quart. Rev. Biol.*, 21:144-177, 221-245).

If some of the mergansers slaughtered could be put to some biological use, perhaps we would know the minimum age of breeding in this species, the percentage of juveniles in the population, and be able to compute their reproductive rates and, therefore, be in a better position to judge the effects of control measures. Techniques for these investigations have been worked out by game researchers and stand ready to be applied. We only wish to point out here that the supposed functions and the actual results of merganser control are unknown. Must we go on condoning action programs with such a dubious basis?

Another possible example of the functioning of *inversivity* induced by man's control measures is the tremendous and persistent upsurge in coyotes as witnessed by their spread into hundreds of miles of new range. Not only has the taxpayer's money, wasted by this policy, proven ineffectual over the last 150 years in the United States, but also one wonders whether the upsurge in coyote populations may not have been induced in part by the harvest! We do not wish to imply that the causal relationships are either clear or simple for it is apparent that the same control efforts have almost completely eliminated the coyote's cousin, the timber wolf, as well as driven the mountain lion from much of its former range.

But now the specter of airplane-distributed new poisons, such as "1080," looms on the horizon for all predators and this latest blasphemy against nature provides the means for wiping out the coyote on the Great Plains. Are we again to see plagues of jackrabbits overrunning our cattle ranges as they did in the 1920's? Already early reports of jack-rabbit increases in the Dakotas and elsewhere suggest that the shift is on the way. We may face a rabbit-controlled landscape such as England has experienced as a result of extreme predator control on her East Anglian heaths. Are we again to trade one problem species for another, and in the name of a "conservation action program"?

Recent studies by Lyle Sowls, at the Delta Waterfowl Research Station in Manitoba, have demonstrated the significance of re-nesting, primarily second nesting attempts made by ducks. Prior to this, Cartright (*Trans. 9th North Amer. Wildl. Conf.*, pp. 324-330) clearly explained how important predation on early nests was to actual species survival in upland game birds. He reasoned that if such single-brooded species nested unmolested by predators, a synchronized early nesting would result; this would make the production of the entire year vulnerable to complete destruction by severe late spring weather such as sleet, hail or flooding. In short, the best insurance against such a catastrophe is a prolonged and staggered nesting season *forced by destruction of a goodly proportion of first nests by predators*. Cartright has recently cited similar evidence from waterfowl populations (*Trans. 17th North Amer. Wildl. Conf.*). In the light of this new concept, the wisdom of mass bombings of crows in winter roosts is seriously challenged as a means for bettering duck nesting. Several state game departments in the Middle West have long pointed with pride to their organized slaughter of crows accomplished by night bombing in winter roosts and by shooting contests. But how many states can demonstrate that the crows they kill come from duck-nesting regions or otherwise are detrimental? Again we are having action programs of destruction thrust upon us by state agencies. It is time to

test the need for these actions since the predators eliminated may actually insure a higher average productivity in ducks or upland game.

In some outstanding waterfowl areas we have visited, crows are now comparatively scarce but skunks seem to have reached an all time high. Instead of being continuously classified and treated as vermin perhaps we may learn that this four-footed nest robber has only replaced in function his avian counterpart, the crow, in ensuring a staggered nesting season. In this way a crop of young ducks is never completely vulnerable to destruction by spring climatic catastrophies, such as the hail storms Alberta suffered in 1947 or the floods so destructive to duck nesting in Manitoba the same year.

Now that we have been provided with the concept of inversivity as a widely operating population phenomenon, as well as some new angles of the predation equation, it becomes increasingly clear that the old dichotomy of "harmful" and "beneficial" is a meaningless and fallacious classification of living things. This division of all plant and animal species into two exclusive categories supposedly having an economic basis is deeply rooted in many fields of biology. That it is still used by authors of student texts, in botany, in entomology, in Farmers' Bulletins, etc., seems most deplorable. Unless we insist upon the forcible excision of this relic of past thinking from all our biological books, we will continue to raise generations which classify living things only on an economic standard.

This may be disastrous. At the rate our human population is expanding in the United States and the resulting increased rate of demand for room for public developments (now taking one-fifth of all our acreage) naturalists will be in no position to justify the preservation of any species or any area on an economic basis alone. If we are to have and to enjoy birds and to harvest wildlife on a permanent basis, we must provide the next generation with criteria other than monetary for judging the recreational, educational and esthetic value of landscape and wildlife.—WILLIAM H. ELDER AND CHARLES M. KIRKPATRICK.

SECOND COOPERATIVE STUDY OF NOCTURNAL BIRD MIGRATION

Studies of the nocturnal migration of birds, using small telescopes directed at the moon, are being continued this fall on a greatly expanded basis. Interested persons who have access to a small telescope are urged to write at once to Robert J. Newman at the Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana. Details regarding project and procedure will be promptly supplied.—George H. Lowery, Jr.

This number of *The Wilson Bulletin* was published on June 16, 1952.

EDITOR OF THE WILSON BULLETIN

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SUGGESTIONS TO AUTHORS

Manuscripts intended for publication in *The Wilson Bulletin* should be neatly typewritten, double-spaced, and on one side only of good quality white paper. Tables should be typed on separate sheets. Before preparing these, carefully consider whether the material is best presented in tabular form. Where the value of quantitative data can be enhanced by use of appropriate statistical methods, these should be used. Follow the A. O. U. Check-List (fourth edition) and supplements thereto insofar as scientific names of United States and Canadian birds are concerned unless a satisfactory explanation is offered for doing otherwise. Use species names (binomials) unless specimens have actually been handled and subspecifically identified. Summaries of major papers should be brief but quotable. Where fewer than five papers are cited, the citations may be included in the text. All citations in "General Notes" should be included in the text. Follow carefully the style used in this issue in listing the literature cited. Photographs for illustrations should be sharp, have good contrast, and be on glossy paper. Submit prints unmounted and attach to each a brief but adequate legend. Do not write heavily on the backs of photographs. Diagrams and line drawings should be in black ink and their lettering large enough to permit reduction. The Illustrations Committee will prepare drawings, following authors' directions, at a charge of \$1 an hour, the money to go into the color-plate fund. Authors are requested to return proof promptly. Extensive alterations in copy after the type has been set must be charged to the author.

A WORD TO MEMBERS

The Wilson Bulletin is not as large as we want it to be. It will become larger as funds for publication increase. The Club loses money, and the size of the *Bulletin* is cut down accordingly, each time a member fails to pay dues and is put on the 'suspended list.' Postage is used in notifying the publisher of this suspension. More postage is used in notifying the member and urging him to pay his dues. When he does finally pay he must be reinstated on the mailing list and there is a publisher's charge for this service. The *Bulletin* will become larger if members will make a point of paying their dues promptly.

NOTICE OF CHANGE OF ADDRESS

If your address changes, notify the Club immediately. Send your complete new address to the Treasurer, Leonard C. Brecher, 1900 Spring Drive, Louisville 5, Kentucky. He in turn will notify the publisher and editor.

Members are reminded of the Club's urgent need of spare issues of Numbers 1, 2, and 3 of the 1951 volume of the *Bulletin*. For further details, see Editorial section of this issue.

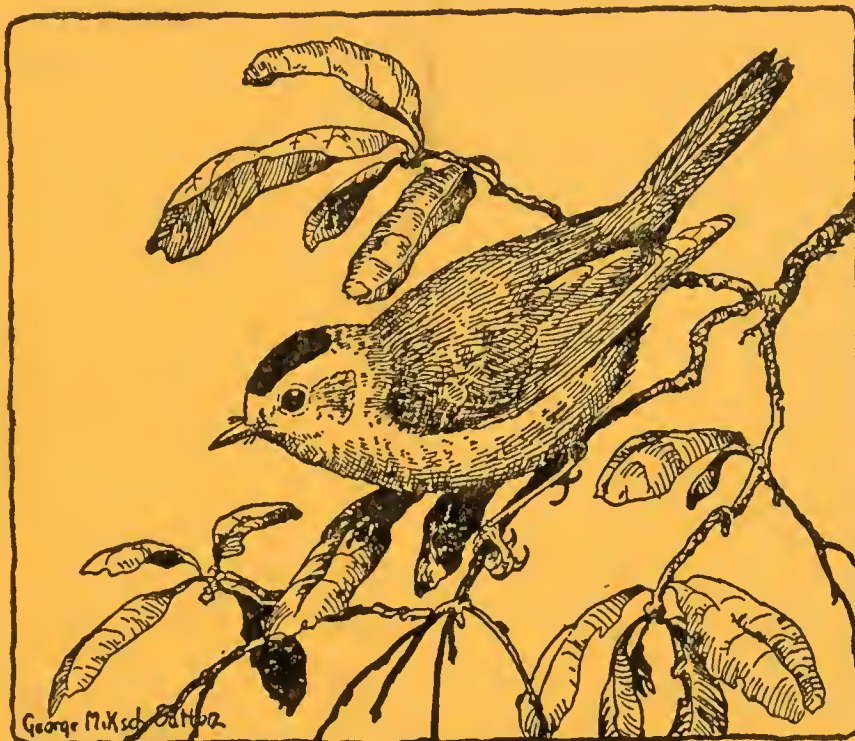
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Founded December 3, 1888

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WILSON ORNITHOLOGICAL CLUB LIBRARY

The Wilson Ornithological Club Library, housed in the University of Michigan Museum of Zoology, was established in concurrence with the University of Michigan in 1930. Until 1947 the Library was maintained entirely by gifts and bequests of books, pamphlets, reprints, and ornithological magazines from members and friends of The Wilson Ornithological Club. Now two members have generously established a fund for the purchase of new books; members and friends are invited to maintain the fund by regular contributions, thus making available to all Club members the more important new books on ornithology and related subjects. The fund will be administered by the Library Committee, which will be glad for suggestions from members on the choice of new books to be added to the Library. George J. Wallace, Michigan State College, East Lansing, Michigan, is Chairman of the Committee. The Library currently receives 65 periodicals as gifts and in exchange for *The Wilson Bulletin*. With the usual exception of rare books, any item in the Library may be borrowed by members of the Club and will be sent prepaid (by the University of Michigan) to any address in the United States, its possessions, or Canada. Return postage is paid by the borrower. Inquiries and requests by borrowers, as well as gifts of books, pamphlets, reprints, and magazines, should be addressed to "The Wilson Ornithological Club Library, University of Michigan Museum of Zoology, Ann Arbor, Michigan." Contributions to the New Book Fund should be sent to the Treasurer, Leonard C. Brecher, 1900 Spring Dr., Louisville 5, Ky. (small sums in stamps are acceptable). A preliminary index of the Library's holdings was printed in the September 1943 issue of *The Wilson Bulletin*, and each September number lists the book titles in the accessions of the current year. A brief report on recent gifts to the Library is published in every issue of the *Bulletin*.

THE WILSON BULLETIN

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All articles and communications for publication, books and publications for review should be addressed to the Editor. Exchanges should be addressed to The Wilson Ornithological Club Library, Museum of Zoology, Ann Arbor, Michigan.

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THE PRESIDENT'S PAGE

W.O.C. members who have never attended an annual meeting of their organization are missing the enjoyable experience of mixing socially with other members and of listening to papers and the discussions following the papers. These members realize the existence of the organization almost exclusively through *The Wilson Bulletin*. They peruse the papers that appear in each *Bulletin* and perhaps wonder who the people are who carry on such studies and under what circumstances they work—probably college professors or enthusiastic college students with full time to devote to their work and with excellent, expensive equipment at their elbows to aid in the work. This is by no means always the case. Consider, for example, the indefatigable Lawrence H. Walkinshaw, a practicing dentist in Battle Creek, Michigan. He has his dental practice, a wife and family, and yet he finds time to do exhaustive work on several species, including Chipping Sparrows (1944. *Wils. Bull.*, 56:193–205), Prothonotary Warblers (1941. *Wils. Bull.*, 53:3–21), and Sandhill Cranes (1949. *Cranbrook Inst. Sci., Bull. No. 29*, x + 202 pp.), not to mention a large number of other shorter articles. Although few of us are endowed with the time, initiative, and energy to accomplish so much in our spare time, no doubt many readers of the *Bulletin* have pet problems they would like to pursue further, and would, with some encouragement and perhaps some financial aid. Even the simplest problems usually require, for special field equipment or travel, funds which are not always available, especially to younger workers. In this connection, two research grants are available this year through the W.O.C.

The first, the Louis Agassiz Fuertes Research Grant of \$100 annually, coming from an anonymous friend of ornithology, has as its basic requirement that work to receive aid must deal with some phase of ornithology. One need not be connected with an educational institution nor have extensive formal education to be eligible. This is the one of the two grants which presents possibilities for helping W.O.C. members in their local bird research problems.

The Pell Fund makes \$25 annually available to assist promising young bird artists to develop their art. This fund was given in honor of the late S. Morris Pell.

These grants are awarded through our W.O.C. Research Committee. Dr. John Emlen (Department of Zoology, University of Wisconsin, Madison 6, Wisconsin) has accepted the chairmanship of this committee for another year, and applications or requests for further information may be sent to Dr. Emlen.

For amateurs and students in small institutions, may I also suggest the research funds from the American Association for the Advancement of Science, which are distributed to recipients through the state academies of science. Funds to state academies are allotted according to the number of members of the particular academy who are also members of the A.A.A.S. In Minnesota, for instance, during 1951 this fund amounted to \$112. Applications for such aid should be sent directly to your state academy of science.

For those interested in knowing what types of work are being carried on and which might be appropriate studies for which to apply for research aid, I suggest reviewing the listing entitled "Graduate Research in Ornithology" by Bagg and Swanson (*Wils. Bull.*, 1951, 63:62–64; 1952, 64:60–63) as well as the note on lists of research in progress at 16 Cooperative Wildlife Research Unit schools (1951. *Wils. Bull.*, 63:212).

Undoubtedly the great majority of W.O.C. members are simply interested in birding as an enjoyable hobby and have no publication ambitions. However, here and there is the capable person with initiative who can make outstanding contributions to ornithology. Such persons, we hope, can be located and given aid in case the financial barrier is proving an effective block to their accomplishments.

W. J. BRECKENRIDGE.



GREEN KINGFISHER
(*Chloroceryle americana*)

From a drawing in watercolor made in Mexico by George Miksch Sutton.
Third in the Hilton memorial series of color plates.

THE GREEN KINGFISHER

BY DWAIN W. WARNER

THE Green Kingfisher (*Chloroceryle americana*) inhabits watercourses and shores from southern Texas and Arizona to the northern tributaries of Hudson's La Plata, from the brackish water of mangrove-fringed lagoons to mountain streams 7000 feet above the sea. The two extremes of habitat are the exception, however; it prefers smaller rivers and streams and quiet pools of lowlands.

Water it must have, and in the water must be small fish upon which it feeds; but the land surrounding these waters may reflect, in various parts of this kingfisher's range, a wide range of climatic conditions. In the semi-arid coastal plain scrub of Tamaulipas I have found it in August along nearly dry arroyos where the only water was in depressions whose sides lay baked hard and cracked deeply under a torrid sun and whose contracting shore line was muddied by constant visitors of many kinds, especially flocks of White-winged Doves (*Zenaida asiatica*). Three weeks earlier I had found this little kingfisher perched in flooded scrub forest near Alta Mira over water four to ten feet deep and turbid with floating debris. In contrast I recall seeing it in January of 1944, along backwaters at the edge of tropical rainforest in Panamá. Again, in Puebla, México, in December of 1951, one individual was found at a still, dark pool in tropical evergreen forest at the brink of a hundred foot precipice overlooking the Río Cazones flowing nearly a thousand feet below.

At all of these places these little kingfishers perched quietly and for long periods, or changed positions on the perch, or flew rapidly in a direct manner to another perch. When startled, they occasionally gave a rattling twitter, sharper than that of the Belted Kingfisher (*Megaceryle alcyon*). I noted little other activity during the non-breeding season. In spring it becomes less solitary, calling increases, and with the approach of the mating period fighting for territories becomes a common sight where the birds are fairly numerous.

What the limitations to its distribution within its geographic range are is not known, but surely food must be one of the most important, and nest sites and competition with other birds possibly are limiting factors also. Its small size precludes its taking anything but small fish and perhaps other small aquatic animals. The prey, taken by short drops to the water, must be near the surface. The body weight (41.0, 42.8 grams; December males) prohibits a deep plunge from a low perch. Mr. Rczneat Darnell, who is completing a study on the fishes of the Río Sabinas in southwestern Tamaulipas, has in-

formed me that several species of *Gambusia* are the only small fish living near the surface of the river and its arroyos, and that they are probably the principal food of the Green Kingfisher there.

In winter I have not found more than a single bird at one place. By early December the families have apparently dispersed. A. C. Bent (1940. *U. S. Natl. Mus. Bull.* 176) reported that the Belted Kingfisher has been seen driving the Green Kingfisher from feeding grounds. But in Veracruz Robert Mengel and I found this small species inhabiting during July a part of the Río Jamapa where the Ringed (*Megaceryle torquata*) and the Amazon Kingfishers (*Chloroceryle amazona*) also occurred.

When considering other bird associates of the Green Kingfisher one cannot restrict the list to water birds alone. At the dark pool on the brink of the Mesa de San Diego in Puebla there were no other water birds, but forest species were common. The little kingfisher living there at the time paid no attention to the sound and activity about, but sat immobile for long periods, staring downward, where its own reflection was mirrored perfectly in the still waters.

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EXTRA-PARENTAL COOPERATION IN THE NESTING OF CHIMNEY SWIFTS

BY RALPH W. DEXTER

OVER a period of years, the interrelationships of individuals in a nesting colony of Chimney Swifts (*Chaetura pelagica*) are closely knit. In an effort to understand these relationships, I have carried on banding and life history studies of the breeding colony of this species inhabiting the campus of Kent State University in northeastern Ohio since 1944. The general methods, objectives, and some of the results of this study have already been published (Dexter, 1950a, 1950b, 1951, 1952).

The present paper is concerned with observations on nesting procedure in which one or two additional birds joined the parents for the nesting season. These visitors live in harmony with the family throughout the nesting period and share in the responsibilities of nesting. A few instances of such behavior have been mentioned previously in connection with life history studies of certain individuals (Dexter, 1951, 1952). The only other known references to such observations are two brief reports. Day (1899) wrote that (after hatching occurred in a nest she had under observation), "From this time forth a third Swift was seen to enter into the care of the nestlings, taking its turn at brooding and feeding." Sherman (1924:87) described the relationship, "Gentle and devoted to one another, they show similar amiability and courtesy to the adult stranger that comes into their home to share the work of feeding and brooding their young." She called the visiting bird a "nurse maid." Extra-parental cooperation in three other species of birds has been described by Skutch (1935).

In the preparation of this report, the assistance and encouragement of Mrs. Margaret M. Nice has been valuable.

During eight years of observations, I studied 22 threesomes and six foursomes. Ordinarily, only one pair of swifts occupies any one of the 88 air shafts available to the birds of this colony. Each year there has been an average of 13 pairs, the majority of them (91 per cent, on the average) having returned from past years' residence. There has been an average of three threesomes and one foursome each year. Altogether a total of 40 swifts (38 per cent of the breeding birds) have been involved in a threesome arrangement. Of these, two were involved five times, two others four times, five three times, and three involved twice. Eighteen swifts have lived in a foursome, one of them three times and four of them twice. Nine birds have been at one time or another in both a threesome and a foursome. Seven of these nine have been in multiple cases of one or the other. Not only is there

TABLE 1
EXTRA-PARENTAL COMBINATIONS OF NESTING CHIMNEY SWIFTS

	1944	1945	1946	1947	1948	1949	1950	1951	
No. of pairs in colony	13	11	11	17	14	14	13	12	
No. of threesomes	2	2	2	1	3	4	5	3	
No. of foursomes	0	1	1	2	1	1	0	0	
Sex of threesomes and foursomes	♀ ♂? ♀ ♀ ♂	♀ ♀ ♂ ♀ ♀ ♂ ♀ ♂ ♂ ♂	♀ ♂ ♂ ♀ ♀ ♂ ♀ ♂ ♂?	♀ ♂? ♀ ♂ ♂ ♂ ♀ ♂ ♂?	♀ ♂ ♂ ♀ ♂ ♂ ♀ ♂ ♂ ♀ ♂ ♂ ♂	♀ ♂ ♂ ♀ ♂ ♂ ♀ ♂ ♂ ♀ ♂ ♂ ♀ ♂ ♂?	♀ ♂ ♂ ♀ ♂ ♂ ♀ ♂? ♀ ♀ ♂ ♀ ♂ ♂	♀ ♂ ♂ ♀ ♂? ♀ ♂?	
Shafts of threesomes	D1; D4	D1; D4	D1; D4	N9	A1; Q2 S1	D1; P3 Q2; S1	D1; E1 G4; M7 Q2	E1; S1 V1	
Shafts of foursomes		H1	H1	Q1; Q2	P3	E1			

a tendency on the part of certain individuals to participate in such a social organization, but they repeatedly choose the same air shafts for their co-operative nesting. One shaft has been thus occupied five times and another one four times. Three have been used three times and two twice. A total of thirteen shafts have been used. Males seem to be more inclined than females to take part in such behavior although both sexes participate. Since sex identification depends upon the dissection of dead birds and the indirect evidence of mating combinations, the sex of all individuals in the colony has not yet been determined. Fortunately, the sex of several key birds has been obtained through dissection, and one female was discovered which laid an egg after being abandoned by her mate (Dexter, 1950b). Knowing these facts, I could ascertain the sex of many individuals; 12 threesomes contained an extra male and five had an extra female. Five cases remain unsettled. Three of the foursomes had two extra males while the other contained one extra male and one of unknown sex. The data are summarized in Table 1.

I thought at first that the extra birds residing with the mated pairs were either immature or too old for breeding. There is evidence, however, that Chimney Swifts can breed in their first year, and some of the multiple combinations remain intact for two consecutive years. Also, I have known combinations to dissolve after a year or two and all individuals take part in active breeding with one mate. Some, but not all, combinations are the result of the attachment of a yearling or an old bird in its last year of life to a mated pair.

Generally during the early stages of the nesting season mated birds of a pair roost for the night side by side on the wall of the air shaft; the extra bird roosts a few inches away or on an adjacent wall, but usually at the same level. After the nest has been completed, one bird may roost on the nest and two just below it, or two on the nest and one either below or beside it. Occasionally all three will roost side by side below the nest, especially just before the clutch of eggs is completed during which time the eggs are seldom incubated. After the nesting season is over and the juveniles have left, a threesome or foursome will sometimes remain roosting together nightly in the same shaft. At times all three or four will roost side by side. The mated pairs do not remain together any longer or in greater frequency than the multiple groups once the juveniles have left the home shaft. The combinations of three and four birds for nesting seem to be an agreeable arrangement, and all apparently assist with incubation of the eggs and care of the young. The histories of certain combinations follow. Observations were made with a flashlight at night and a mirror during the daytime. The birds were trapped for banding in the standard traps used for Chimney Swifts.

In 1944, a female (42-196912) nested with two birds of undetermined sex in shaft D1. The following year the female returned to the same place, but in the absence of the other two she nested with a young male (42-196934) which I had banded as a fledgling the previous year. They were joined by a female (42-196915) which had nested the previous year in shaft J1. In 1946, nos. 12 and 34 returned again to nest in D1 where they were joined by a male (42-184486). The latter was probably the functional male since no. 34 left the group before nesting was completed.

Late in September, 1946, when many of the swifts had already left the campus, no. 12 was recaptured from D1. She was roosting at that time, not with her mate of that year, but with the female visitor of the previous year (no. 15). No. 15 did not nest on the campus in 1946, and the mate of no. 12 that year was roosting alone in shaft D3 nearby. Nos. 12 and 86 nested together in D1 in 1947 and 1948. They had no regular visitor although in 1948 a yearling from the brood of 1947 (possibly an offspring of this pair) visited them briefly at the time nest-building began. In the spring of 1949, nos. 12 and 86 continued to nest in D1, but were joined by an all-season visiting male (42-188589). The following year all three returned to D1 and nested together again. Soon no. 12, the female, disappeared, and no. 89 deserted the other male and the four eggs on the nest, moved to shaft A1, and mated with the female there. After one week, the unattended eggs were destroyed. The remaining male, no. 86, then brought in a new mate (48-164508) who within a week laid a second clutch of eggs in the original nest. In 1951, this pair remained mated in D1 without visitors until after nesting was completed.

After having left the pair in D1 in 1946, no. 34 returned the next year to mate with no. 42-196934 in shaft S1. In 1948 these two returned there to nest again and were joined by a male (42-188552) for the season. The following year this latter male mated with a female in R1. Although nos. 34 and 84 were left to nest in S1 by themselves, he visited them briefly both before and after an unsuccessful attempt at nest building in R1.

When no. 89 parted from the other two birds inhabiting D1 in 1950, he completed nesting in shaft A1 with the female which had nested in that same place for the three preceding years. He returned the following year to shaft S1 where another threesome developed. This time he was mated with a female (42-196959) whose mate of the previous year (no. 52) did not return. The new pair was visited regularly by one swift and occasionally by several others throughout the nesting season.

After mating together in shaft H1 during the season of 1944, the female (42-196927) and the male (42-196928) returned to the same shaft the following year, but this time they were joined by two males (42-196941; 42-184425) that resided with them. No. 41 (captured as a juvenile the preceding year)

is a possible offspring of nos. 27 and 28. In 1946 the original pair and this male (no. 41) returned together for another nesting season, while the second visitor (no. 25) moved into shaft G4 to nest with a female whose mate of the past two years did not return. No. 25 was replaced by another swift; thus, for the second consecutive year four birds nested together in shaft H1. In later years no. 41 nested with a single mate in G4 for three seasons. In the fourth and last year (1950) of the nesting of no. 41 and his mate in G4, another swift spent the season with them. The functional female that year was no. 42-196907; this female had been in another threesome in 1944, 1945, and 1946.

In 1947 no. 27 nested with three males (42-196995; 42-188523; —24) in shaft Q1. This group scattered the following year, but three of them continued to live in other groups of three and four birds. No. 27 joined two males in Q2; nos. 95 and 23 joined the pair which had nested during the preceding year in P3 and which continued to nest there in 1948. The female of that pair (42-196910) returned in 1949 with males 95 and 23, her former mate having disappeared, and they continued as a threesome. In 1950, however, no. 23 soon left the other two and made an unsuccessful attempt to nest in R2. The other two remained as mates in P3 for that year and had no visitor.

Female no. 42-196909 nested in shaft E1 for six consecutive years (1944–49). During that time her mate was no. 42-196921 each year except 1945, and each year she nested with a single bird until 1949. In 1949, two other swifts, one of them a male (42-188588), joined the pair in E1 for the season when their nest was about three-fourths completed. In 1950, male no. 21 returned to the same shaft but with a new mate (42-188595), a visitor in E1 at the end of the previous nesting season. In addition to the new female mate, male no. 88 returned as a regular visitor again. Soon after nesting was underway, no. 88 left the group to replace a male (42-188655) which had died in shaft G3. No. 88 then mated with the female there; together they constructed a nest ten days following the new union (see Dexter, 1951). In 1951, no. 21 and his new mate again nested in E1 with an occasional male visitor, but this time with a different male—no. 48-164570. This visitor did not stay consistently in E1, and once I found soot in the band, indicating that some nights he had roosted in a chimney. This bird was removed for experimental purposes before the end of the season and died, apparently from fright, in a respirometer.

In addition to the observations of threesome and foursome combinations described and tabulated here, there were a number of instances discovered in which a visitor joined a pair for a brief time but soon left to nest with a

mate of its own or to roost elsewhere. Some of these visitors apparently left the campus colony.

There were seven cases discovered where an extra swift roosted with a pair over varying lengths of time before nesting began. For example, the same pair residing in E1 was visited by an individual for one evening two weeks before nest construction began in 1946. This bird was not found again until the fall migration of 1947, when it again roosted in E1 with five other swifts, including the breeding male of E1. I never again saw the visitor in question.

The pair which nested in shaft M7 in 1946 had a different visitor roost with them on two occasions during the month preceding nest construction. These two visitors, one a female (42-196902) and one a male (42-196954), later mated with each other in shaft N9. The male had previously nested in that shaft for two years and continued to do so for another three years, but only in 1946 was he mated with no. 02. In 1947, he and his new mate had an all-season visitor. In 1948, this pair nested by themselves.

A pair which nested in A1 (42-196987; 42-188656) for three years had two visitors in 1948. One on May 20, just three days before the nest foundation was built, was a male (42-188540) which failed to mate that season but returned to nest in following years and formed a threesome in 1950 in shaft M7, as mentioned earlier. The other visitor, also a male (42-188546), joined the pair during egg-laying and remained for the balance of the season. The next year, 1949, this male nested in shaft A5, not far from the pair it resided with in 1948. Just before nos. 87 and 56 nested in A1 in 1949, they had for a brief time a male visitor (42-188655) which had nested in the colony for two years and which soon left to nest again with its own mate.

There is a possibility that some of the early visitors mentioned above might have remained with the mated birds throughout the season if they had not been disturbed by trapping and handling. Mated birds are fairly tolerant of trapping, but unmated individuals sometimes leave if they are disturbed too much. Further, on some occasions when a bird left a threesome or foursome group, it did so to obtain a mate and establish its own nest. It would appear that some visitors are simply waiting for an opportunity to secure a mate of their own. Mrs. Margaret Nice has suggested to me that multiple nesting in this colony may be the result of a shortage of females; my data do not permit a conclusive answer to this possibility.

SUMMARY

1. During eight years of observations on the nesting behavior of Chimney Swifts living in a colony on the campus of Kent State University, I found 22

cases where three birds nested together and six cases where four birds nested together.

2. Certain individuals were often involved in, and seemed to prefer, three-some and foursome combinations. Of 40 individuals which participated in threesomes, 12 were involved more than once. Of 18 participating in foursomes, five were involved more than once. Nine birds have been part of both a threesome and a foursome at one time or another.

3. Thirteen air shafts have been used by these combinations; eight of them have been used more than once.

4. Males seem to be involved more often than females in extra-parental coöperation. Twelve threesomes had an extra male, five had an extra female, and five remain with sex undetermined. Three foursomes had two extra males and three others had one extra male and one of unknown sex.

5. Some of the visitors are known to be birds in their first year and some are old birds in, apparently, their last year, but many are intermediate in age and engage in active reproduction in later years.

6. The parents and visitors often remain as a unit throughout the nesting season and share the work of incubation, brooding, and feeding of the nestlings.

7. Seven cases of brief visits by an additional bird just before nesting began were discovered. Some of these might have developed into continuing threesomes if they had not been disturbed by trapping, but in other cases the birds left after finding mates of their own. Probably some visitors are just waiting for an opportunity to obtain a mate.

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1950a Banding Chimney Swifts. *Audubon Mag.*, 52(3):158-161.

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KENT STATE UNIVERSITY, KENT, OHIO, FEBRUARY 14, 1952

A CHECK-LIST AND BIBLIOGRAPHY OF HYBRID BIRDS IN NORTH AMERICA NORTH OF MEXICO

BY E. LENDELL COCKRUM

ERNST MAYR (1942:257-270) has discussed in detail some of the philosophical implications of hybridism. He points out, for example, that: "In birds, we have a fair amount of information, since some collectors, sensing their scarcity value, have specialized in the collecting of hybrids, and amateur observers have always been fascinated by them. We can state, on the basis of the data collected by these naturalists, that sympatric hybrids are found primarily in genera in which copulation is not preceded by pair formation and an 'engagement period' [p. 261] . . . Hybrids occur much more rarely among pair-forming species of birds. In such cases the male and female have committed not only an original 'mistake,' but have apparently not 'corrected' it afterwards by abandoning the brood [p. 262]."

In spite of the increased interest in hybridism in birds in recent years, no attempt has been made to compile the many scattered references and reports of hybrids into a single paper since the early compilation by Suchetet (1897). In that classic Suchetet attempted to list all known cases of hybrids in birds. Unfortunately his work is not readily available to most ornithologists in this country.

My attempt to compile known cases of hybrids in birds has been made with three important restrictions: First, I have listed only those cases in which the hybrids presumably resulted from crosses in nature. If hybrids resulting from birds in captivity were listed, the list would be much larger, especially among the ducks and geese (see Ball, 1934:2-4; Sibley, 1938:327-335; Kortright, 1942:43-44; and Delacour and Mayr, 1945:3-55). Second, I have listed only those cases reported from North America north of Mexico. Third, where alternate explanations (intergradation, dimorphism, etc.) have been proposed to account for supposed hybrids, I have made no attempt to evaluate the evidence but, rather, merely report such alternative explanations. Some authors (such as Kortright, 1942:43-44) have discussed hybridism only in a general way and where no specific cases are presented, I have not entered the reference in the check-list.

I wish to emphasize that this check-list and bibliography is certainly incomplete and should be regarded only as a starting point in any bibliographic search. The following sources, among others, yielded clues to the location of the various papers listed in the bibliography: "A Bibliography of Birds" (Strong, 1939-1946); *Zoological Record*; *Biological Abstracts*; and subject indices of *The Auk*, *The Condor*, and for volumes 13-35 and 50-62 inclusive,

of *The Wilson Bulletin*. I have examined the originals of all the papers listed in the bibliography except those preceded by an asterisk (*).

I acknowledge with thanks the critical aid and suggestions given by Harrison B. Tordoff, of the University of Kansas Museum of Natural History.

CHECK-LIST

Family Ardeidae. Herons and Bitterns.

Ardea occidentalis occidentalis Audubon \times *Ardea herodias wardi* Ridgway.
Great White Heron \times Ward's Heron.

Ardea wurdemanni Baird, 1858:669.

Ardea wuerdemanni, Allen, 1888:195.

Ardea occidentalis \times *Ardea herodias wardi* = *Ardea wurdemanni*, Holt, 1928:1-35;
Peters, 1940:105.

Family Anatidae. Swans, Geese, and Ducks.

Branta bernicla nigricans (Lawrence) \times *Branta canadensis hutchinsi* (Richardson). Black Brant \times Hutchins Goose.

Branta nigricans \times *Branta canadensis hutchinsi*, Ransom, 1927:170.

Branta bernicla hrota (Muller) \times *Chen hyperborea* (Pallas). American Brant \times Snow Goose.

Brant \times Snow Goose, Brimley, 1927:427.

Anser albifrons gambelli (Hartlaub) \times *Branta canadensis* (Linnaeus). Tule Goose \times Canada Goose.

Anser albifrons gameli \times *Branta canadensis*, Suchetet, 1897:738.

White-fronted Goose \times Canada Goose, Baird, 1873:5.

Chen caerulescens (Linnaeus) \times *Chen hyperborea hyperborea* (Pallas). Blue Goose \times Snow Goose.

Chen caerulescens \times *Chen hyperborea hyperborea*, Harrold, 1928:290; Sutton, 1931:335-364; Emery, 1945:636; Sibley, 1949:274.

Conspecific—merely examples of dichromatism, Manning, 1942:168-174.

Anas platyrhynchos Linnaeus \times *Anas rubripes* Brewster. Mallard \times Black Duck.

Anas boschas \times *Anas obscura*, Dutcher, 1889:133; Suchetet, 1897:137, 682; Bigelow, 1907:382-384.

Mallard \times Black Duck, Poole, 1929:535.

Mallard \times Northern Black Duck, Eaton, 1903:64.

Anas platyrhynchos \times *Anas rubripes*, Ridgway, 1909:441; Ball, 1934:23.

Anas platyrhynchos Linnaeus \times *Anas strepera* Linnaeus. Mallard \times Gadwall.

Anas breweri Audubon, 1840 (iv):252.

Anas boschas \times *Anas strepera* = *Anas breweri*, Elliot, 1892:162.

Anas platyrhynchos Linnaeus × *Anas acuta tzitzihoa* Vieillot. Mallard × Pintail.

Anas boschas × *Dafila acuta*, Coues, 1874:54; Elliot, 1892:161; Suchetet, 1897:639; Beyer, 1900:170; Fegler, 1903:303; Bigelow, 1907:383.

Mallard × Pintail, Cross, 1890:162.

Anas boschas × *Anas acuta*, Suchetet, 1896:117.

Anas platyrhynchos × *Anas acuta*, Ball, 1934:3.

Anas platyrhynchos platyrhynchos × *Dafila acuta tzitzihoa*, Gunther, 1941:570.

Anas platyrhynchos Linnaeus × *Anas cyanoptera* Vieillot. Mallard × Cinnamon Teal.

Mallard × Cinnamon Teal. Maillard, 1902:46.

Anas platyrhynchos Linnaeus × *Anas carolinensis* Gmelin. Mallard × Green-winged Teal.

Anas boschas × *Nettion carolinensis*, Stone, 1903:209.

Anas platyrhynchos Linnaeus × *Aythya valisineria* (Wilson). Mallard × Canvas-backed Duck.

Anas boschas × *Fuligula vallisneria*, Baird, 1847:209.

Anas platyrhynchos Linnaeus × *Mareca americana* (Gmelin). Mallard × Baldpate.

Anas boschas × *Anas americana*, Elliot, 1892:165; Suchetet, 1896:690.

Anas boschas × *Mareca americana*, Bigelow, 1907:386.

Anas platyrhynchos × *Mareca americana*, Ball, 1934:3.

Anas strepera Linnaeus × *Mareca americana* (Gmelin). Gadwall × Baldpate.

Anas strepera × *Anas americana*, Suchetet, 1897:709.

Mareca penelope (Linnaeus) × *Mareca americana* (Gmelin). European Widgeon × Baldpate.

Mareca penelope × *Mareca americana*, Bailey, 1919:25.

Anas discors Linnaeus × *Anas cyanoptera* Vieillot. Blue-winged Teal × Cinnamon Teal.

Anas discors × *Anas cyanoptera*, Suchetet, 1897:708.

Spatula clypeata (Linnaeus) × *Anas cyanoptera* Vieillot or *Anas discors* Linnaeus. Shoveller × Cinnamon or Blue-winged Teal.

Spatula clypeata × *Querquedula cyanoptera* or *Q. discors*, Swarth, 1915:115.

Spatula clypeata × *Anas discors*, Suchetet, 1897:708.

Shoveller × Blue-winged Teal, Deane, 1905:321.

Aix sponsa (Linnaeus) × *Aythya americana* (Eyton). Wood Duck × Redhead.

Aix sponsa × *Fuligula ferina*, Suchetet, 1897:728.

Aythya americana (Eyton) × *Anas acuta tzitzihoa* Vieillot. Redhead × Pintail.

Redhead × Pintail, Boardman, 1876:276.

Fuligula ferina × *Dajila acuta*, Suchetet, 1897:728.

Aythya collaris (Donovan) × *Aythya americana* (Eyton). Ring-necked Duck × Redhead.

Fuligula affinis × *Fuligula Valismeria* (or *F. americana*), Elliot, 1859:437.

Fuligula collaris × *Fuligula americana*, Newton, 1880:336; Suchetet, 1897:724.

Fuligula affinis (or *F. collaris*) × *Fuligula Valismeria* (or *F. americana*), Suchetet, 1897:161.

Bucephala clangula americana (Bonaparte) × *Lophodytes cucullatus* (Linnaeus). American Golden-eye × Hooded Merganser.

Clangula americana × *Mergus cucullatus* = *Clangula mergiformis*, Cabot, 1854:118; Suchetet, 1896:169.

Bucephala clangula americana × *Lophodytes cucullatus*, Ball, 1934:7.

Somateria mollissima borealis (Brehm) × *Somateria spectabilis* (Linnaeus). Northern Eider × King Eider.

Somateria mollissima borealis × *Somateria spectabilis*, Krabbe, 1926:543.

Family Accipitriidae. Kites, Hawks and allies.

Accipiter gentilis atricapillus (Wilson) × *Accipiter cooperii* (Bonaparte). Eastern Goshawk × Cooper's Hawk.

Astur atricapillus × *Falco Cooperi*, Suchetet, 1897:470.

Family Tetraonidae. Grouse and Ptarmigans.

Lagopus lagopus (Linnaeus) × *Canachites canadensis* (Linnaeus). Willow Ptarmigan × Spruce Grouse.

Lagopus lagopus × *Canachites canadensis* [sic], Hachisuka, 1928:65.

Lagopus lagopus × *Canachites canadensis*, Taverner, 1932:89.

Pedioecetes phasianellus (Linnaeus) × *Dendragapus obscurus* (Say). Sharp-tailed Grouse × Dusky Grouse.

Pediaecetes phasianellus columbianus × *Dendragapus obscurus richadsonii*, Brooks, 1907:167.

Pediaecetes phasianellus columbianus × *Dendragapus obscurus richardsoni*, Hachisuka, 1928:65.

Pedioecetes phasianellus × *Dendragapus obscurus*, Lincoln, 1950:210-212.

Pedioecetes phasianellus (Linnaeus) × *Tympanuchus cupido* (Linnaeus). Sharp-tailed Grouse × Prairie Chicken.

Pedioecetes phasianellus columbianus × *Cupidonia cupido* = *Cupidonia cupidini-columbinus*, Brewster, 1877:66.

Pedioecetes phasianellus × *Cupidonia cupido*, Gurney, 1884:391.

Pediocaetes phasianellus campestris × *Tympanuchus americanus*, Shufeldt, 1893:281.

- Pedioecetes phasianellus* × *Tympanuchus americanus*, Suchetet, 1896:589.
Pedioecetes phasianellus campestris × *Tympanuchus cupido*, Lincoln, 1918:1.
Pedioecetes phasianellus × *Tympanuchus americanus*, Rowan, 1926:336.
Pediaecete phasianellus campestris × *Tympanuchus a. americanus*, Hachisuka, 1928:65.
Pedioecetes phasianellus campestris × *Tympanuchus cupido americanus*, Gross, 1930:97.

Family Tetraonidae × *Family Phasianidae*.

Phasianus colchicus Linnaeus × *Dendragapus obscurus* (Linnaeus). Ring-necked Pheasant × Dusky Grouse.

Phasianus torquatus × *Dendragapus obscurus fuliginosus*, Anthony, 1899:180.

Phasianus colchicus torquatus × *Dendragapus obscurus fuliginosus*, Jewett, 1932:191.

Phasianus colchicus Linnaeus × *Tympanuchus cupido* (Linnaeus). Ring-necked Pheasant × Prairie Chicken.

Phasianus colchicus × *Tympanuchus cupido*, Lincoln, 1950:210.

Family Phasianidae. Quails and Pheasants.

Callipepla squamata (Vigors) × *Colinus virginianus* (Linnaeus). Scaled Quail × Bobwhite.

Callipepla squamata × *Colinus virginianus*, Suchetet, 1897:470.

Lophortyx californica (Shaw) × *Colinus virginianus* (Linnaeus). California Quail × Bobwhite.

California Quail × Bobwhite, Aiken, 1930:80.

Lophortyx californica (Shaw) × *Lophortyx gambelii* Gambel. California Quail × Gambel's Quail.

Lophortyx californicus × *Lophortyx gambeli*, Henshaw, 1885:247.

Colinus californicus × *Callipepla gambeli*, Suchetet, 1896:6, 481.

Lophortyx californica × *Lophortyx gambeli*, Hachisuka, 1928:84.

Lophortyx californica (Shaw) × *Oreortyx picta* (Douglas). California Quail × Plumed Quail.

Lophortyx californicus californicus × *Oreortyx pictus plumiferous*, Peck, 1911:149.

Lophortyx californicus × *Oreortyx* sp., Bailey, 1928:210.

Lophortyx californica × *Oreortyx picta*, Hachisuka, 1928:83.

Lophortyx gambelii Gambel × *Callipepla squamata pallida* Brewster. Gambel's Quail × Scaled Quail.

Gambel's Quail × Scaled Quail, Bailey, 1928:210.

Lophortyx gambeli × *Gallipipla* [sic] *squamata*, Hachisuka, 1928:84.

Family Laridae. Gulls and Terns.

Larus leucopterus kumlieni Brewster. Kumlien's Gull.

Larus kumlieni Brewster, Bent, 1921:74; Taverner, 1933:88; Sutton, 1931:158; Gross, 1937:30.

Larus leucopterus kumlieni, Bishop, 1944:186.

Larus leucopterus × *Larus argentatus thayeri* = *Larus kumlieni*, Dwight, 1925:250.

Larus hyperboreus Gummerus × *Larus argentatus vegae* Palmén. Glaucous Gull × Vega Gull.

Larus nelsoni, Henshaw, Bent, 1921:76.

Larus hyperboreus × *Larus argentatus vegae* = *Larus nelsoni*, Dwight, 1925:250.

Family Trochilidae. Hummingbirds.

Calypte costae (Bourcier) × *Selasphorus platycercus* (Swainson). Costa's Hummingbird × Broad-tailed Hummingbird.

Calypte costae × *Selasphorus platycercus*, Huey, 1944:636.

Calypte costae (Bourcier) × *Archilochus alexandri* (Bourcier and Mulsant). Costa's Hummingbird × Black-chinned Hummingbird.

Calypte costae × *Trochilus alexandri*, Thayer and Bangs, 1907:313; Taylor, 1909:293.

Amazilia violiceps ellioti (Berlepsch) × *Cyananthus latirostris magicus* (Mulsant and Verreaux). Violet-crowned Hummingbird × Broad-billed Hummingbird.

Cyanomyia salvini Brewster, 1893:214.

Uranomita salvini, Bishop, 1906:337.

Amazilia violiceps conjuncta × *Cyananthus latirostris* = *Amazilia salvini*, Griscom, 1934:378.

Calypte anna (Lesson) × *Archilochus alexandri* (Bourcier and Mulsant). Anna's Hummingbird × Black-chinned Hummingbird.

Trochilus violajugulam Jeffries, 1888:168.

Calypte anna × *Trochilus alexandri* = *Trochilus violajugulam*, Thayer and Bangs, 1907:313.

Calypte anna × *Trochilus alexandri*, Taylor, 1909:293.

Calypte anna × *Archilochus alexandri* = *Archilochus violajugulum*, Grinnell and Miller, 1944:569.

Selasphorus rufus (Gmelin) × *Stellula calliope* (Gould). Rufus Hummingbird × Calliope Hummingbird.

Selasphorus rufus × *Stellula calliope*, Thayer and Bangs, 1907:312; Taylor, 1909:293.

Selasphorus sasin sasin Lesson × *Calypte anna* (Lesson). Allen's Hummingbird × Anna's Hummingbird.

Selasphorus floresii Gould, Emerson, 1901:68; Grinnell and Miller, 1944:569.

Selasphorus alleni × *Calypte anna*, Thayer and Bangs, 1907:313; Taylor, 1909:291; Grinnell and Miller, 1944:569.

Family Picidae. Woodpeckers.

Colaptes auratus (Linnaeus) × *Colaptes cafer* (Gmelin). Yellow-shafted Flicker × Red-shafted Flicker.

Colaptes ayresi Audubon, 1843.

Colaptes hybridus Baird, 1858.

Colaptes auratus × *Colaptes cafer* = *Colaptes hybridus*, Elliot, 1892:161.

Colaptes auratus × *Colaptes cafer*. Allen, 1892:21; Rhoads, 1892:325; Eaton, 1893:25; Suchetet, 1897:840; Ridgway, 1909:441; Chapman, 1924:26; Taverner, 1934:34; Deakin, 1936:585; Graber and Graber, 1951:145; Bent, 1939:290; Alexander, 1938:27.

Colaptes auratus luteus [sic] × *Colaptes cafer collaris*, Baldwin, 1910:340.

Colaptes auratus luteus × *Colaptes cafer collaris*, Bent, 1908:26; Wood, 1923:49.

Colaptes auratus × *Colaptes mexicanus*, Suchetet, 1896:429.

Colaptes chrysoides mearnsi Ridgway × *Colaptes cafer collaris* Vigors.
Gilded Flicker × Red-shafted Flicker.

Colaptes chrysoides × *Colaptes mexicanus*, Brewster, 1883:25; Suchetet, 1896:435.

Colaptes chrysoides × *Colaptes collaris*, Swarth, 1905:27.

Gilded × Red-shafted Flicker, Brenninger, 1898:13.

Colaptes chrysoides mearnsi (not hybrids but color dimorphism), Grinnell, 1914:137; Bent, 1939:304.

Dendrocopos nuttalli (Gambel) × *Dendrocopos pubescens* (Linnaeus). Nuttall's Woodpecker × Downy Woodpecker.

Dryobates nuttalli × *Dryobates pubescens gairdnerii*. Ridgway, 1887:521; Suchetet, 1896:437.

Family Hirundinidae. Swallows.

Hirundo rustica erythrogaster Boddaert × *Petrochelidon pyrrhonata* (Vieillot). Barn Swallow × Cliff Swallow.

Hirundo horreori-lunifrons Trotter, 1878:135.

Hirundo horreorum × *Petrochelidon lunifrons*, Trotter, 1878:135; Trotter, 1887:309.

Hirundo erythrogaster var. *horreorum* × *Petrochelidon lunifrons*, Suchetet, 1896:291.

Hirundo erythrogaster × *Petrochelidon lunifrons*, Mearns, 1902:73.

Petrochelidon pyrrhonota (Vieillot) × *Iridoprocne bicolor* (Vieillot). Cliff Swallow × Tree Swallow.

Petrochelidon lunifrons × *Tachycineta bicolor*, Chapman, 1902:392.

Family Paridae. Titnics, Verdins, and Bush-tits.

Parus atricapillus Linnaeus × *Parus carolinensis* Audubon. Black-capped Chickadee × Carolina Chickadee.

Black-capped Chickadee × Carolina Chickadee, Chapman, 1924:27.

Parus atricapillus Linnaeus × *Parus gambeli* Ridgway. Black-capped Chickadee × Mountain Chickadee.

Parus atricapillus × *Parus Gambelli*, Suchetet, 1897:300.

Parus bicolor Linnaeus × *Parus atricapillus* Linnaeus. Tufted Titmouse × Black-capped Chickadee.

Lophophanes bicolor × *Parus atricapillus*, Ridgway, 1876:169.

Parus bicolor × *Parus atricapillus*, Suchetet, 1897:301.

Parus bicolor Linnaeus × *Parus atricristatus* Cassin. Tufted Titmouse × Black-crested Titmouse.

Parus atricristatus castaueifrons Sennett, 1887:28.

Parus bicolor texensis Sennett, 1887:29.

Baeolophus bicolor × *Baeolophus atricristatus*, Allen, 1907:468.

Baeolophus bicolor × *Baeolophus atricristatus* Sennetti, Ridgway, 1904:386.

Family *Sylviidae*. *Warblers, Gnatcatchers, and Kinglets.*

Regulus calendula (Linnaeus) × *Regulus satrapa* Lichtenstein. Ruby-crowned Kinglet × Golden-crowned Kinglet.

Regulus cuvieri Audubon, 1832:288.

Regulus calendula × *Regulus satrapa*, Brewster, 1881:225; Suchetet, 1896:375.

Known only from Audubon's description and figure of the original specimen, killed in June, 1812, on the banks of the Schuylkill River, in Pennsylvania.

Family *Parulidae*. *Wood Warblers.*

Vermivora chrysoptera (Linnaeus) × *Vermivora pinus* (Linnaeus). Golden-winged Warbler × Blue-winged Warbler.

Helminthophaga leucobronchialis Brewster, 1876:1.

Helminthophila leucobronchialis, Ridgway, 1882:53; Ridgway, 1885:359; Thurber, 1886:411; Trotter, 1887:307; Richmond, 1895:307; Bishop, 1901:21; Ridgway, 1902:453; Bishop, 1905:24.

Vermivora leucobrauchialis, Sutton, 1928:206; Watterson, 1928:511; Broun, 1929:214; Cramer, 1931:434; Walkinshaw, 1931:613; Cramer, 1932:355; Campbell, 1934:526; Broun, 1935:320; Olsen, 1935:100; White, 1936:450; Pitelka, 1938:540; Pitelka, 1939:340; Seibert, 1941:410.

Brewster's Warbler, Carter and Howland, 1923:423; Hicks, 1935:168.

Helminthophaga lawrencei Herrick, 1874:220.

Helminthophila lawrenceii, Osgood, 1907:342; Ridgway, 1902:452.

Helminthophila lawrencei, Beebe, 1904:387.

Vermivora lawrencei, Tucker, 1928:102; Broun, 1929:213; Brown, 1934:242; Campbell, 1934:526; Meanley, 1944:477.

Lawrence's Warbler, Trotter, 1887:307; Nichols, 1908:86; Roland, 1928:510; Hicks, 1929:43; Hicks, 1935:168.

Helminthophila lawrencei × *Helminthophila pinus*, Brewster, 1886:411; Ridgway, 1876:169; Ridgway, 1882:53.

Helminthophila chrysoptera × *Helminthophila pinus*, Fisher, 1885:378; Sage, 1889:279; Suchetet, 1896:319; Bishop, 1905:24; Mceker, 1906:104; Nichols, 1908:86; Ridgway, 1909:441; Faxon, 1911:57; Faxon, 1913:311.

Vermivora chrysoptera × *Vermivora pinus*, Moore, 1916:202; Morss, 1926:384; Richardson, 1928:46; Pitelka, 1939:340; Carter, 1944:48; Parkes, 1949:48; Parkes, 1951:5.

Blue-winged × Golden-winged Warbler, Alexander, 1919:579.

Vermivora pinus (Linnaeus) × *Oporornis formosus* (Wilson). Blue winged Warbler × Kentucky Warbler.

Helmiuthophaga cincinnatiensis Langdon, 1880:119.

Helminthophaga pinus × *Oporornis formosa* = *Helminthophaga cincinnatiensis*, Ridgway, 1880:237; Suchetet, 1896:345; Ridgway, 1902:446.

Vermivora pinus × *Oporornis formosus*, McCamey, 1950:67.

Vermivora pinus (Linnaeus) × *Oporornis philadelphia* (Wilson). Blue-winged Warbler × Mourning Warbler.

Vermivora pinus × *Oporornis philadelphia*, McCamey, 1950:67.

Parula americana (Linnaeus) × *Setophaga ruticilla* (Linnaeus). Parula Warbler × American Redstart.

Compsothlypis americana × *Setophaga ruticilla*, Sutton, 1942:153; Burleigh, 1944:292.

Dendroica coronata (Linnaeus) × *Dendroica auduboni* (Townsend). Myrtle Warbler × Audubon's Warbler.

Dendroica coronata × *Dendroica auduboni*, Taylor, 1911:173; Brodkorb, 1934:243; Mailliard, 1937:223; Monson and Phillips, 1941:108; Packard, 1945:623; Alexander, 1945:623; Tordoff, 1950:80; Graber and Graber, 1951:146.

Dendroica occidentalis (Townsend) × *Dendroica townsendi* (Townsend). Hermit Warbler × Townsend Warbler.

Dendroica occidentalis × *Dendroica townsendi*, Jewett, 1944:23.

Dendroica dominica (Linnaeus) × *Parula americana* (Linnaeus). Yellow-throated Warbler × Parula Warbler.

Dendroica potomac Haller, 1940:49.

Dendroica dominica × *Compsothlypis americana*, Sutton, 1942:151.

Dendroica striata (Forster) × *Dendroica castanea* (Wilson). Black-poll Warbler × Bay-breasted Warbler.

Dendroica striata × *Dendroica castanea*, Brodkorb, 1934:243.

Dendroica striata (Forster) × *Dendroica tigrina* (Gmelin). Black-poll Warbler × Cape May Warbler.

Sylvia carbonata Audubon, 1831:308.

Dendroica carbonata, Ridgway, 1902:540.

Dendroica striata × *Periglossa tigrina*, Brewster, 1881:225; Suchetet, 1896:347.

Dendroica carbonata × *Dendroica tigrina*, Coues, 1927:332.

Known only from Audubon's plate and description of two specimens killed near Henderson, Kentucky, in May, 1811.

Family Icteridae. Meadowlarks, Blackbirds, and Troupials.

Sturnella magna (Linnaeus) × *Sturnella neglecta* Audubon. Eastern Meadowlark × Western Meadowlark.

Sturnella magna × *Sturnella neglecta*, Chapman, 1924:25.

Sturnella magna magna × *Sturnella magna neglecta*, Chapman, 1900:297-320.

Icterus galbula (Linnaeus) × *Icterus bullockii* (Swainson). Baltimore Oriole × Bullock's Oriole.

Icterus galbula × *Icterus bullockii*. Bent. 1908:29; Sutton. 1942:79; Beecher, 1950:77; Graber. 1951:146.

Icterus galbula × *Icterus bullocki*. Sutton. 1938:1.

Quiscalus quiscalula (Linnaeus) × *Quiscalus versicolor* Vieillot. Purple Grackle × Bronzed Grackle.

Quiscalus quiscula aeneus × *Quiscalus quiscula stonei*, the hybrid population called *Quiscalus quiscula ridgwayi*, Chapman, 1936:405; Mayr, 1942:265.

Quiscalus quiscula × *Quiscalus aeneus*, Chapman, 1892:1-20; Allen, 1904:467.

Purple Grackle × Bronzed Grackle. Chapman, 1924:26.

Family Thraupidae. Tanagers.

Piranga olivacea (Gmelin) × *Piranga ludoviciana* (Wilson). Scarlet Tanager × Western Tanager.

Piranga olivacea × *Piranga ludoviciana*, Tordoff, 1950:3.

Piranga olivacea (Gmelin) × *Piranga rubra* (Linnaeus). Scarlet Tanager × Summer Tanager.

Piranga erythromelas × *Piranga rubra*, Suchetet, 1897:775; McCormick, 1898:302.

Family Fringillidae. Grosbeaks, Finches, Sparrows, and Buntings.

Pheucticus ludovicianus (Linnaeus) × *Pheucticus melanocephalus* (Swainson). Rose-breasted Grosbeak × Black-headed Grosbeak.

Hedymeles ludovicianus × *Hedymeles melancephalus papago*, Swenk, 1930:289; Hudson, 1933:32; Swain, 1933:63; Swenk, 1936:27.

Pheucticus ludovicianus × *Pheucticus melanocephalus*, Graber and Graber, 1951:146.

Passerina cyanea (Linnaeus) × *Passerina amoena* (Say). Indigo Bunting × Lazuli Bunting.

Passerina cyanea × *Passerina amoena*, Breckenridge, 1930:39; Sutton. 1938:5; Beecher, 1950:77; Graber and Graber, 1951:146.

Spiza americana (Gmelin) × *Guiraca caerulea* (Linnaeus). Dickcissel × Blue Grosbeak.

Emberiza townsendii Audubon, 1834:183.

Spiza americana × *Guiraca caerulea*, Coues, 1927:447.

The original specimen, taken May 11, 1833. in Chester County, Pennsylvania, remains unique.

Pinicola enucleator leucura (Müller) × *Carpodacus purpureus* (Gmelin). Pine Grosbeak × Purple Finch.

Pinicola enucleator × *Carpodacus purpureus*, Cross, 1890; Thompson, 1894:1, Suchetet, 1897:267, 768.

Acanthis flamma (Linnaeus) × *Acanthis hornemanni exilipes* (Coues). Common Redpoll × Hoary Redpoll.

Acanthis linaria × *Acanthis exilipes*, Suchetet, 1897:247.

Acanthis flammea (Linnaeus) × *Spinus pinus* (Wilson). Redpoll × Pine Siskin.

Aegiothus flavirostris var. *brewsterii* Ridgway, 1872:433.

Acanthis brewsterii, Ridgway, 1885:354.

Acanthis linaria × *Spinus pinus*, Brewster, 1881:225; Suchetet, 1896:246; Coues, 1927:391.

Junco aikenii Ridgway × *Junco oreganus* (Townsend). White-winged Junco × Oregon Junco.

Junco aikenii × *Junco oreganus mearnsi*, Miller, 1941:425.

Junco aikenii × *Junco oreganus*, Miller, 1949:341.

Junco hyemalis (Linnaeus) × *Junco oreganus* (Townsend). Slate-colored Junco × Oregon Junco.

Junco hyemalis cismontanus × *Junco oreganus montanus*, Miller, 1941:425.

Junco hyemalis × *Junco oreganus*, Dwight, 1918:295; Monson and Phillips, 1941:110.

Junco caniceps caniceps (Woodhouse) × *Junco caniceps dorsalis* Henry. Gray-headed Junco × Red-backed Junco.

Junco caniceps caniceps × *Junco caniceps dorsalis*, Miller, 1941:412.

Junco caniceps caniceps × *Junco oreganus dorsalis*, Miller, 1939:211.

Junco caniceps × *Junco phaeonotus* = *Junco dorsalis*, Dwight, 1918:300.

Junco caniceps (Woodhouse) × *Junco oreganus* (Townsend). Gray-headed Junco × Oregon Junco.

Junco oreganus mutabilis Van Rossem, 1931:325.

Junco caniceps caniceps × *Junco oreganus thurberi*, Miller, 1939:211; Miller, 1941:412.

Junco caniceps caniceps × *Junco oreganus mearnsi*, Miller, 1941:412.

Junco caniceps dorsalis × *Junco oreganus pinosus*, Miller, 1938:92.

Junco caniceps × *Junco mearnsi*, Van Tyne and Sutton, 1937:110; Monson and Phillips, 1941:110.

Junco caniceps caniceps × *Junco mearnsi*, Miller, 1939:211.

Junco caniceps × *Junco thurberi* = *Junco oreganus mutabilis*, Monson and Phillips, 1941:111.

Spizella pallida (Swainson) × *Spizella breweri* Cassin. Clay-colored Sparrow × Brewer's Sparrow.

Spizella pallida × *Spizella pallida* var. *Breweri*, Suchetet, 1897:274.

Zonotrichia coronata (Pallas) × *Zonotrichia leucophrys* (Forster). Golden-crowned Sparrow × White-crowned Sparrow.

Zonotrichia coronata × *Zonotrichia leucophrys*, Miller, 1940:45.

Zonotrichia albicollis (Gmelin) × *Junco hyemalis* (Linnaeus). White-throated Sparrow × Slate-colored Junco.

Zonotrichia albicollis × *Junco hyemalis*, Townsend, 1883:78, Stone, 1893:213; Suchetet, 1897:272, 769.

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MUSEUM OF NATURAL HISTORY, UNIVERSITY OF KANSAS, LAWRENCE, JUNE 5,
1951

GENERAL NOTES

Snowy Egret and Little Blue Heron breeding in Oklahoma.—The first nesting colony of Snowy Egrets (*Leucophoyx thula*) and Little Blue Herons (*Florida caerulea*) known in Oklahoma was found in 1951 in a ten-acre patch of oak woods on the farm of Paul A. Robertson, nine miles west of Oklahoma City near Lake Overholser, Oklahoma County, Oklahoma. In addition, the colony included nesting American Egrets (*Casmerodius albus*) and Black-crowned Night Herons (*Nycticorax nycticorax*), not previously known to breed in Oklahoma County.

Mrs. Marcelle Tattan of Oklahoma City, niece of Mr. Robertson, first discovered the birds in May, 1951. Mr. Robertson reported the find to A. D. Goodwin, U. S. Fish and Wildlife Game Management Agent, Oklahoma City, who in turn informed the State Game and Fish Department. On June 20, 1951, Mr. Robertson, Mr. Goodwin, Alden Kimsey, and I counted 136 nests in the area, which was located a quarter-mile from the North Canadian River and 100 yards from a busy highway. Nests were situated from 15 to 35 feet above the ground; usually there were several nests per tree. The colony was estimated at approximately 200 birds. Numbers of each species were: Black-crowned Night Heron, 45 pairs; Snowy Egret, 35 pairs; Little Blue Heron, 18 pairs; American Egret, 2 pairs.

Mr. Robertson said that the Black-crowned Night Herons had nested in the area for the past five years, but that the 1951 season was the first for the egrets and Little Blue Herons.—WALLACE HUGHES, *State Game and Fish Department, 118 State Capitol, Oklahoma City, Oklahoma, January 24, 1952.*

Nesting-height preference of the Eastern Kingbird.—Nests of the Eastern Kingbird, *Tyrannus tyrannus*, have been reported as low as two feet and as high as 100 feet. In the literature we read that nests in trees are commonly at heights of about 20 feet, while in open country nests are placed frequently on top of fence posts. Recently I had an opportunity to investigate the nesting-height preferences of these birds where a large number of almost identical nesting platforms were offered at various heights.

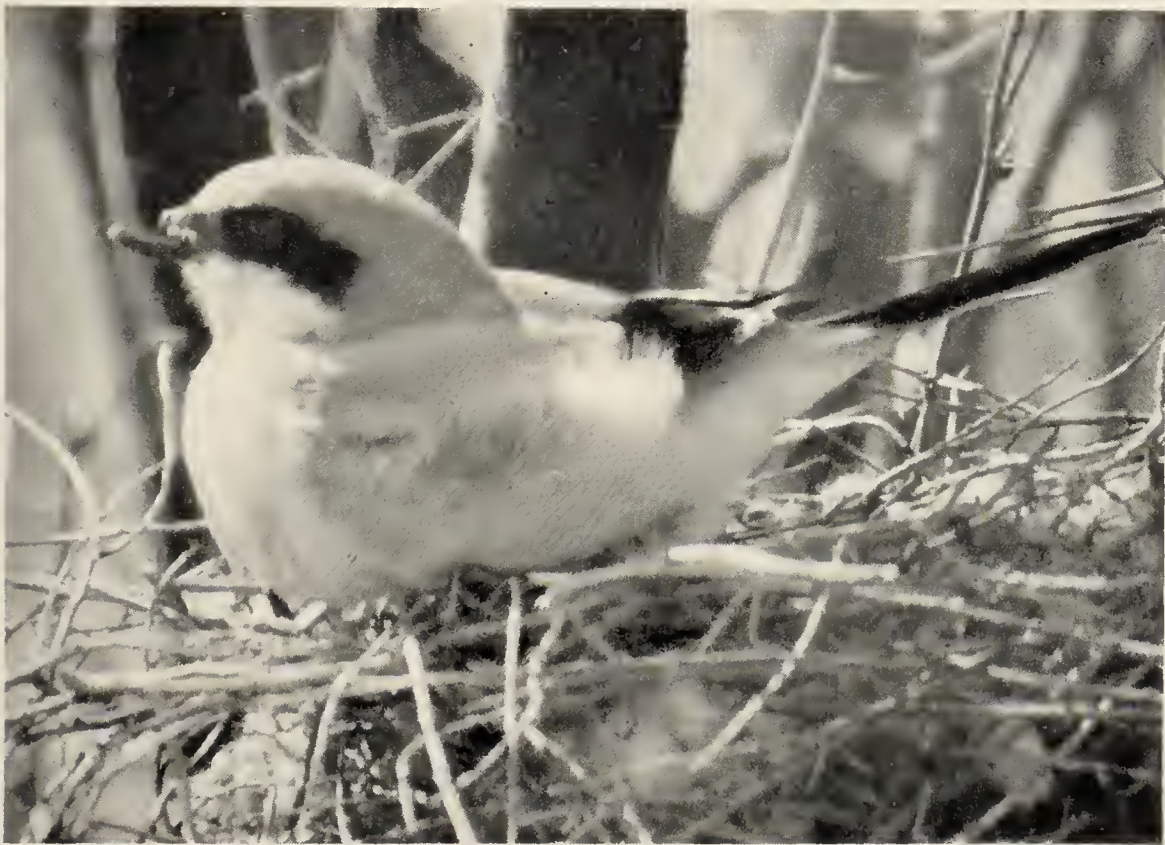
From Mio, Michigan, eastward there is a line of high-voltage electric towers that provide nest sites for a number of Eastern Kingbirds. Intersecting braces at each of the four corners of these towers form platforms suitable for nests. The first set of such intersections is at a height of about six feet. Then a similar pattern—almost identical and equally suitable as judged by human eyes—is repeated at heights of 21, 26, 31 feet and so on to the top of the tower.

On June 28, 1951, I examined 16 nests on these towers (all with eggs or young). All but one of these nests were at the six-foot level. The one exception was at the 21-foot level, and in this instance a nearby hill had the effect of reducing the apparent height. Along the line of the towers for a width of about 100 feet, the vegetation is kept to a height of a foot or less by mowing; so a nest at six feet is placed prominently above the immediate surroundings except for the tower itself. However, the neighboring countryside outside the mowed swath varied widely in character. In some places it consisted of grasslands; in others, bottomland deciduous forest and upland pine forest.

The evidence here suggests that the Eastern Kingbird prefers a nest site considerably below 20 feet, provided that platforms are available and that the nest site stands out over most objects nearby.—HAROLD MAYFIELD, *2557 Portsmouth Ave., Toledo, Ohio, December 31, 1951.*

Northern Mockingbird on Mona Island, Puerto Rico.—For four months prior to November, 1951, visitors to the small island of Mona, approximately 50 miles west of Puerto Rico, reported the presence of a Mockingbird (*Mimus polyglottos*) on the eastern part of the island. On November 5, 1951, the bird was collected and presented to me. It was prepared as a museum specimen and is now in the collection of the Biology Department of the College of Agriculture of the University of Puerto Rico. This bird, probably a young male, apparently represents the race *M. p. orpheus*. This is the first record of a Mockingbird from Mona Island. —VIRGILIO BIAGGI, JR., *Biology Department, College of Agriculture, Mayaguez, Puerto Rico, January 24, 1952.*

Loggerhead Shrike with malformed bill.—Abnormalities of the bill are fairly



frequently noted in birds. Often these abnormalities interfere with feeding sufficiently to cause the bird to be in poor condition.

The accompanying photograph shows a Loggerhead Shrike (*Lanius ludovicianus*) which seemingly has suffered little although almost completely lacking the upper mandible. The bird, which we photographed in a mesquite tree three miles east of Casa Grande, Pinal County, Arizona, on March 11, 1947, was active and appeared to be in good condition. We judged it to be a female, since it was the only one of the pair seen incubating the eggs. The shrike was fed by its mate as it sat on the nest.—BERNARD AND EMILIE BAKER, *Route No. 1, Judson Road, Spring Lake, Michigan, November 1, 1951.*

Post-juvinal wing molt in the Bobolink.—According to Dwight (1900. *Annals N. Y. Acad. Sci.*, 13:156) and subsequent authors, the Bobolink (*Dolichonyx oryzivorus*) differs from all other Icteridae of eastern North America, except the genus *Icterus*, in

having a partial rather than a complete post-juvenal molt. The molt is said by Dwight to take place (in New York) in July, and to involve the body plumage, tertials, and wing coverts, but not the rest of the wings nor the tail.

On September 5, 1951, I collected a Bobolink about two miles west of Etna, Tompkins County, New York. This specimen showed a number of peculiarities. Although September 5 is by no means the latest fall date for this species in central New York, most of the Bobolink migration usually takes place earlier. The bird in question was the only Bobolink seen, and was associated with a migrating flock of Kingbirds (*Tyrannus tyrannus*). Examination of the specimen showed it to be an immature male, with the cranium incompletely ossified and testes about one-half millimeter in diameter. The bird was in heavy molt in all tracts of body plumage, with many feathers of the juvenal plumage still evident on the underparts. Specimens in the Cornell collection confirm Dwight's dating of the post-juvenal molt of New York Bobolinks; this bird was thus over a month late in its molt. In addition, the two outermost primaries of each wing were sheathed and only about half-grown. The bilateral symmetry of this molt would seem to discredit accidental loss as an explanation for this replacement of primaries. All of the other remiges were fully grown and showed no sheathing, so it is difficult to state whether they, too, had been replaced. Examination with a hand lens showed that the remaining primaries and the secondaries showed no more wear at the tips than the tertials, which definitely belonged to the first winter plumage. It is thus possible that this individual Bobolink replaced all of its remiges in the post-juvenal molt. The rectrices were considerably worn; apparently none had been replaced.

The condition of this specimen suggested that a re-examination of the post-juvenal molt of the Bobolink was warranted. I therefore checked all of the pertinent specimens of this species in the considerable series in the American Museum of Natural History. Only a single immature specimen was found which showed indications of a molt of the flight feathers. This specimen (AMNH 98205), also a male, was picked up under the lighthouse at Fire Island, New York, by L. S. Foster on September 1, 1888. Through the kindness of Charles O'Brien, I was permitted to take this specimen to Ithaca to compare it with mine.

There is no statement as to age of the Fire Island specimen on the original label. Judging by color, however, it definitely appears to be in first winter plumage, evidenced particularly by the color of the tertials (which are more contrastingly and richly colored in adult winter specimens). Body molt appears to have been completed; no old feathers nor sheathed new ones were found. In this specimen not only the two outermost primaries but also the innermost (sixth) secondaries are sheathed, although almost fully grown. As in the other specimen, all of the remiges are unworn and appear new. In the Fire Island bird, however, the rectrices too appear to have been replaced, as they show almost no wear at the tips.

Dr. Ernst Mayr informs me that the post-juvenal molt in passerine birds is so variable in extent, even within families, that it is impossible to attribute any evolutionary significance to the presence or absence of a complete molt. It is interesting to note, however, that, while the *failure* to complete a molt would not be particularly surprising, especially in an unhealthy bird, we have here the case of two individuals which molted feathers that are normally retained until the following spring. These two individual Bobolinks thus displayed a molt pattern abnormal for their species but typical of most of the rest of their family.—KENNETH C. PARKES, *Laboratory of Ornithology, Cornell University, Ithaca, New York, January 10, 1952.*

Little Blue Heron and Sandhill Crane in central New York.— The remarkable flight of southern herons and marsh birds that occurred in eastern United States during the summer of 1948 is now a matter of record (see *Audubon Field Notes*, 1948, 2, No. 5, and 1949, 3, No. 1). I should like to mention here some noteworthy records pertaining to this flight from central New York.

Records of birds known to have occurred in the Cayuga Lake Basin go back more than 100 years, but the Little Blue Heron (*Florida caerulea*) and Sandhill Crane (*Grus canadensis*) were unrecorded before 1948. On July 18, George Loring and I were in the Montezuma Wildlife Refuge located in Cayuga County, near the north end of Cayuga Lake. We had seen more than 30 American Egrets (*Casmerodius albus*) when two distinctly smaller white herons were detected. Their grayish bills and greenish legs and feet identified them as Little Blue Herons. We saw at least one more (and possibly as many as three more) later that day in another part of the marsh. On July 30, a group of four was recorded. All of the Little Blue Herons that we saw were in the white, immature plumage.

On July 30, an adult Bald Eagle (*Haliaeetus leucocephalus*) was frightened from its perch near the dike on the Montezuma Refuge by a group of four persons including the writer. The eagle flew out over the marsh, causing pandemonium among the numerous ducks and herons, the latter mostly Great Blue Herons (*Ardea herodias*) and American Egrets. As the birds milled about, Edward Chalif, one of the group, saw a large gray bird which he recognized as a Sandhill Crane. The bird was approximately 200 yards away and flying to our right. When perhaps 300 yards from us, the crane reversed its direction of flight and traveled some 400 yards before disappearing in the marsh. During the minute and a half the bird was under observation, we all had an unobstructed view. The bird's neck was very long, outstretched, and drooping and the legs trailed behind; thus the back was higher than any other part. The manner of flight was unique—quick flaps in a narrow arc rather than the deep beats characteristic of the larger herons. Though only Chalif was familiar with the crane in life, we felt certain that he had correctly identified the bird.

A perusal of the literature discloses that the Sandhill Crane occurred in New York during colonial years, but has since become extremely rare, there being only two published records of 'recent' occurrences. The first of these was a bird collected near Albion, Orleans County, about 1880. The second was based also on a bird taken in Orleans County, in the town of Clarendon, on May 20, 1885 (Eaton, 1910. "Birds of New York," *New York State Mus. Mem.* 12, 1:269).

The Sandhill Crane has been equally rare in New England. Forbush (1925. "Birds of Massachusetts and other New England states," Mass. Dept. of Agric., 1:349-350) who said it "may appear in New England again as an accidental straggler," listed but two records. One bird was taken in 1896 or 1897 at Wakefield, New Hampshire; the other was shot on the Connecticut River at Lunenburg, Vermont, no date given.

Since 1948, the Little Blue Heron has been seen each summer in the Cayuga Lake Basin, but I have seen no additional records of the Sandhill Crane in the East.—RICHARD B. FISCHER, *Department of Conservation, Cornell University, Ithaca, New York. October 26, 1951.*

Obstruction on the bill of a Mockingbird.—In my bird-banding operations I occasionally have captured birds with bits of food adhering to the bill. Bills of the House



Finch (*Carpodacus mexicanus*), for instance, are frequently discolored by berry juices and at times dried pulp accumulates on the bill.

On September 17, 1951, at Benicia, Solano County, California, one of the two Mockingbirds (*Mimus polyglottos*) in one of my banding traps appeared to have an abnormal growth on its forehead. This apparent abnormality, however, upon investigation proved to be an accumulation, approximately a cubic centimeter in size, of dried fig pulp firmly imbedded at the base of the upper mandible, and nearly closing the nostrils.

Most birds endeavor to maintain clean mandibles by scraping them on any available object. This incumbrance of dried fig, however, was so firmly attached that it was necessary to employ scissors to cut through the feathers at the base of the bill to remove the impediment.—EMERSON A. STONER, *Benicia, California, January 29, 1952.*

Winter mortality of Barn Owls in central Ohio.— In considering tolerance of the Barn Owl (*Tyto alba*) for rigorous winter weather, A. K. Fisher (1893, "Hawks and Owls of the United States," p. 138) wrote: "in all probability it sometimes perishes in the northern part of its range, when overtaken by severe weather, before being able to migrate." More recently the literature records at least two instances in which Barn Owls died as a result of severe winter weather in the northern United States. In February, 1930, following a period in which the temperature dropped to a low of -24° F., Errington (1931, *Wilson Bulletin*, 43:60) found two dead Barn Owls at their roosting place near Madison, Wisconsin. Errington mentioned the presence of at least some snow on the ground prior to the time the birds were found. The digestive tracts of the birds were

examined and found to be empty or nearly so, and he noted a progressive decline in size of pellets egested prior to the time of the birds' death. In January, 1940, following a period in which the temperature dropped to a minimum of -15° F., Speirs (1940. *Auk*, 57:571) found evidence of the death of four or five Barn Owls at their roosting place in Champaign, Illinois. The number of birds suggests that these might have been winter nestlings (Wallace, 1948. *Michigan State Col., Tech. Bull.* 208:17) which had not yet left their hatching place. Several other American authors have reported a marked decline in the local population of Barn Owls in connection with rigorous winter weather, but it is not clear whether the decrease was effected by migration or death of the birds. Schneider (1937. *Vogelzug*, 8:168) also reported winter killing of Barn Owls (*Tyto alba guttata*), in Germany, particularly during the severe winter of 1928-29. He also noted that the dead birds weighed significantly less than the minimum for well fed individuals of the species.

In central Ohio during November, 1950, two Barn Owls died apparently as a result of an abundant snowfall and near-zero temperatures. No sub-zero temperature was recorded, however. The following records of snowfall and temperature for the critical period were furnished by the Columbus, Ohio, station of the U. S. Weather Bureau:

Date	Lowest temp. F.	Inches of snowfall	Inches of snow on ground
Nov. 23	20°	1.1	—
Nov. 24	8°	1.2	2.0
Nov. 25	5°	7.5	10.0
Nov. 26	7°	1.9	11.0
Nov. 27	15°	1.1	13.0
Nov. 28	22°	.3	12.0

The first of these owls to come to my attention was found dead beneath a large bridge in Columbus, Ohio, by Roy Stimmel on November 28, but it was believed to have died at least as early as November 27. The dead bird came into my possession on December 1, and was turned over to the veterinary clinic of Ohio State University for examination on December 4. There was no indication of injury or disease, and the bird was seemingly a victim of adverse weather. Unfortunately, decomposition had progressed so far that it was not possible to determine the extent to which starvation and freezing figured as direct causes of death. The alimentary tract was devoid of food, and the bird seemed to be slightly emaciated. This bird weighed 457 grams (16 oz.)—somewhat below the minimum of 510 grams (18 oz.) given by E. H. Forbush (1927. "Birds of Massachusetts and Other New England States," 2:189). The second bird was reported to have been found dead on approximately the same date, but precise information was not available, nor was the bird accessible for necropsy.

Although the Barn Owl is the most nocturnal of the owls, Ralph Andrews reported seeing one eating a frozen Norway Rat (*Rattus norvegicus*) in full sunlight at 3:00 p.m. on November 26, 1950. This was at the dump on the Ohio State University grounds, and the rat seemingly had been dug from the snow by a dog. The owl departed upon Andrews' approach. It showed no signs of exhaustion.

More definite information is needed, but the observations given above suggest that the Barn Owl cannot survive if deprived of food during more than three or four days. A rapid rate of digestion for the species is suggested in a quotation by T. S. Roberts (1932. "Birds of Minnesota," 1:598): "A captive bird has been known to swallow 9

mice in quick succession and be ready for a second meal in 3 hours." The inaccessibility of food is probably the primary factor causing death of Barn Owls during periods of adverse winter weather in the northern part of the bird's range. A thick covering of snow on the ground accentuates the Barn Owl's difficulty in finding mice since the latter move about chiefly beneath the snow. The amount of snow covering is presumably the decisive factor in survival of Barn Owls. Low temperatures may be incidental in that they normally follow periods of heavy snowfall.—PAUL A. STEWART, *Dept. of Zoology and Entomology, Ohio State University, Columbus 10, Ohio, January 16, 1952.*

Hail damage to wildlife in southwest Oklahoma.—Late in the afternoon of October 5, 1951, an unusually severe hail storm accompanied by high winds and rain hit southwestern Oklahoma. The area of this storm extended from Wellington, Texas, eastward to Lone Wolf, Oklahoma, and varied in width from three to ten miles. The area of the most severe damage occurred between the towns of Reed and Granite in Greer County, Oklahoma. In this area of about 110 square miles, cotton was completely destroyed, windows of many homes were shattered, and shingles were beaten off roofs. Tree shelterbelts in full foliage were completely denuded, branches and twigs storm-pruned, and whole areas of bark stripped from the trunks of the trees. The hail stones measured between one inch and one and one-half inches in diameter. The hail fell for about ten minutes and covered the ground to a depth of two to three inches. It was followed by a downpour of rain which varied throughout the storm area from .8 to 2.5 inches. Total precipitation, including hail, was three to four inches.

On October 8th, three days after the storm, State Game Ranger Clem Patillo, of Mangum, accompanied by game technicians Richard De Arment and Walter Stidham, of Clinton, inspected wildlife habitat improvement plots for storm damage. In the course of this inspection they visited a farm two miles north and one mile west of Mangum, Oklahoma. This farm is on flat land—an old flood-plain of Elm Fork of the Red River—and is bordered on the south by a dense tree shelterbelt, 120 feet wide and one mile long. In this shelterbelt they found the following dead wildlife: 45 Swainson's Hawks (*Buteo swainsoni*); 1 immature Red-tailed Hawk (*Buteo jamaicensis*); 1 Cooper's Hawk (*Accipiter cooperii*); 30 Crows (*Corvus brachyrhynchos*); 3 Barn Owls (*Tyto alba*); 3 Mourning Doves (*Zenaidura macroura*); 4 Cottontail Rabbits (*Sylvilagus audubonii*); and 1 Wood Rat (*Neotoma floridana*). In addition, 4 living Swainson's Hawks were found with broken wings.

One-half mile north of the first shelterbelt is another, less dense than the first, which is 60 feet wide and one-half mile long. Fifteen Swainson's Hawks, but no other forms of dead wildlife, were found here.

A second farm, one mile west of the first, was visited. It comprises 160 acres and is west of the Red River. Along the weedy fencerows of cultivated land on this farm were three coveys of Bobwhite Quail (*Colinus virginianus*) which had been killed. These coveys were huddled in groups under clumps of sunflowers, ragweeds, Russian thistles, and such brushy cover as the fencerow afforded. One of the coveys contained 22 quail; one 11; and the third, 8. In addition, 9 dead jackrabbits (*Lepus californicus*) were found in various places in an 80-acre pasture.

I visited the first shelter-belt mentioned above two weeks after the storm, and found the damage as described by the men who visited it earlier. The four injured Swainson's Hawks were still there and appeared to be recovering slowly. Injuries appeared to

be broken wrist bones in one or both wings, but the birds reacted violently to handling, and, rather than risk further injury to the birds, only obvious injuries were noted. The bodies of the dead birds were so badly decomposed that it seemed wise not to handle them to determine the nature of the fatal injuries. The injured hawks apparently had been using some of the dead crows for food, but there was no evidence that they had eaten the bodies of their own kind.

Forty-four of the 47 hawks and two of the three owls were found in the eastern one-half mile of the shelterbelt. The cultivated land of this farm lies north of the tree belt. It is almost flat but with a very gentle slope to the southeast. The gentle slope of the land allowed the eastern half-mile of the belt to be flooded while the western half-mile was not. The reason that most of the hawks were found in this eastern portion of the belt may be that many of the injured hawks that were knocked to the ground were either drowned or so thoroughly drenched that they died from exposure. Or, perhaps, the hawks may have been concentrated in that particular area because of the abundance of rodents and grasshoppers in an adjoining alfalfa field. All the crows were found in the western unflooded portion of the tree belt. No doubt hawks of all kinds in the storm area suffered heavy losses since hawk migration was in full swing and this is the section of Oklahoma through which the main body of the migration occurs. There were also numerous reports throughout the storm area of small birds, squirrels, rabbits, quail, wood rats, field mice, and other forms of wildlife which had been killed by this storm.—GLENN JONES, 1115 West Garver St., Norman, Oklahoma, November 21, 1951.

A possible hybrid between the Hooded Merganser and the Red-breasted Merganser.—On April 14, 1951, I saw several male and female Red-breasted Mergansers (*Mergus serrator*) on Lake Vadnais, part of the water system of St. Paul, Minnesota. Accompanying them was another bird, closely resembling a male Red-breasted Merganser in its typical merganser profile, dark head with ragged crest, white collar and reddish-brown breast. This bird was noteworthy in that, behind the eye on each side of its head, it possessed a white patch, in the same position and of the same size and shape as the white patches on the head of a male Hooded Merganser (*Lophodytes cucullatus*). These white areas were not so sharply marked off from the dark head as in Hooded Mergansers, but were nevertheless well defined. None of these birds carried on any courting during the period of observation.

The available literature mentions no Hooded Merganser × Red-breasted Merganser hybrids. Ball (1934. *Peabody Mus. Nat. Hist. Yale Univ. Bull.*, 3:3-26), however, has described a Hooded Merganser × American Goldeneye (*Glaucionetta clangula*) hybrid.—JOHN G. ERICKSON, 611 N. Lilac Drive, Minneapolis, Minnesota, October 29, 1951.

EDITORIAL

At the annual meeting in Tennessee, Ernst Mayr announced, for John T. Emlen, Jr., chairman of the Research Committee, that the Louis Agassiz Fuertes Research Grant was awarded to Robert W. Nero, a graduate student at the University of Wisconsin, for his studies on "territorial and sexual behavior in the Red-winged Blackbird."

Volumes 86 and 87, covering the literature of 1949 and 1950, of the Aves section of the "Zoological Record" are now available. This indispensable tool may be ordered directly from the Secretary, Zoological Society of London, Regent's Park, London, N.W. 8 (price for the Aves section, 7s. 6d. plus 4d. postage) or from the Treasurer of the A.O.U., Dr. R. Alyn Moser, R.R. 1, Omaha 4, Nebraska (price per section, \$1.00). Also available at the same price are volumes 79 (1942) through 85 (1948). The Zoological Society deserves the support of Wilson Club members for performing this outstanding service to science.

Dr. George M. Sutton, recently Editor of the *Bulletin*, has taken up the duties of his new position as Professor of Zoology at the University of Oklahoma. Dr. Sutton was at the University of Michigan from 1946 to 1952. He began work at Oklahoma on Sept. 1.

Thirty members of the W.O.C. have responded to our appeal for spare issues of Numbers 1, 2, and 3 of the 1951 volume of the *Bulletin*. These members we thank for their generosity.

We wish here to make a final appeal to other members who may wish to donate any of the needed copies to the Club. In the Editorial section of the March, 1952, number, we explained the need for these *Bulletins*; extra copies to alleviate this urgent need should be sent to the "Wilson Ornithological Club Library, Museum of Zoology, University of Michigan, Ann Arbor, Michigan."

We hope to print the membership list in the December, 1952, issue of *The Wilson Bulletin*. All members are reminded that back dues, changes of address, or corrections in the spelling of names should be sent to the Treasurer, Leonard C. Brecher, by October 5, in order that the list may be as accurate as possible.

OBITUARIES

JAMES LEE PETERS, Curator of Birds at the Museum of Comparative Zoology, Harvard University, died on April 19, 1952. He was born August 13, 1889. His ornithological studies included field work in the West Indies, Central America, and South America. Mr. Peters was one of the best known and most respected ornithologists in the world. He will long be remembered for his monumental seven volumes on the "Birds of the World." He published many additional ornithological studies, was once President of the American Ornithologists' Union and for many years Editor of *Bird Banding*.

DR. THOMAS HUME BISSENETTE, a member of the Wilson Club since 1939, died recently. Dr. Bissonnette was born June 27, 1884, and earned the doctoral degree at the University of Chicago in 1923. He was well known as a teacher, an able researcher, and a capable administrator. His major studies were on avian and bovine embryology and photoperiodicity in birds and mammals. His passing marks the end of an especially fruitful career dedicated to experimental studies.

NEW LIFE MEMBER



Heinz Karl Meng was born February 25, 1924, in Baden, Germany. At the age of five he came to the United States with his parents and lived on Long Island, New York. He received B.S. and Ph.D. degrees in 1947 and 1951, respectively, at Cornell University. His doctoral research was on the Cooper's Hawk. He majored in Ornithology and minored in Entomology and Nature Study. At present he is teaching at State Teachers College, New Paltz, New York. He is a life associate of the A.O.U. and the Cooper Ornithological Club, and a member of the National Audubon Society, Hawk Mountain Sanctuary Association, and Eastern Bird Banding Association. He is especially interested in birds of prey, falconry, photography, and painting.

ORNITHOLOGICAL LITERATURE

SPECIATION AND ECOLOGIC DISTRIBUTION IN AMERICAN JAYS OF THE GENUS APHELOCOMA.
By Frank A. Pitelka. University of California Publications in Zoology, Vol. 50, No. 3,
July 20, 1951:iv + pp. 195-463, plates 17-30, 21 figs. in text. \$3.00.

This important paper analyzes the known populations of three species of jays of the undefined genus "*Aphelocoma*." The most familiar of these are the Scrub Jay (including such races as the California, Woodhouse's, and Florida Jays) and the Arizona ("Mexican") Jay. Of each population represented by an adequate sample in the nearly 5000 specimens examined, coloration and eight measurements are thoroughly analyzed. Presentation of the resulting data parallels the general pattern of such other papers, in the same series, as those on Juncos (Miller, 1941) and on Mexican populations of Red-eyed Towhees (Sibley, 1950). For reviews of these see *The Wilson Bulletin* (Brodkorb, 1941, 53:246-247; and Dickinson, 1951, 63:349-350). Geographic variations within these jays are of course far less striking than in the extreme cases of those fringillids; nevertheless Pitelka recognizes no less than 31 subspecies, of which two are newly named and others revived or described in this paper, which climaxes his years of work on the group. This is a 35% increase over the number of forms recognized by Hellmayr in the last complete review of these jays (1934).

In many ways, this paper is a model revision which will well repay careful study. Particularly satisfying are the careful analyses of molt and of variations with age and sex. Specimens were examined in many public and private collections, both in and out of the United States; nearly all the type specimens were studied either by Pitelka or by the late A. J. van Rossem. Museum work was supplemented by eight expeditions and other field studies. There is a strong and usually sound emphasis on ecology almost throughout the paper. Color is described from fresh fall-plumaged skins in all, or nearly all, cases. Readers who lack Ridgway's "Color Standards and Color Nomenclature" will be grateful for tables 1 and 2, which compare various shades of blue.

Pitelka also emphasizes unsolved problems for future workers. He points out geographic areas where special taxonomic study is needed. His discussions show the need for detailed studies of food habits on a geographic basis, in order to determine whether the geographic variations in size and proportions of the birds are correlated with their feeding habits. Weight variations remain obscure; variations in length, wingspan, and in the skeleton remain unstudied, as well as many questions of interspecific and "inter-generic" competition.

Reliance on the inadequate and misleading ornithological literature of the Southwest and Mexico has led Pitelka to underestimate the migrations of Scrub Jays. He even speculates (p. 272) that a weak humerus may prevent flights of five to twenty-five miles! His map of their, presumably, breeding and permanent resident distribution covers almost all of the states of Arizona and New Mexico, including the entire Rio Grande of New Mexico and the Salt and Gila River valleys of Arizona west to Gila Bend. Actually, Scrub Jays are winter visitants in such places, and have been recorded even farther from their main breeding range; see for example Huey (1942. *Trans. San Diego Soc. Nat. Hist.*, 9:368) and Monson (1949. *Condor*, 51:264). Because specimens taken away from breeding grounds are mostly first-year birds (the reviewer has adults, from Phoenix, Arizona), Pitelka considers that such records indicate "the dispersal" of young birds and concludes that all these jays "are nonmigratory." This may be partly a matter

of definitions; but at any rate the reader will not learn from Pitelka's paper the obvious differences in migratory behavior between the two Arizona species treated.

Taxonomically, Pitelka's concept of the species is exceptionally broad; it includes all forms occupying a similar ecological "niche," even if reproductively isolated (pp. 378-379). Behavior, call-notes, and life histories are barely touched upon. Among subspecies, the limits are narrow and uneven. A single "*Aphelocoma*" occurs in Oregon and California; on the Pacific slope north of Santa Barbara and Ventura counties, it is represented by populations that vary slightly and irregularly, without well-marked clines; the largest exceeds the smallest by 5.67 millimeters (4.5%) in mean wing length of adult males. In tail length maximum variation is 6.17 millimeters (4.4%), and in weight 18.3 grams (18.9%). In color, the paler population is inseparable from the darker in 15 to 20% of the birds, while "with an additional 15 to 20 per cent, separations would be doubtful" (p. 256); we are not told what percentage, if any, of the darker population is separable from the paler. Anywhere else, such a situation would be covered by one or at most two names; but in California and Oregon it is covered by five, with a broad "area of intergradation" which is not allowed to interfere with the drawing of neat, sharp lines on maps. Two of the populations so separated (in Santa Clara County, California) differ appreciably in only one minor respect: adult females of the "smaller" population average 5.43 millimeters (4.2%) longer in tail measurements than do the "larger" ones! Where, in this sort of thing, is what George Willett termed the "benefit to ornithology"?

This naming of minor variations and small intermediate populations is, however, quite in accord with current practice in other species in the same region. The other newly named population in this paper, *cana*, is an intermediate one inhabiting a single mountain, of small extent, and possibly scattered points elsewhere. It is difficult to understand why minor variant populations are separated in the text by such distinct races as *hypoleuca*.

Away from California, subspecies limits seem to follow the conventional 75% rule. A cline of as much as 4.7% in mean wing length of adult males (11.4% in weight) is included within the race *A. u. arizonae*. But guesswork is obvious in the maps, particularly in northeastern Arizona. Fortunately, the questionable nomenclature and the idealized maps do not conceal the admirably thorough analyses of variation.

Of the three species treated, Pitelka regards *unicolor* as the least modified. The phylogenetic discussions treat fully of juvenal bill colors and molts, but ignore juvenal plumages. The reviewer doubts that any jay existed in nearly modern aspect in the Miocene.

Like other papers in the same series, this one is not easy to use. There are no keys. The characterizations of races are scattered through the text. Specimens examined are listed without dates of collection; and though these specimens are the very basis of the entire work, the lists are relegated to a lengthy nomenclatural appendix. Partial or sectional maps, and tables, are also scattered, and are not indexed. A brief table of contents, and many cross references, however, enable the reader to find the characters of particular races.

Pitelka's summary is well written, but elsewhere there are many long and involved sentences. The discussion of ecological factors (p. 380) seems unduly technical. Readers will not easily grasp why "negative correlation between hue and intensity in *grisea* indicates that the bluest forms are not necessarily the grayest" (p. 362). "Comparable" is often used to mean "identical" or "indistinguishable." The word "variant" is also overworked. Such language tends to discourage the wide audience which this paper so richly deserves. The plates, however, help to visualize the races, and the colored frontis-

piece by Sutton forms an excellent introduction to these jays. The nine habitat photographs will aid readers unfamiliar with California vegetation, but there are none of the habitats of the other species and races. Such minor details will not deter serious students of evolution, speciation, and ecology from a careful study of the many ideas presented in this important contribution.—Allan R. Phillips.

ARIZONA AND ITS BIRD LIFE. By Herbert Brandt. Bird Research Foundation, Cleveland, Ohio, 1951:7½ × 10 in., xvi + 723 pp., 20 color plates, 16 full-page photographs, 18 pen sketches, 2 figs., 1 map. Indexed. \$15.00.

This is a rambling account of the ornithological adventures of a "naturalist bird reporter" in Arizona. Although the title might seem to include the entire state, the book in fact is limited to the southeastern one-ninth. This consists of the Mexican border wonderlands of the Sulphur Springs, San Pedro, Santa Cruz, and Altar valleys, and the marvelous Chiricahua, Huachuca, Santa Rita, Santa Catalina, and Baboquivari mountain ranges.

The book is based on field experiences of parts of eight nesting seasons during the years from 1935 to 1948. In this time, Brandt acquired a competent knowledge of southeastern Arizona's ecology, and his concept of the relation of climate to birds is quite good. Chapter 3, which treats the ecology, is well worth serious study. He loses no opportunity to attack man's abuse of soil and moisture, which is so readily apparent in the desert landscape.

A valuable part of the book, scientifically, is the appendix, in which Brandt has assembled considerable data on the nesting activities of the birds known to breed within this area; not only are his own notes included, but also those of the late Frank Willard, for many years a resident of this region. Thus he presents a wealth of data which will be a boon to all who wish to know when they may find each species at the height of its breeding season. Subspecies are listed separately, in the occasional cases where two breed in this limited area. One new subspecies is proposed, *Progne subis oberholseri*, for the Purple Martin inhabiting the saguaros of central-southern Arizona.

While Brandt's style, familiar to many ornithologists in earlier writings, is apt to be repetitious and discursive, his enthusiasm and delight in birds reveals itself between the lines and is conveyed to the reader in a wholly interesting manner. The book would be more enjoyable if the use of adjectives were not so artificial, and if trite descriptive phrases were not so frequent.

Brandt does not profess to be so much a scholar as a bird adventurer. This may account for his employment of common names for subspecies, many of which are not in the A.O.U. Check-List; this does not achieve any particular object, but only adds to the confusion already existent and further muddles the amateur. It may also account for such an oddity as the wedding of the Palmer and Plateau Thrashers (p. 132).

The book is a handsome one. It is heavy enough (five pounds) to be difficult to hold comfortably. Paper and type are pleasing. Certainly one of its most laudable attributes are the splendidly-reproduced paintings by Brooks, Peterson, Sutton, and Shortt. Especially choice are those of the Coppery-tailed Trogon, Arizona Jay, and Painted Redstart by Major Brooks, and the two plates of Blue-throated and Rivoli Hummingbirds, and Mexican Chickadee and Audubon Warbler, by Roger Peterson. The pen sketches, mainly Dr. Sutton's, add much to the attractiveness of the volume.

It may be of interest to note that the book was featured in the May, 1952 issue of *Arizona Highways* (Phoenix, Ariz.), a magazine noted for its pictorial qualities. Nine of the color plates were reproduced, one of them being used as the cover illustration. The magazine also reproduced the excellent chart of "schematic cross section of a high desert mountain range and outwash basin," which gives Brandt's views of the principal breeding association of each bird in southeastern Arizona.—Gale Monson.

BIRDS OF AN IOWA DOORYARD. By Althea R. Sherman. Edited by Fred J. Pierce. Christopher Publishing House, Boston, 1952:5½ × 8 in., 270 pp., 9 plates. \$3.75.

Miss Sherman's most valuable work as a pioneer student of life histories was with Flickers (*Colaptes auratus*), Sparrow Hawks (*Falco sparverius*), Screech Owls (*Otus asio*), and Chimney Swifts (*Chaetura pelagica*). For the first three she contrived nesting boxes with peep holes through which she watched the nestings from egg laying to fledging; there were also hand holes for removing eggs and young to be weighed. For observation of the Chimney Swifts she built a unique tower and artificial chimney, the whole 8 feet square and 30 feet high.

In this posthumous book are reprinted the monograph on many nestings of the Yellow-shafted Flicker and shorter papers on single nestings of Sparrow Hawks and Screech Owls. One long chapter, including excerpts from her notebooks, is devoted to the swifts. There are, also, nine chapters of new material which Miss Sherman had written in popular style for a book she was never able to finish, and nine papers that were either read at scientific meetings or published in *The Auk* and *The Wilson Bulletin*. Among the shorter papers is "Down with the House Wren Boxes," in which she held that this species' egg-piercing habits were responsible for the decrease of many birds, notably Bluebirds (*Sialia sialis*) and certain warblers. One wonders if it isn't time for another general check-up on the influence of the House Wren (*Troglodytes aëdon*).

Her discussion in Chapter 4 on the "guerilla warfare" that results from birds' overcrowding, especially the Brown Thrasher's (*Toxostoma rufum*) destruction of the eggs of other Brown Thrashers, will come as a revelation to students who have watched this species in sections that afford plenty of territorial room. In the same chapter is a surprising account of a Barn Swallow (*Hirundo rustica*) that came after a female had lost her mate and repeatedly tried to kill the young in her nest. One chapter reports seven years' experiments with artificial feeding of Ruby-throated Hummingbirds (*Archilochus colubris*), and another covers 25 years' observations of Phoebe (*Sayornis phoebe*). Birds briefly considered are the Catbird (*Dumetella carolinensis*), Red-winged Blackbird (*Agelaius phoeniceus*), Short-billed Marsh Wren (*Cistothorus platensis*), Sora (*Porzana carolina*), and Virginia Rail (*Rallus limicola*). Six of the author's charming bird drawings are reproduced.

Miss Sherman was plainly a most extraordinary personality. Her book reflects great energy, genuine concern for individual bird life, impatience for human stupidity, and through all a scientist's exact regard for the smallest details. She wrote with a directness that is sometimes sharp, often vivid, and always vigorous. Her bibliography includes 67 papers published from 1905 to 1932. Fred J. Pierce, the editor, deserves the gratitude of the students of bird behavior.—Ruth Thomas.

OUTDOOR EDUCATION COOK COUNTY STYLE

Conservation is an activity which concerns everyone. Not infrequently the action of individuals and groups both public and private creates a condition adverse to sound conservation. Vigilance is therefore essential to keep such problems at a minimum. Your conservation committee has this watch-dog function. It has been obligated to report many unpopular and unwise attitudes and occurrences. This kind of reporting, despite its necessity and usefulness, is depressing to write and to read.

Occasionally, however, there appears an organization so pragmatic in its purposes and so skillful in its function that the whole field of conservation could benefit by its example. This report deals with such an organization.

Just outside of the city of Chicago is a block of land comprising about 45,000 acres, sixty per cent of which is forested. Eighty per cent can be called "wild" land in that it is not under formal cultivation nor managed as a park.

This area is known as the Cook County Forest Preserve.

What is its purpose and the policy of its staff? The purpose of the Preserve may be briefly stated thus: "to preserve for all time and for all people, the forests of the county and the necessary lands connecting them." By charter these lands are dedicated to the education, recreation, and enjoyment of the people. Here then are the physical facilities to create or broaden the meaning of conservation for many people. To implement the proposed program, the administrators of the Cook County Forest Preserve created a Department of Conservation. Its activities are many and varied.

One of the first efforts undertaken was to acquaint the people of Chicago, particularly the children, with the Preserve. To this end organized field trips were conducted through various sections. Each trip was guided by a competent naturalist. As interest grew, more time was required for field trips, particularly as groups became larger. Facilities for overnight camping within a reasonable distance from Chicago are virtually nonexistent. The inevitable solution was the "day-camp." Daytime camping in the Cook County Forest Preserve by thousands of Chicago youngsters provides the condition under which principles of conservation can best be taught. The program for day-campers is diversified but one of the major activities is the study of natural history—the way plants and animals live together.

It is an impressive sight to see eager children respond to outdoor teaching. Many of the day-campers come from families in the lower income brackets where even day-camping without the facilities of the Cook County Forest Preserve would be out of the question. Fundamentals of botany, forestry, and aquatic and terrestrial zoology are taught in simple, understandable language. The many plant associations and aquatic environments serve as natural laboratories for demonstration.

It is at such day-camps that the foundations for sound attitudes toward our renewable resources are laid. It is here that we will win (or lose) the conservation battles to be fought in the future. Karl Beringer once said "Delight in knowing and understanding the beauty of nature's spectacles adds to the intrinsic quality of our lives, and at decisive moments may have a deeper influence than we can measure."

Adult training programs are also undertaken although the greater emphasis is on the youth program. In-service training in outdoor teaching is part of the adult program.

During the school season the staff continues its program of education by going directly into the public schools. Lectures on natural history and conservation reach new audiences and stimulate new interests. These lectures bring more children to the Cook County

Forest Preserve who, in turn, become better able to enjoy and understand the benefits of a conservation program.

So that no potential interest in natural history may go unsolicited, the Cook County Forest Preserve staff has even utilized radio in an attempt to enlighten and train with a series of broadcasts on out-of-door topics. These have been successful beyond expectation.

Not satisfied with only an educational and recreational program, the staff of the Preserve has gone into waterfowl research, and in 1947 reported on one of the finest jobs of duck banding in the Midwest. This report, entitled "Waterfowl Banding at McGinnis Slough Orland Wildlife Refuge for the Years 1944 and 1945" contains much important information on ducks of the Chicago area. It also has been used to clarify other waterfowl problems of the Mississippi flyway.

Last, but not least of the contributions to child and adult education, the Cook County Forest Preserve publishes a series of nature bulletins. These are one-page articles dealing with ideas, persons, species of plants or animals, geological formations, water in its various forms, etc. The lucid and delightful presentation of subjects pertaining to natural history has doubtless gone far in spreading knowledge to all age groups. This weekly almanac of ideas has a distribution of about 6,500 copies. They are sent to 135 newspapers, about 50 foreign language papers, all of the big Chicago dailies and other newspapers in the Chicago area. Virtually all the public and parochial schools in Chicago and Cook County are on the mailing list for one or more copies. It may be difficult to measure the benefits of this medium of outdoor education, but that there are benefits is undeniable. These leaflets deal with facts such as names, places, weights, height, etc., but each closes with a catchy line, a witty phrase, or a moral. For example, the leaflet entitled "Arbor Day" closed with "'Mighty oaks from little acorns grow,' but the giant sequoia grow from tiny flat seeds about the size of a pin head"; the article on "Mussels" closes thus: "There are two sexes but the difference is important only to another clam"; and the leaflet entitled "Crickets," ends with "The cricket leads a merry life: meek and voiceless is his wife." The Aesop-like flavor to this medium of education makes each lesson pleasant reading. The single page is suitable for posting on bulletin boards.

Who is responsible for the operation of this conservation organization that covers the ground from field trips, day-camps, and trailside museums to scientific waterfowl research?

There are many men who have had a hand in this laudable effort. Administrators, public officials, philanthropists, and civic-minded citizens have all played a part. In our opinion, the lion's share of the credit must go to Roberts Mann, Superintendent of Conservation. Seven years ago he was joined by Dr. David H. Thompson, Senior Naturalist of the Cook County Forest Preserve. Together these two field-wise naturalists are bringing conservation to places and people where conservation and wild creatures in nature are new ideas under the sun.

The Conservation Committee of the Wilson Club takes this opportunity to commend the Cook County Forest Preserve as well as Superintendent Mann and his staff for efficiently accomplishing the momentous task of bringing a conservation consciousness to the Chicago region.—Robert A. McCabe.

WILSON ORNITHOLOGICAL CLUB



BOOKS: COMPLETE LIST 2

Following the complete list of books owned by the Wilson Ornithological Club Library that was published in *The Wilson Bulletin* for September 1943, a list of the year's accessions has been published in each September issue. However, the earlier lists are not available to many members and, in any case, it is inconvenient to consult nine separate listings. Consequently, the Library Committee, under the chairmanship of George J. Wallace, has prepared a complete list of the books on the Wilson Ornithological Club Library shelves.

We hope that Club members and friends will find this useful in their ornithological researches and also as a guide in their efforts to fill, with their generous donations, some of the more important gaps in the Library.

A representative collection of pamphlets, reprints, and ornithological periodicals are also available to Club members, but their complete listing is not practicable at this time. Visitors to the Library will find a

few recordings of bird songs. However, the record player, lent to the Library some years ago by a Club member, cannot, by modern standards, be called a good one. We hope that it can soon be replaced, either by generous donations from Club members or by funds derived from the sale of duplicate items in the Library.

Inquiries about the facilities and needs of the Library and requests to borrow books may be addressed to: Wilson Ornithological Club Library, Museum of Zoology, Ann Arbor, Michigan. All members of the Club are privileged to borrow books. It has not been necessary so far to set a definite time-limit on loans, except for current periodicals, but members are asked to return books promptly when they have finished using them. Books and other loans are sent postpaid, but borrowers are expected to pay return transportation. The post-office book rate makes the cost negligible.

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PROCEEDINGS OF THE THIRTY-THIRD ANNUAL MEETING

BY HAROLD F. MAYFIELD, SECRETARY

The Thirty-third Annual Meeting of the Wilson Ornithological Club was held at the Greystone Playhouse, Gatlinburg, Tennessee, on Friday and Saturday, April 25 and 26, 1952. It was sponsored by the Tennessee Ornithological Society, Georgia Ornithological Society, and Carolina Bird Club.

There were four sessions devoted to papers, an evening program of motion pictures, and two general business meetings. A meeting of the Executive Council was held on the evening of April 24. After the motion picture session on Friday evening, members and guests were entertained at a reception by the Tennessee Ornithological Society. A registration fee of \$1.00 was charged.

The Annual Banquet was held on Saturday evening, with President Maurice Graham Brooks serving as toastmaster and speaker. Local entertainment was provided.

Informal field trips were held Friday morning, and guided field trips Saturday morning and all day Sunday. The sessions on Friday and Saturday began in mid-morning to permit the maximum time afield.

FIRST BUSINESS SESSION

President Brooks called to order the first general meeting at 10 a.m., Friday, April 25. The minutes of the 32nd annual meeting were approved as published in the *Wilson Bulletin* for September, 1951. The report of the treasurer, Leonard C. Brecher, was presented and approved by the membership.

Secretary's Report

The secretary, Harold Mayfield, reported that the amendment to the constitution submitted to the members by mail ballot in 1951 was passed. This amendment eliminated the associate class of membership, with the effect of increasing the minimum cost of membership to \$3.00.

The secretary summarized the principal actions of the Executive Council as follows:

1. Harrison B. Tordoff of the University of Kansas was unanimously re-elected editor of *The Wilson Bulletin* for 1952.
2. The Executive Council accepted the invitation of the University of Michigan and the Michigan Audubon Society to hold the 34th Annual Meeting at the Biological Station near Cheboygan, Michigan, on Friday and Saturday, June 12 and 13, 1953. A meeting of the Executive Council will be held on June 11 and organized field trips will be offered on Sunday, June 14.

Treasurer's Report

The treasurer, Leonard C. Brecher, reported on the finances of the club. His report was approved, subject to the report of the Auditing Committee scheduled for the following day. A summary of this report appeared in the June, 1952, issue of the *Bulletin*.

Library Committee

George Wallace, chairman, reported that accessions to the Library since the last annual

meeting include 44 books, 365 reprints, 78 magazines and bulletins, and 35 pamphlets—a total of 522 items. The leading donors of the year were Margaret M. Nice and Nada Kramer. Members of the club are borrowing books by mail at an increasing rate each year.

Illustrations Committee

Robert M. Mengel, chairman, reported that the committee is continuing its service to authors who want finished drawings prepared from sketches. This work will be done by the committee at a charge of \$1 per hour, with the money going to the color-plate fund of the *Bulletin*.

Conservation Committee

Robert A. McCabe, chairman, reported by letter that the Conservation Committee has published articles in the *Bulletin* for September 1951, and March 1952. Other articles are to appear in later issues.

Louis Agassiz Fuertes Research Grant Committee

Ernst Mayr, reporting for Chairman John Emlen and the committee, stated that the committee's selection for the 1952 grant was Robert W. Nero of the University of Wisconsin, who is working on "Territorial and Sexual Behavior in the Red-winged Blackbird."

Membership Committee

Ralph M. Edeburn, chairman, reported that the names of 207 prospective members enrolled since the 1951 Annual Meeting were posted for the inspection of members and for election by vote at the final business session. On April 15, 1952, the club had 1788 members and 155 institutional subscriptions to the *Bulletin*. The membership has continued to grow even though the elimination of the associate membership class has raised the minimum cost of membership.

Temporary Committees

The President appointed three temporary committees as follows:

Auditing Committee

Frederick V. Hebard, Chairman
Burt L. Monroe
Mrs. Herbert E. Carnes

Resolutions Committee

Richard H. Pough, Chairman
Zeno P. Metcalf
Ben Coffey, Jr.

Nominating Committee

O. S. Pettingill, Jr., Chairman
A. W. Schorger
R. Allyn Moser

SECOND BUSINESS SESSION

The second and final general business meeting was called to order at 10 a.m., Saturday, April 26, by President Brooks.

The applicants for membership, whose names were posted in the reception area, were elected to the club.

Report of Auditing Committee

The Auditing Committee reported that the books of the treasurer had been examined and found to be in excellent order. Special thanks were expressed to Burt Monroe for the special assistance he had given the new treasurer at the start of the year.

Report of Resolutions Committee

WHEREAS variations in the intensity of solar ultraviolet appear to have a significant influence on many organisms including birds, BE IT RESOLVED that the Wilson Ornithological Club urge the United States Weather Bureau to give increased attention to accurate recording of such variations.

BE IT RESOLVED that the Wilson Ornithological Club express its great appreciation to the officials of the Great Smoky Mountains National Park for all the things they have done to make this meeting and the field trips successful.

BE IT RESOLVED that the Wilson Ornithological Club express its sincere thanks to the Gatlinburg Chamber of Commerce and the Greystone Hotel for the facilities that have been made available during these meetings and for the many advance arrangements that have contributed so greatly to the comfort of those attending.

BE IT RESOLVED that the Wilson Ornithological Club tender its wholehearted thanks to Arthur Stupka and the other members of the local committee for the time and thought that went into the arrangements which have made this meeting such an outstanding success as a scientific and social gathering and as a unique field experience for so many of us.

BE IT RESOLVED that the Wilson Ornithological Club express its appreciation to Gretchen and Bill Postlewaite of the Gatlinburg Press for the fine publicity they have given this meeting in this week's issue of the Press.

Election of Officers

Olin Sewall Pettingill, Jr., reported for the Nominating Committee and proposed the following members for officers in 1952: President, Walter J. Breckenridge; First Vice President, Burt L. Monroe; Second Vice President, Harold F. Mayfield; Treasurer, Leonard C. Brecher; Secretary, Phillips B. Street; Elective members of Executive Council, Fred T. Hall (term expires 1953), W. W. H. Gunn (term expires 1954), Joseph C. Howell (term expires 1955).

The report of the Nominating Committee was accepted, and the secretary was instructed to cast a unanimous ballot for these nominees.

PAPERS SESSIONS

Friday, April 25

Arthur Stupka, U. S. National Park Service, *Some Natural History Features of Great Smoky Mountains National Park*, slides.

V. E. Shelford, University of Illinois, *An Experimental Approach to the Study of Bird Populations*, slides.

Harrison B. Tordoff, University of Kansas, *The Relationships of the "Fringillid" Subfamily Carduelinae*, slides.

- Ernst Mayr, American Museum of Natural History, *Problems of Bird Systematics*.
- Eugene P. Odum, University of Georgia, *Seasonal Periodicity in Fat Deposition in Birds*, slides.
- Nicholas Cuthbert, Central Michigan College, *Food Requirements of the Black Tern*, slides.
- Josselyn Van Tyne, University of Michigan, *Systematic Records on Bird Nests*, slides.
- Charles H. Blake, Massachusetts Institute of Technology, *Birds and Waves*, slides.
- Margaret Morse Nice, Chicago, Illinois, *Concerning Incubation Periods*.
- Aretas A. Saunders, Canaan, Connecticut, *Variations in the Songs of the Purple Finch*.
- James H. Jenkins, University of Georgia, *Distribution and Abundance of the Wild Turkey in Georgia*, slides.
- Ralph Edeburn, Marshall College, *Activities at a Nighthawk's Nest*, motion pictures.
- Douglas E. Wade, Clemson Agricultural College, *Pileated Woodpecker and Horned Grebe*, motion pictures.
- Karl Maslowski, Cincinnati, Ohio, *Earthquake Lake*, motion pictures.

Saturday, April 26

- Olin Sewall Pettingill, Jr., Carleton College, *Ornithologically Unexplored Areas of the United States*, slides.
- Thomas L. Quay, North Carolina State College, *Habitat and Territory in Macgillivray's Seaside Sparrow*, slides.
- Chandler S. Robbins, U. S. Fish and Wildlife Service, *Cooperative Fall Migration Studies on the Broad-winged Hawk in 1951*, slides.
- Edward L. Seeber, Marshall College, *The Changing Waterfowl Populations in the Central Ohio Valley*.
- Arthur Stupka, U. S. National Park Service, *Some Notes Relating to the Mortality of Screech Owls in Great Smoky Mountains National Park*.
- Haven H. Spencer, Ann Arbor, Michigan, *The 1951-52 Winter Invasion of Boreal Bird Forms in Michigan*.
- James T. Tanner, University of Tennessee, *Survival Rates of Passerine Birds*, slides.
- Joseph C. Howell, University of Tennessee, *A Population Index for the Bald Eagle in East Central Florida*.
- Harold S. Peters, U. S. Fish and Wildlife Service, *The Cooperative Mourning Dove Study*.
- Kenneth C. Parkes, Cornell University, *The Sharp-tailed Sparrow in New York: A Re-evaluation of the Races*, slides.
- Frederick V. Hebard, Philadelphia, Pennsylvania, *The Warblers of Southeastern Georgia*.

ATTENDANCE

Members and guests registered at the meeting numbered 359. They came from 26 states and one province of Canada.

From **Alabama**: 3—*Birmingham*, Mrs. Blanche E. Dean, Mrs. John H. Williamson; *Fairfield*, Thomas A. Imhof.

From **California**: 2—*San Francisco*, Maxine Chenoweth, Paul Chenoweth.

From **Connecticut**: 2—*Canaan*, Aretas A. Saunders; *New Haven*, Mrs. Doris Lehman.

From **District of Columbia**: 3—*Washington*, Allen J. Duvall, Mr. and Mrs. C. O. Handley, Jr.

- From **Florida**: 4—*Daytona Beach*, Mr. and Mrs. C. H. Ekdahl; *Ponca City*, Mr. and Mrs. Joe C. Creager.
- From **Georgia**: 63—*Athens*, J. H. Jenkins, Gibson Johnston, Sr., Jim Major, Eugene P. Odum, Bob Pearson; *Atlanta*, Ann F. Anderson, Dr. Sam A. Anderson, Orpha P. Baker, Mr. and Mrs. George Beal, Mrs. J. E. Boyd, Beverly Brown, Rebecca Brown, Mrs. J. M. Candlish, Mrs. Charles G. Cowan, Gertrude C. Werner, Ray C. Werner, Mrs. J. C. Olins, Mr. and Mrs. Richard A. Parks, Mrs. E. R. Partridge, Fay S. Peters, Harold S. Peters, Ralph L. Ramsey, Cleo Sampson, Mrs. J. Morgan Smith, Mr. and Mrs. W. J. Snow, Mrs. Frances Stafford, Eva M. Stokely, Mrs. B. H. Willinghorn; *Augusta*, J. Fred Denton, Mrs. Gary Satcher; *Collegeboro*, Gilbert C. Hughes, III, Jimmy Oliver; *College Park*, Mr. and Mrs. William W. Griffin; *Columbus*, T. Charlton Hudson, Mrs. Frank Schley; *Dalton*, Blanche Gardner, Mr. and Mrs. R. E. Hamilton; *Decatur*, J. B. Ross; *Demorest*, Dorothy P. Neal; *Folleston*, Frederick V. Hebard; *Macon*, Edmund Farrar, Jr.; *Marietta*, Manella B. Laud, Mary Phillips; *Milledgeville*, Mrs. Fern E. Davis, Gertrude Manchester, Mrs. Lucille C. Rutchford, Gloria Vicedomini; *Richmond Hill*, Sam Miller; *Robins A. F. B.*, Nathaniel R. Whitney, Jr.; *Savannah*, Mr. and Mrs. Herman W. Coolidge, Ivan R. Tomkins; *Statesboro*, Tulley Pennington; *Thomasville*, Leon Neel, H. L. Stoddard, Sr., George M. Sutton; *Warner Robins*, Mr. and Mrs. Thomas J. Cater, Jr.
- From **Illinois**: 22—*Blue Island*, Karl E. Bartel; *Catlin*, Mary Baldwin, S. Glidden Baldwin; *Champaign*, Earle A. Davis, Jr.; *Chicago*, Muriel Beuschlein, Mr. and Mrs. A. L. Campbell, Constance Nice, L. B. Nice, Margaret M. Nice, Millicent Stebbins; *Danville*, Jack C. Blackman; *Elsah*, Norwood Hazard; *Moline*, Mr. and Mrs. Elton Fawks; *Quincy*, Edgert J. Long, O.F.M., Bro. Michael, Rozella M. Nichols; *Springfield*, Virginia S. Eifert; *Urbana*, Harvey I. Fisher, V. E. Shelford; *Ursa*, Mrs. Tom Sorrill.
- From **Indiana**: 12—*Centerville*, Helen Cope, J. P. Cope; *Fort Wayne*, Margaret Umbach; *Fremont*, Mrs. R. R. Caswell; *Hanover*, Mr. and Mrs. J. Dan Webster; *Indianapolis*, Mildred Campbell, Mrs. S. G. Campbell; *Richmond*, Richard Myers, Mr. and Mrs. C. S. Snow, Charles Thaeler, Jr.
- From **Iowa**: 9—*Davenport*, Albia F. Hazard, N. C. Hazard, Dr. and Mrs. J. P. Leonard, Peter Petersen, Jr.; *Iowa City*, Dr. and Mrs. A. Klaffenbach, Dr. and Mrs. Peter P. Laude.
- From **Kansas**: 1—*Lawrence*, Harrison B. Tordoff.
- From **Kentucky**: 13—*Louisville*, Mr. and Mrs. Leonard C. Brecher, Helen G. Browning, Mr. and Mrs. Dulaney Logan, Mabel Slack, Mrs. F. W. Stamm, Mrs. Wm. B. Tabler, Audrey A. Wright, Mr. and Mrs. James B. Young; *Valley Station*, Donald Summerfield.
- From **Maryland**: 5—*Chevy Chase*, Mr. and Mrs. Elting Arnold; *Laurel*, Chandler S. Robbins; *Towson*, Mr. and Mrs. R. D. Cole.
- From **Massachusetts**: 3—*Boston*, Phoebe G. Arnold; *Lincoln*, Charles H. Blake; *Wellesley*, Lucy Fisher.
- From **Michigan**: 47—*Albion*, Shirley Brady, Louise Canfield, Wm. B. Canfield, Clara Dixon, Mary Ertell, Joan Glass, Maureen Kennedy, Owen Perkins, Jim Turner; *Ann Arbor*, Andrew J. Berger, Dorothy Blanchard, Mr. and Mrs. H. W. Hann, Mrs. Reuben L. Kahn, Cecil Kersting, Mary McNeil, Robert M. Mengel, Mrs. Beryl W. Spencer, Haven H. Spencer, J. Van Tync; *Dearborn*, Mrs. Harold A. Barber, Harriet Berytold Woolfenden; *Detroit*, Margaret G. Common; *Grosse Pointe*, Clarence

- J. Messner, Hazel W. Messner; *Jackson*, Hazel L. Bradley, Dr. and Mrs. W. Powell Cottrille, Robert A. Whiting; *E. Lansing*, Mr. and Mrs. George Wallace; *Huntington Woods*, Mr. and Mrs. Neil T. Kelley; *Kalamazoo*, Mr. and Mrs. H. Lewis Batts, Jr., Mr. and Mrs. C. B. Cook, Harold O. Wiles, Helen Wiles, Judy Wiles; *Mt. Pleasant*, Mabel Cuthbert, N. L. Cuthbert, Irene F. Jorac; *Port Huron*, Elizabeth Kiefer, Francis Kiefer; *Whitmore Lake*, Mrs. Jane S. Mengel; *Ypsilanti*, Esther Byers.
- From **Minnesota**: 11—*Duluth*, Doris E. Bronoel, Joel K. Bronoel, Elaine Hofslund, P. B. Hofslund, Evelyn Putnam; *Minneapolis*, Lewis L. Barrett, Mrs. Miriam C. Barrett, Mr. and Mrs. W. J. Breckenridge, Theodora Melone, Vera E. Sparkes; *Northfield*, Olin Sewall Pettingill, Jr.
- From **New Jersey**: 3—*Tenafly*, Betty Carnes, *Verona*, Mr. and Mrs. Alfred E. Eynon.
- From **New York**: 12—*Buffalo*, Fairman Cumming, Harold D. Mitchell, Mildred D. Mitchell, Edward L. Seeber; *Ithaca*, Julia Temple Grinnell, Lawrence I. Grinnell, Kenneth C. Parkes; *New York*, Florence Page Jaques, Francis L. Jaques, Ernst Mayr; *Pelham*, Richard H. Pough; *Waterloo*, Jason A. Walker.
- From **North Carolina**: 18—*Bryson City*, Mary Jenkinson; *Chapel Hill*, Mrs. R. Lynn Ganet, Mrs. H. W. Walters; *Charlotte*, H. V. Autry, Mrs. H. V. Autry, Jr., Sara Nooe, Mrs. George C. Potter, Kitty Sandifer; *Durham*, Mrs. Mary M. Guy; *Lenoir*, Mr. and Mrs. Chas. E. Lavin; *Matthews*, B. R. Chamberlain; *Raleigh*, Charlotte Hilton Green, Mr. and Mrs. Z. P. Metcalf, Robert Overing, T. L. Quay, Richard Weaver.
- From **Ohio**: 15—*Cleveland*, Elsie Erickson, Adela Gaede, Lucille Mannix, Mildred Stewart; *Columbus*, W. L. Muhlbach; *Delaware*, William D. Stull; *Solon*, Mr. and Mrs. Louis Sturm; *Steubenville*, Clinton S. Banks, Elizabeth Banks, Earl Farmer, Mr. and Mrs. Harry Graul; *Toledo*, Harold Mayfield, John M. McCormick.
- From **Pennsylvania**: 7—*Exton*, Berrell E. Street, Phillips B. Street; *Gettysburg*, G. E. Grube; *Pittsburgh*, Anthony Netting, M. Graham Netting, Dana P. Snyder; *York*, K. V. Gardner.
- From **South Carolina**: 8—*Charleston*, Mr. and Mrs. Ellison A. Williams; *Clemson*, Norma Pearson, Douglas Wade; *Georgetown*, William C. Grimm; *Greenville*, May W. Puett, *McClellanville*, Robert D. Edwards; *Travellers Rest*, Ruth Gilreath.
- From **South Dakota**: 2—*Sioux Falls*, Mr. and Mrs. J. S. Findley.
- From **Tennessee**: 57—*Cookeville*, Beulah Clark, Amy Johnson; *Elizabethton*, Dr. and Mrs. Lee R. Herndon, Dick Hughes, Mrs. Hugh Taylor; *Franklin*, Mrs. Elizabeth DeBrohun, Ruth White; *Gatlinburg*, Mr. and Mrs. Arthur Stupka; *Knoxville*, Hugh M. Davis, Jr., J. C. Howell, Don Hurley, John C. Jacobs, Jr., Reed Jenkins, Mr. and Mrs. W. M. Johnson, Richard R. Laurence, Mr. and Mrs. R. A. Monroe, Holly Overton, Bob Scott, William F. Searle, III, John Sonner, James T. Tanner, Isabel H. Tipton, Samuel R. Tipton, Mr. and Mrs. H. VanDeventer; *Memphis*, Frederick T. Carney, Mr. and Mrs. Ben B. Coffey, Jr., Nell Coleman, Tom Conley, Jr., Mary Davaut, Johnny Johnson, Frances E. Jones, Lawrence C. Kent, Harry Landis, Alic Smith, Demett Smith, Brother Leo Thomas; *Nashville*, Mrs. William Bell, Ruth Castles, Clara Williams Fentress, William E. Fentress, Albert F. Ganier, Mrs. Ernest Goodpasture, Frances Hagar, Mrs. F. C. Laskey, G. R. Mayfield, Jennie Riggs; *Oak Ridge*, Mrs. C. Brockney, Mr. and Mrs. R. J. Dunbar, Julia Moore, Barbara S. Thompson.
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Stanwyn G. Shetler, Milo D. Stahl; *Norfolk*, Mrs. Floy Burford; *Richmond*, Frederic R. Scott.

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From **Wisconsin**: 7—*Madison*, Mr. and Mrs. A. W. Schorger, *Milwaukee*, Helmut C. Mueller; *Oshkosh*, John L. Kaspar; *Two Rivers*, Winnifred Smith; *Wausau*, Herbert W. Levi; *West Bend*, Gerald A. Vogelsang.

From **Ontario, Canada**: 6—*Pickering*, Doris H. Speirs, J. Murray Speirs; *Thistletown*, Irma Metcalfe; *Toronto*, Olive Barfoot, W. W. H. Gunn, Douglas Scott Miller.

This number of *The Wilson Bulletin* was published on September 23, 1952.

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ROBERT M. MENGEL

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Manuscripts intended for publication in *The Wilson Bulletin* should be neatly typewritten, double-spaced, and on one side only of good quality white paper. Tables should be typed on separate sheets. Before preparing these, carefully consider whether the material is best presented in tabular form. Where the value of quantitative data can be enhanced by use of appropriate statistical methods, these should be used. Follow the A. O. U. Check-List (fourth edition) and supplements thereto insofar as scientific names of United States and Canadian birds are concerned unless a satisfactory explanation is offered for doing otherwise. Use species names (binomials) unless specimens have actually been handled and subspecifically identified. Summaries of major papers should be brief but quotable. Where fewer than five papers are cited, the citations may be included in the text. All citations in "General Notes" should be included in the text. Follow carefully the style used in this issue in listing the literature cited. Photographs for illustrations should be sharp, have good contrast, and be on glossy paper. Submit prints unmounted and attach to each a brief but adequate legend. Do not write heavily on the backs of photographs. Diagrams and line drawings should be in black ink and their lettering large enough to permit reduction. The Illustrations Committee will prepare drawings, following authors' directions, at a charge of \$1 an hour, the money to go into the color-plate fund. Authors are requested to return proof promptly. Extensive alterations in copy after the type has been set must be charged to the author.

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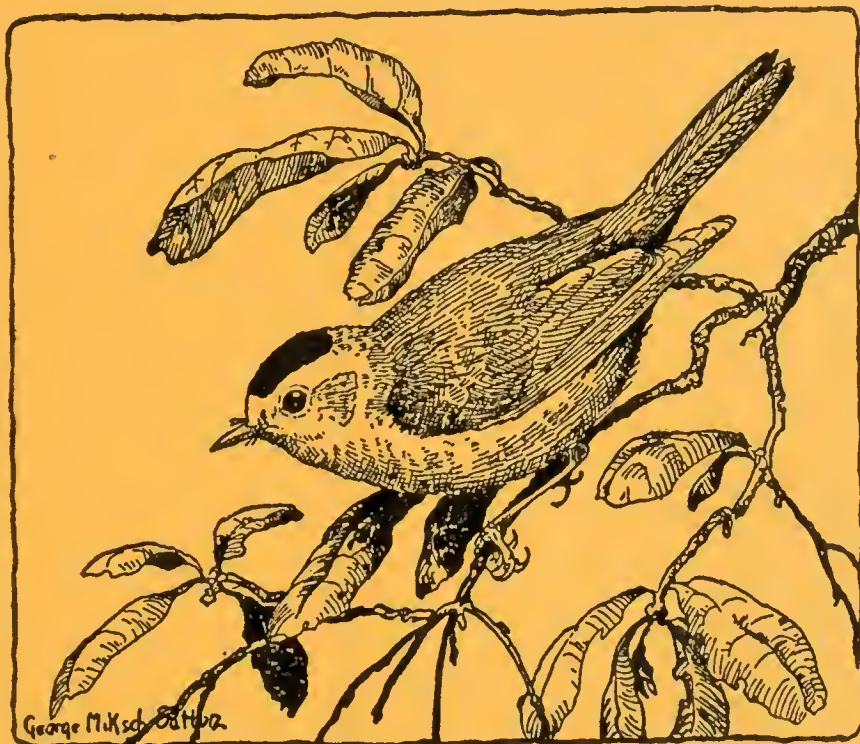
Members are reminded of the Club's urgent need of spare issues of Numbers 1, 2, and 3 of the 1951 volume of the *Bulletin*. For further details, see Editorial section of this issue.

December 1952

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Founded December 3, 1888

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THE WILSON BULLETIN

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THE WILSON BULLETIN

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THE PRESIDENT'S PAGE

Everyone leading an active life today realizes that extensive and rapid changes are taking place, not only in our physical surroundings, but also in our methods and techniques of doing almost everything. Even our birding is experiencing changes. In years gone by a large part of the significant contributions to ornithology came through observations and researches of individuals working essentially by themselves in the field as well as in the laboratory. Although there are still unlimited opportunities for individual work, today many resourceful bird students are turning to cooperative projects to furnish the answers to many baffling questions that still face the ornithologists. Those bird researchers with organizing tendencies and facilities might well probe deeper into the possibilities of such organized endeavor as a means of securing data bearing on problems of migration, local movements, homing and related bird phenomena.

Cooperation between bird students as it pertains to subject matter alone is not new, of course. The enormous bird banding program, direction of which was assumed by the United States Biological Survey back in 1920, attests to that. Observation coordinated as to time, as well as to subject matter, is the more modern approach, although even this technique appeared early in the National Audubon Society's Christmas censuses. The coordinated reporting of a single season's findings on certain species, such as has been carried on by the Wisconsin Society for Ornithology, has been productive of much better over-all pictures on the nesting distribution and migration of these species than could be secured by random reporting. The U. S. Fish and Wildlife Service's nationwide study of the migration of the Broad-winged Hawk, carried on under the direction of C. S. Robbins, Patuxent Research Refuge, Laurel, Maryland, is bringing to light many new facts concerning the routes, rate of migration, and the effects of weather on the flights. And very much in the public eye just at present is the project of coordinating nocturnal observations of bird migrants seen crossing the face of the moon. Inaugurated by Dr. George H. Lowery, Jr., Museum of Zoology, Louisiana State University, Baton Rouge, this new and somewhat romantic form of bird study has attracted many cooperators and is producing factual data on many phases of the still rather mysterious nocturnal movements of birds. Both of the last mentioned projects are operating at the present time, and the leaders of both would welcome the services of more volunteer observers.

The above are examples of projects organized on a continent-wide basis. Smaller local field studies carried out cooperatively by the members of local clubs can also be productive of new and more accurate information. I recently enlisted such cooperation in determining the extent of daily movements of wintering American Golden-eye flocks, while the Craighead brothers used such methods in outlining the daily feeding movements of hawks in Jackson Hole, Wyoming. With the increase in numbers of local bird clubs more and more problems, difficult or impossible of solution through individual observations, can now be attacked by such coordinated teams. And most active clubs have keen and experienced members who, having passed through the early stages of field identification, are groping about for projects into which they can direct their energies which will result in real contributions to the science of ornithology. The major lack at the moment, I feel, is of more originality and ingenuity on the part of the leaders of organized groups in outlining such cooperative projects aimed at the solution of the many ornithological problems in need of more and better factual data.

W. J. BRECKENRIDGE



OLIVACEOUS CORMORANT
(*Phalacrocorax olivaceus mexicanus*)

Immature. From a drawing in watercolor made in Mexico by George Miksch Sutton. Fourth in the Hilton memorial series of color plates.

OLIVACEOUS CORMORANT

BY EUGENE EISENMANN

THE Olivaceous Cormorant (*Phalacrocorax olivaceus*) has one of the most remarkable distributions of neotropical birds. It not only ranges throughout tropical America but breeds north to southern Texas, Louisiana, and the Bahamas and south to the sub-Antarctic coast of Cape Horn. It nests in great colonies on coastal islands drenched by salt spray, but is equally common on large rivers and fresh-water lakes. Isolated pairs or small groups can be found on lesser wooded streams and ponds. Abundant at sea-level in the warm waters of the torrid zone, it yet manages to survive on cold lakes high in the Andes. Goodall, Johnson, and Philippi (1951. "Las Aves de Chile," 2:82) report their amazement at finding ten of these cormorants on Lake Cotacotani, east of Arica, Chile, at an elevation of 4,800 meters—almost 14,500 feet.

In appearance and behavior this cormorant much resembles the familiar North American *Phalacrocorax auritus* and *P. carbo*. Distinctly smaller than either, adults of *P. olivaceus* look solidly black in the field, and immatures dull brownish, paling to whitish on the breast in juveniles. In breeding dress, at close range, one can see fine, white, filament-like feathers on the sides of the head and neck, a white line bordering the gular pouch, and the olive-slate centers of the feathers on the upper back and wing-coverts.

My own experience with this species has been chiefly in Panamá. There the nominate race is common wherever sufficient water exists, inland as well as along both coasts. I have seen pairs along small, shallow rivers and lakes, usually perched on trees, not only in the lowlands, but also at altitudes of over 4,000 feet. On Gatun Lake, a large artificial lake created in the building of the Canal, this cormorant is the only swimming bird regularly observed. Here one finds the cormorants drying their feathers while perched on projecting branches of the drowned forest or slipping through the water, largely submerged, with only serpentine head and neck showing. Lines of cormorants can often be noted flying high across the continent from ocean to ocean. At low tide, great flocks, moving in unison, fish where the waves break across the exposed rocks and flats at Panama city. Individuals perch on the spars of fishing vessels or on the sea-wall, unconcerned by the presence of human beings. In the Gulf of Panama these birds are especially abundant, breeding on many islets. By preference nests are built in trees, but on islands where trees are absent low bushes are accepted, and, if need be, the

bare rock or ground. (See R. C. Murphy, 1936. "Oceanic Birds of South America," 2:909-915.)

Several subspecies have been recognized, but the differences are slight, chiefly size and relative proportions. Oddly enough, the nominate race, which extends widely over the tropics, averages larger than the races described from the presumably cooler extremities of the range, both north (*mexicanus* and *chancho*) and south (*hornensis*). The species name *P. olivaceus* used in the A.O.U. Check-List, should be replaced, according to Hellmayr and Conover (1948. *Field Mus. Nat. Hist., Zool. Series*, 13, Pt. 1, No. 2:141), by *P. brasiliensis*.

The A.O.U. Check-List Committee, translating the current technical designation, has adopted Olivaceous Cormorant as the English name for the species as a whole. While superior to the unduly restrictive geographic names, such as Mexican and Brazilian Cormorant, that have been used, this selection is hardly felicitous for a bird that is essentially all black. My personal preference would be Neotropic Cormorant, as the species extends over the entire Neotropical Region and is the only cormorant that does so.

11 BROADWAY, NEW YORK 4, NEW YORK, SEPTEMBER 19, 1952

FALL MIGRATION OF BIRDS AT CHICAGO

BY HOLLY REED BENNETT

INTRODUCTION

THIS study of fall migration is the result of a daily census of land birds in Lincoln Park, Chicago, in the five years 1946 to 1950 inclusive. The conclusions reached are based mainly on the census record of birds that migrate chiefly at night. This paper is a regional study of grounded migrants, most of which arrived during hours of darkness. My conclusions may or may not apply to day migrants and to migrating birds in other regions.

Lincoln Park lies in a 4½ mile strip along the shore of Lake Michigan, the strip averaging about ½ mile wide. The southern boundary is along North Avenue, 2 miles north of the business center of Chicago. The study area was confined to the southern part of the park, south of Diversey Parkway. The 1¾ mile route traversed each morning meandered so as to include the localities most frequented by the various types of land birds. The route varied somewhat, depending on the season and weather. The census was taken each day between 6:30 and 8:45 a.m. during the principal migration period. The daily time spent afield decreased as migration waned into November, when days are short and birds few in number. On Sunday more time was available and the route was traversed at a more leisurely pace. The observations cover the periods August 1 to November 30 in each of the five years.

Some of the variations in this census record are due to purely chance differences in the number of birds present in the study area from day to day, and from season to season, and to the chance differences in the number of birds present which are seen by the observer. This fortuitous factor is most important in day-to-day counts, and in the yearly records of species seen in small numbers; its effect is reduced in the larger counts of the more abundant species. In this study the major differences in the daily and yearly counts of the more abundant species are regarded as mostly not fortuitous. Slow changes in bird population are known to take place and sudden changes in the populations of certain species have occurred due to special causes, but I have arbitrarily assumed that the autumn populations of the species involved were approximately the same in each of the five years.

Migration routes are believed to be relatively constant year after year. Birds nesting in a given area normally migrate southward within a certain zone or band of territory, and radical departures from such normal migration routes must be uncommon for most species. The bird waves that characterize the autumn migration, the wide variation in the season counts

of the abundant species, and other features of the census record are believed to be due chiefly to variable weather conditions, and particularly to the invasion of the north-central states by great masses of relatively cold northern air, preceded by cold fronts. This conclusion is reached from a study of the Daily Weather Map for each day, in connection with the Lincoln Park census records, and additional weather data published in the Monthly Weather Review. Also essential was the record kept by the writer of the time of important weather changes at Chicago.

Brief References to other Migration Studies

The importance of the relation of bird migration to wind direction and the cyclonic circulation has only been recognized in recent years. McMillan (1938:402-403) stated "the general hypothesis that, whenever possible, migrating birds ride the wind" and Landsberg (1948) used the expression "pressure-pattern flying" for the tendency of birds to take advantage of tail winds in long distance flights, just as aircraft do. This has been confirmed recently by the notable study of nocturnal migration by Lowery (1951) based on telescopic night observations at 34 stations over a wide area east of the Great Plains and south to Yucatán. He finds that a striking correlation exists between air currents and the direction of night flights, and that the flow of migration is, in general, coincident with the flow of air. Lowery's study was restricted to the spring migration, but this correlation probably applies equally in the autumn. Also important is his discovery that most night migrants utilize less than half of the night for their migratory flights, the bulk of night migration ordinarily being between 9 p.m. and 2 a.m. This is an important limiting factor on the distances ordinarily covered during night flights.

The relation of spring migration to weather phenomena has been discussed and the literature reviewed by Bagg, *et al.* (1950), who conclude that during the period of spring migration, pronounced movement will take place into or through a given region during the interval between the passage of a warm front and the subsequent arrival of a cold front. The winds are southerly in these meteorological areas, sometimes strong. These authors distinguish onrushing waves impelled forward by favorable conditions and arrested waves, which are onrushing waves grounded by adverse weather conditions as the cold front approaches, or by quasi-stationary fronts encountered.

Detailed studies have been made of the fall migration of hawks. Allen and Peterson (1936) found at Cape May, New Jersey, that a NW wind of fairly strong or strong force is almost certain to be accompanied by a large influx of migrant hawks and many smaller land birds. Stone (1937:41, 52-53, 262-263) says of the same region that the great flights are always coincident with a NW wind and a falling temperature, and after shifts to a NW wind the whole Cape May Point area will be deluged with birds, these remarks applying not only to hawks, but to kingbirds, flickers, Woodcock (*Philohela minor*), warblers, and others.

The autumn hawk migrations of 1934-1938 at Hawk Mountain, Pa., were studied by Broun (1939). He noted that the most remarkable flight was during 3 days of NW wind following the passage of a hurricane up the Atlantic coast in September, 1938. His daily records for September and October show that 61.9% of the hawks counted were seen on days of NW to NE wind. The NW-NE wind days show an average count

of 340, which was 2.5 times the 134 average count for days of other wind directions. The later, November records are irregular, with 17.9% of the hawk count on days of NW-NE wind.

Fishers Island, at the east entrance to Long Island Sound, is one of three stepping stones in the migration route of hawks (mostly Sharp-shinned Hawks, *Accipiter striatus*) flying from eastern New England southwest to Long Island. The Fergusons (1922) counted 42 flights during 5 fall seasons, of which 30 were with NW wind and 5 with winds NW to NE. In some cases the hawks flew high with NW wind when the surface wind was NE.

Reports on fall migration published in *Audubon Field Notes* contain comments on the relation of weather to migration. Concerning the 1951 period in the New England region, Griscom (1952:5) said, "There were no less than 17 marked cool waves with northwest winds from July 31 to Oct. 21; as a result the whole eastern coast was flooded with land-bird migrants in wave after wave, producing a huge list of species, and many remarkably high daily counts of individuals." In contrast, Griscom (1948:4) said the 1947 fall migration "was as dull and uninteresting as any in the memory of the present generation," due to the abnormally hot weather from August to October, and the scarcity of storms and cool waves, which resulted in a lack of bird waves, the migrants dribbling through day by day. In reporting on the New York region for the same year, Nichols (1948:5) also correlated the warm autumn weather with the late arrival and uniform flow of migrants, until October cool fronts from the northwest brought migration waves. The similarity of the 1947 migration at Chicago will be discussed later.

Williams (1948, 1949, 1950) has made the most important correlations between fall bird migration and cold fronts in his reports on the south Texas region. He associates the principal migration periods or waves appearing in the Texas coast region with the arrival of "northers" and other cold fronts, with NW to NE winds prevailing at the time of influx. For 1947 he listed 20 cold fronts in July to December and recorded their effects on migration; for 1948 he listed 13 cold front periods, stating that "except for a few straggling individuals, the migration occurs in a series of pushes that involve many individuals and species The optimum condition of migration is an advancing cold front with falling (not necessarily low) temperature and precipitation in the area north of Texas." Williams listed 17 fall migration periods or waves for the Houston area in 1949, each during a period of northerly winds following the advance of a cold front. He correlates these migrations with temperature drops at Pierre, South Dakota (1050 airline miles from Houston), and Minneapolis, each of which followed the passage of a NW cold front through the upper Mississippi Valley. The writer's Lincoln Park August to November records show migration waves during the periods of northerly winds following the arrival of these same cold fronts at Chicago. There is no evidence that temperature drops were the principal motivating factor that caused these migratory movements. During the spring migration important bird waves are always associated with southerly winds, generally at least moderately strong; they are not induced by rising or high temperatures alone when not accompanied by southerly winds. In the absence of contrary evidence, it seems likely that the fall migrants likewise merely take advantage of favorable winds, whenever possible, to make their long migratory flights. These northerly winds follow the passage of cold fronts and in the northern states and Canada are almost invariably accompanied by temperature drops. But the

writer believes that the favorable wind is the critical factor, particularly in the case of migration waves of small land birds migrating at night in August and September when the temperature effect of a cold front passage is usually quite moderate. The temperature factor may dominate in October and November, when sharp drops to sub-freezing frequently occur.

GENERAL RELATION OF WEATHER AND MIGRATION IN CHICAGO REGION

The weather of the Mississippi Valley region is dominated during most of the year by the movement of great masses of relatively cool or cold air coming usually from the north or northwest and masses of warmer air, often of tropical origin, coming from the south. The boundaries between these air masses are called fronts. A cold front is the boundary of relatively cold air advancing into an area occupied by warmer air; it is the advancing edge of the cold air mass. Its arrival at a given point is usually followed by a change of wind from a southerly to a northerly direction. These cold air masses are areas of high barometric pressure, called anticyclones, or merely Highs. (The period of northerly wind following the passage of a cold front will be referred to hereafter as a "cold front period.")

The southward migration of birds in autumn is favored during the period soon after the passage of a cold front through the Chicago area, when the winds are generally NW to N. Most autumn migration waves are of the onrushing type. When storm centers pass south of Chicago, conditions adverse to migration may continue for some time after the wind shifts from NE to N and NW, and in such cases the migratory movement is delayed until the storm passes on and better flying conditions prevail. Such delayed waves are frequent in autumn, but arrested waves are uncommon.

Many weather cycles are complicated and prolonged. Highs moving across the continent may be marked at a given station by more than one cold front. These air masses are really great currents that may flow southward and eastward for several or many days, with minor interruptions and phases, each of which may be marked by a new cold front. A discussion of these complications will be avoided. A person without weather maps merely observes the changes in wind direction and other weather phenomena. The changes from southerly to northerly wind directions generally follow the arrival of the important cold fronts. But if a storm center is passing to the south, as the cold front approaches the wind will shift to E and NE, and then N and NW as the Low center moves eastward.

As a general rule the big migration waves of a given species occur during cold front periods in the early or middle part of that species' migration period. Later the number of birds remaining in the north is so reduced that only relatively small migratory waves can originate there. This obvious fact is of major importance in explaining why the total number of birds of a

given species seen varies so greatly from year to year, a subject discussed later. Following the arrival of a cold front and northerly winds bringing a wave of birds of a given species, the number seen in the study area ordinarily decreases for several days, down to a number more usual for the species at that time of year. The balance between arrivals and departures determines whether the observer finds an increase in his study area on the morning after a cold front passage. Toward the end of a species' migration period the departures commonly exceed arrivals.

The period of strong cyclonic circulation generally begins at some time in September and ends in May. During these months the weather is dominated by the procession of Lows and Highs, storms and cold fronts, that move across the continent in a general easterly direction. During the summer the weather conditions are much more static, the air circulation is more sluggish, and the storms and cold fronts mild compared to the vigorous phenomena of later months. The autumn migration begins during this static summer period and much of the warbler migration has passed before the strong circulation of autumn is established. So the early part of fall migration is in a separate period, not so much dominated by cold fronts.

The principal autumn migration waves into the Chicago region occur during September and the first 20 days of October. The later waves involve fewer birds because by late October almost all of the migratory birds (at least of the species here studied) have already left the regions north of Chicago. The important waves are clearly related to favoring winds, but the sharp drop in temperature that usually follows a cold front passage may be a factor in causing birds to start off on a migratory flight. The cold fronts followed by important bird waves in the period September 1 to October 20 seldom bring temperatures low enough to force the birds to leave the regions north of Chicago. Only a few stragglers remain in the north to be driven south by the late cold fronts which bring the first wintery weather.

The 1949 record will be cited. No freezing temperatures were recorded prior to September 28 at Green Bay, Sault Ste. Marie, Duluth, International Falls, or Winnipeg, and yet at that date the warbler count (exclusive of Palm, *Dendroica palmarum*, and Myrtle Warblers, *D. coronata*) in Lincoln Park had reached 3,525, and later only 258 additional birds were counted. It is obvious that, in 1949, these warblers were not really forced to leave the regions north of Chicago because of cold weather. And in the same year no temperatures under 24 degrees Fahrenheit were recorded at any of these northern stations until October 23, yet at that date most of the later migrants had already passed Chicago, where no freezing temperatures had yet been recorded.

Cold fronts entering the Chicago region may be divided, as regards bird migration, into three groups: (1) cold fronts followed by NW winds, (2) cold fronts followed by NW-NE winds, and (3) cold fronts followed by NE winds. The cold fronts of these types, including some very mild ones, that reached the Chicago region during the period August 10 to November 10 in each of the five years were as follows:

	1946	1947	1948	1949	1950	Totals
NW type	7	6	4	13	8	38
NW-NE type	5	9	3	2	9	28
NE type	2	2	5	4	3	16
	—	—	—	—	—	—
Totals	14	17	12	19	20	82

Cold Fronts Favoring Migration into Chicago Region

Cold fronts with NW winds are the most important type as regards bird migration in the Chicago region. The barometric High (anticyclone) and the great air mass which it represents usually moves from western Canada across the northern Great Plains and on to the southeast, passing west and south of Chicago. The arrival of the cold front at Chicago is ordinarily marked by a change from southerly to NW wind. The moderate to strong NW wind generally continues for at least 24 hours, and in many cases for several days. As the High center moves on to the southeast, the wind shifts back to a southerly direction, usually SW.

Cold fronts with NW-NE winds are only a variation of the preceding type, and are always the result of High centers passing north of Chicago. The High center generally moves from the west along the southern boundary of Canada, or from northwest Canada to the upper Great Lakes region and eastward. The southerly wind shifts to NW or N when the cold front reaches Chicago; then generally within 6 to 12 hours the wind shifts on to NE as the High center moves eastward. The NE wind may continue for several days. In many cases storm centers pass south of Chicago as the cold front approaches, which causes the wind to shift through the E and NE to N or NW as the storm passes. The principal flight of birds appears to accompany the initial phase of NW or N wind.

The effect of a large number of these cold fronts and the periods of NW-N winds that followed on the migration of nine of the abundant species is shown in Table 1, which shows for each species the average count on the two mornings preceding arrival of the cold front at Chicago, and on the three mornings following. The average effect is striking, but for individual cold front periods the increase for some of the species is much greater than these averages.

Cold Fronts with Northeast Winds

Cold fronts followed by NE winds are generally not accompanied by bird waves in the Chicago region. They result from air masses moving from northern Canada to the Lake Superior region or farther east. The path of the air mass movement generally lies farther east than the air masses causing cold fronts with NW-NE winds. The High center passes north and east of Chicago. These cold fronts cause the wind at Chicago to shift from a southerly direction to NE, and the NE wind may continue for several days. Such cold fronts generally extend in a west to east direction, moving directly south or even southwest as they approach Chicago. In the types described in the preceding section, the cold fronts generally extend southwest to northeast and approach Chicago from the northwest.

In the Chicago region cold fronts with NE winds are characteristic of the summer period of static weather. They are common during August and early September, and much less frequent later, after the strong cyclonic circulation becomes established. Cold fronts of this type are followed by decreased bird counts in Lincoln Park; during the 5-year period no marked bird waves followed any of these cold fronts. Table 2 gives the warbler counts on the two mornings before and two mornings after arrival of 7 NE cold fronts in August and September. Table 3 gives data for 3 October cold front periods of this type, including both combined warbler counts and the combined counts of Fox Sparrow (*Passerella iliaca*), White-throated Sparrow (*Zonotrichia albicollis*), Slate-covered Junco (*Junco hyemalis*), Tree Sparrow (*Spizella arborea*), Hermit Thrush (*Hylocichla guttata*), Brown Creeper (*Certhia familiaris*), and Golden-crowned Kinglet (*Regulus satrapa*) ("Sparrows etc." in tabulation).

Barrier Effect of Lake Michigan

Autumn migration waves at Chicago are commonly associated with cold fronts invading the central states, accompanied by strong NW to N winds. No pronounced waves occurred during intervening and static weather periods, and this five-year study has produced no evidence that birds migrate across Lake Michigan in any appreciable numbers. Cold fronts accompanied only by strong NE winds never brought migration waves to Lincoln Park. Strong NE winds at all times during both fall and spring, particularly if cold, tend to drive the birds out of the park. During periods of lighter NE wind the moderate increase in bird counts is interpreted as merely the result of southward flights in the region just west of Lake Michigan. With strong NE winds in the Lake Michigan region, birds migrating from areas north of Chicago would naturally tend to fly southwest with the wind, and thus pass west of Chicago.

TABLE 1

AVERAGE MORNING COUNTS IN RELATION TO PASSAGE OF COLD FRONTS

	No. of Fronts	Before Arrival		After Cold Front Passage		
		2nd Morn.	1st Morn.	1st Morn.	2nd Morn.	3rd Morn.
Palm Warbler	22	7.0	7.4	42.2	24.5	16.4
Myrtle Warbler	25	17.2	14.1	35.3	27.9	21.6
White-throated Sparrow	28	23.6	24.1	75.1	58.9	35.0
Fox Sparrow	22	3.6	3.9	15.6	13.3	8.4
Slate-colored Junco	30	36.0	33.0	102.1	78.5	50.5
Tree Sparrow	20	8.2	4.7	27.2	18.0	11.1
Hermit Thrush	21	5.2	4.8	16.6	14.7	8.8
Brown Creeper	26	2.1	1.9	6.2	4.9	2.9
Golden-crowned Kinglet	23	6.6	7.3	36.9	32.6	22.2

TABLE 2

MORNING COUNTS OF WARBLERS DURING SEPTEMBER COLD FRONT PERIODS OF
NORTHEAST WIND TYPE

Date of Cold Front	Sept. 11 1946	Sept. 24 1947	Aug. 30 1948	Sept. 2 1948	Sept. 13 1948	Sept. 20 1948	Sept. 16 1950
<i>Before arrival</i>							
2nd Morning	98	125	—	100	217	437	78
1st Morning	60	123	128	243	236	217	63
<i>After arrival</i>							
1st Morning	57	38	136	151	175	151	43
2nd Morning	79	53	102	60	122	138	72

TABLE 3

MORNING COUNTS OF WARBLERS AND OTHER BIRDS DURING OCTOBER COLD
FRONT PERIODS OF NORTHEAST WIND TYPE

Date of Cold Front	Oct. 15, 1949		Oct. 14, 1950		Oct. 21, 1950	
	Warblers	Sparrows etc.	Warblers	Sparrows etc.	Warblers	Sparrows etc.
<i>Before arrival</i>						
2nd Morning	122	135	76	310	32	243
1st Morning	76	130	50	128	19	62
<i>After arrival</i>						
1st Morning	61	92	39	95	14	73
2nd Morning	37	35	23	50	12	33

The converse must also be true. Migration waves moving southeast with strong NW winds must be largely stopped when the west shore of Lake Michigan is reached. Cold fronts followed by strong NW winds result, I think, in concentrations of birds in the area just west of Lake Michigan. Many of the birds arriving in the Chicago area during a cold front period are slow to leave, and the same is true of birds along the west shore farther north. The gradual southward migration of birds from the shore zone north of Chicago results in an abnormal number of new daily arrivals in the Chicago area. The result is that for many days following such a migration wave the count of the species involved will be abnormally large at Chicago, if the weather is mild and the birds do not suddenly leave during later cold front periods.

Early autumn flights of swallows, Nighthawks (*Chordeiles minor*), and hawks are observed frequently along the west shore of Lake Michigan in the Chicago area. Beebe (1933) described the migration of hawks from Ontario southwest through Upper Michigan to the north shore of Lake Michigan, and thence west and south along the lake. Jung (1935:75) says that farther south in Door County, Wisconsin, these hawk flights are confined chiefly to a narrow shore belt only $\frac{1}{4}$ to $\frac{1}{2}$ mile wide. No general correlation between these day migrations and wind direction and other weather conditions was made.

An August flight of more than 10,000 Purple Martins (*Progne subis*) was observed by Smith (1908) west of Holland, Michigan. The birds flew with a moderately strong NE wind and were restricted to a strip about one quarter mile wide along the east shore of Lake Michigan. The wind continued NE and next morning abundant arrivals of warblers and flycatchers were noted, the first migration wave of the season. In August, 1904, a flight of more than 1,000 hawks was observed at the same locality, also during a period of moderately strong NE wind. This record of a pronounced migration wave on the second morning of a NE wind period contrasts sharply with the relation between migration waves and wind direction observed on the west side of the lake.

Concentrations of migrants are produced along the Atlantic coast during periods of strong NW winds, particularly at Cape May, New Jersey, where the work of Allen and Peterson (1936) and Stone (1937), already referred to, has shown that strong NW winds blowing across the usual line of southward inland migration produce great concentrations of migrants. Even the hawks do not attempt to fly on south across Delaware Bay during these periods. These writers also say that night migrants that flew beyond the coast line are sometimes seen in early morning flying in from the open ocean

against the wind, and Stone records Woodcock and warblers flying in low from the sea at night.

Lakes Ontario and Erie are at least partial barriers to the southward autumn flight of day migrants. Baillie (1950, 1952:14-15) refers to the traditional SW direction of flight of hawks, Flickers (*Colaptes auratus*), and Blue Jays (*Cyanocitta cristata*), along the north shore of Lake Ontario in the Toronto area. He records large westerly flights of the birds farther west in the vicinity of Port Stanley, London, and Chatham, Ontario. But to what extent these lakes hinder the southward movement of night migrants is unknown.

At this point other important questions relating to migration through the Chicago region will be mentioned. What route is ordinarily followed by birds nesting north of Lake Superior? Do they cross Lake Superior, or do they migrate east or west around it? And to what extent do birds other than hawks migrate from Ontario westward through the Sault Ste. Marie area to Upper Michigan, and then south through eastern Wisconsin? The answers to these questions probably account for some of the irregularities in the numbers of northern nesting birds seen in Lincoln Park. This is particularly true of the Golden-crowned Kinglet and a number of the warbler species that nest principally east of Manitoba.

The westward route through the Sault Ste. Marie area may be important in the southward migration of many species during periods of easterly winds in the upper Great Lakes region. Strong NW cold fronts would favor migration south across the Straits of Mackinac to Lower Michigan, or eastward along the north side of Lake Huron and Georgian Bay. The westward route could be followed easily during the late summer period of relatively static weather, before the strong cyclonic circulation of autumn is established. In 1947, no strong NW cold fronts invaded the Great Lakes region until mid-September. In 1950, there was none from September 3 to October 2, and in 1948, none from September 8 to October 1. The first strong NW cold front of 1949 reached Chicago on September 18. Easterly winds during these and many other shorter periods were probably favorable to migration along the westward route from Ontario through the Sault Ste. Marie area to Upper Michigan.

Migration Waves at Irregular Times

During this study there were few migratory waves that arrived at irregular times in relation to cold fronts, in spite of the complex relation in many periods between storm centers and cold fronts. In several cases the arrival of a migratory wave appears to have been delayed by the passage of an extensive storm through the region. At least two minor waves were classified

as arrested waves, that is, the migrating birds were grounded by adverse weather in the Chicago area. On two occasions a considerable flight of birds preceded the change in surface wind direction to NW, and, therefore, arrived in advance of the time when an observer would normally have expected the arrival of birds flying with the NW wind following the passage of an advancing cold front.

An advancing cold front is characterized by more or less interfingering of air currents. In some cases an air current from the NW overlies at no great height a SW surface wind. Such a condition might explain the arrival of a migration wave before the surface wind shift. Some cold fronts move slowly or stop advancing, and migrating birds might fly on into the zone of southerly winds, beyond the surface wind shift line of the cold front. Atmospheric conditions along slow moving or stationary cold fronts are usually not turbulent, and cloud conditions and lack of precipitation may permit the flight of birds.

Complex Weather of September—October, 1946

The weather record for the north-central states in September and October, 1946, was complex. A number of storm centers passed through the Chicago region or west of it. Four of them were followed by cold fronts that caused no shift to NW or N winds at Chicago. Six cold fronts from the northwest or north died out in central or southern Wisconsin, and two others lost force and became static as they reached Chicago, their progress stopped by storms developing in or passing through the central states. Only five cold fronts from the northwest or north passed through the Chicago region with any force, and some of these were mild.

This was naturally an autumn of few bird migration waves in the Chicago region. The eight cold fronts that died out or lost force as they reached central and southern Wisconsin undoubtedly brought many migratory birds into the region not far north and northwest of Chicago. Such concentrations of migrants would disperse gradually as the birds continued their migration southward. This is indicated by the very irregular record of birds in Lincoln Park during these months. The first September cold front with NW to N wind reached Chicago on September 28, and as a result the counts of species migrating largely during the last half of September and early October were low, and their median dates were late. (The median date is the date on which the season count of a species reached half of the season total.) In October, four cold fronts reached Chicago and six others died out or lost force in southern and central Wisconsin. So the counts of species migrating principally in October were relatively large.

Western Palm Warbler Migration

	1946	1947	1948	1949	1950
Total count	315	1055	1476	559	240
Median date	Oct. 8	Oct. 2	Sept. 19	Oct. 1	Oct. 4

The Western Palm Warbler (*Dendroica p. palmarum*) nests from northern Minnesota north along the west side of Hudson Bay to northern Manitoba, and west to the Mackenzie Valley and casually to Alberta. With static weather the birds migrate leisurely southward through the Missouri and Mississippi valleys and the bulk of the migrants probably pass through the region west of Chicago. The year 1950 was an extreme example, with no cold fronts with strong NW winds invading the north-central states during September. During this period the daily count of Palm Warblers never exceeded 20, and the total was small. The early October cold fronts were too late in the migration period of the Palm Warbler to be accompanied by great flights, the peaks being 25 on Oct. 3 and 55 on Oct. 9. So the total count for 1950 was low chiefly because of the sequence of weather, and particularly the lack of strong NW winds during the first half of the Palm Warbler migration period.

The year 1948 was an opposite extreme. A cold front followed by strong NW winds swept down from Alberta at the very beginning of the migration period of the Palm Warbler. This favorable wind brought a great flight of these warblers into the Chicago region, with counts of 134 and 150 on September 9 and 10. Many of the arriving birds must have remained for a considerable period of time, departing gradually. This same cold front must have brought comparable flights into the region to the north along the west side of Lake Michigan, and there was probably an unusual concentration of Palm Warblers along the west side of Lake Michigan as a result of its barrier effect. So in the days that followed a large number of birds were migrating south through the Chicago area, and each succeeding cold front (on September 13, 20, and 30) was followed by a sharp increase in the daily count. From September 11 to October 4, the average daily count was 41. The net result was that the strong cold front from the NW at the very beginning of the Palm Warbler migration resulted in a large total count for the season.

The year 1947 was similar. The migration as a whole was late that year, as will be pointed out later. A prolonged heat wave was finally ended on the evening of September 14 by a cold front followed by a migration wave on September 15, including 23 Palm Warblers. A week later a strong cold front swept down from northwest Canada, bringing a wave of Palm Warblers with a count of 140 on September 22 and an average daily count of 46 for 16 days thereafter. The result was a season total much above average.

The total count in 1949 was intermediate. The early cold fronts on September 13 and 19 were mild and not accompanied by waves of fall migrants. A stronger cold front on September 27, bringing peaks of 45 and 50, was evidently too late to be accompanied by a great wave of Palm Warblers.

The complexity of the 1946 autumn weather has been discussed. No cold fronts with NW or N winds reached Chicago in September until September 28, with stronger cold fronts on October 7 and 11. The lack of strong cold fronts with favoring NW winds during September resulted in a low count of Palm Warblers for that year.

Myrtle Warbler Migration

	1946	1947	1948	1949	1950
Total count	955	528	1426	1942	713
Median date	Oct. 4	Oct. 3	Oct. 4	Oct. 7	Oct. 13

The Myrtle Warbler breeds westward to Alberta, British Columbia, and Alaska. The years of highest counts are those marked by cold fronts with strong NW winds during late September and early October, but this relation is not as striking as in the case of the Palm Warbler. Important waves of Myrtle Warblers do not appear so early as those of the Palm, the migration of the former under the most favorable conditions being somewhat later. Day to day observations show that Myrtle Warblers remain in Lincoln Park longer than Palm Warblers, probably because of more favorable feeding conditions for the Myrtle Warbler in the park. If a wave of Myrtle Warblers arrives early in the migration period of the species, the daily count generally continues near the peak for four or five days.

A strong NW cold front on September 21, 1949, caused successive daily counts of 75, 60, 75, and 75. The next NW cold front on September 27 was followed by an average daily count of 61 for seven days. These strong cold fronts in 1949 early in the Myrtle Warbler migration period, coupled with four later cold fronts in October, were mainly responsible for the high season total. In 1948, the September weather was static after the September 8 cold front that brought the big Palm Warbler wave. From September 20 to 29 a NE wind blew continuously, with a gradual increase in Myrtle Warblers; then a strong cold front October 1 resulted in a count of 622 in eight days. Later cold front periods added their quotas and so the 1948 count was large.

The extremely low 1947 count was connected with the prolonged heat wave until mid-September. The big Palm Warbler wave followed the September 21 cold front, but conditions during the next two weeks resulted in only a small migration of Myrtle Warblers at Chicago. The static September weather of 1950 resulted in an early scarcity of Myrtle Warblers even more

pronounced than in the case of the Palm Warbler. Most of the birds came with cold fronts in the last half of the normal migration period on October 2, 7, 11, and 19. The season count was low and the median date later than usual.

Migration of Sparrows

	1946	1947	1948	1949	1950
White-throated Sparrow					
Total count	1436	2181	2000	1656	1116
Median date	Oct. 8	Oct. 8	Oct. 9	Oct. 4	Oct. 7
White-crowned Sparrow (<i>Zonotrichia leucophrys</i>)					
Total count	162	179	136	64	20
Median date	Oct. 12	Oct. 2	Oct. 8	Oct. 5	Oct. 9
Fox Sparrow					
Total count	393	224	456	233	207
Median date	Oct. 8	Oct. 16	Oct. 19	Oct. 11	Oct. 14
Slate-colored Junco					
Total count	3465	4204	5185	2105	2076
Median date	Oct. 21	Oct. 24	Oct. 22	Oct. 18	Oct. 20
Tree Sparrow					
Total count	143	279	1074	51	101
Median date	Nov. 2	Nov. 2	Nov. 1	Nov. 3	Nov. 3

The sparrows listed nest north to the limit of trees and the Tree Sparrow beyond in the barren grounds. They (excluding western subspecies probably not involved in this study) breed west to Alberta and the Mackenzie Basin, the Slate-colored Junco and Fox Sparrow extending on to northwestern Alaska. Their migration through the Chicago region would be expected to follow in general the Palm Warbler pattern. With static weather the birds would migrate at a leisurely rate southward and most of the birds nesting in the western part of their breeding range would pass west of Chicago. But cold fronts sweeping down from the northwest during the early part of their migration periods would result in shifting more of these western birds into the area east of the Mississippi, and the barrier effect of Lake Michigan would be effective in causing concentrations along the western shore.

The big Palm Warbler years were 1947 and 1948 because of strong cold fronts from the northwest early in their migration period. For much the same reason these were also the years of great abundance at Chicago of the northern nesting sparrows. The low sparrow counts in 1949 and 1950 were connected with the warm autumn weather in both years. October 1949 was the warmest October of record at Chicago and October 1950 the second warmest. In both years there were few strong cold fronts during the period September 15 to October 15. The percentage of days with southerly and easterly winds was unusually high. The count of juncos was 100 or more on

only two days in 1949 and six days in 1950, compared with 27 days in 1948 and 19 days in 1947.

The large sparrow counts in 1947 and 1948 resulted from a succession of strong cold fronts. The 1947 sequence was most favorable for the White-throated Sparrow; beginning with the September 21 cold front that brought the big wave of Palm Warblers, the White-throats reached a peak of 225 on September 30, when the junco migration had barely begun. In 1948 the weather sequence favored the juncos, which were very abundant until mid-November; and also the Fox Sparrow, whose median date was later than usual. No explanation is apparent for the relative scarcity of Fox Sparrows in 1947. The large 1946 count of Fox Sparrows was the result of very large counts following cold fronts on September 28 and October 7.

Tree Sparrows are abundant in Minnesota and Iowa during the fall migration. This species seems to prefer to migrate through the more open country, west of Chicago. It was counted in large numbers only in 1948, when the cold front sequence apparently caused many sparrows nesting in the western part of their species' breeding ranges to migrate farther to the east than usual. The Tree Sparrow is a late migrant and in each year the principal flight came with a cold front around November 1. The high count in 1948 resulted largely from a cold front on October 22, followed by a peak count of 100 and average daily counts of 51 for eight days, and a cold front October 31 with peaks of 100 and 155 and an average of 71 for seven days. The highest daily count of the other four years was 40.

Other Important Late Migrants

	1946	1947	1948	1949	1950
Hermit Thrush					
Total count	234	316	456	248	332
Median date	Oct. 13	Oct. 13	Oct. 11	Oct. 5	Oct. 11
Brown Creeper					
Total count	98	159	257	171	138
Median date	Oct. 19	Oct. 19	Oct. 8	Oct. 12	Oct. 10
Ruby-crowned Kinglet (<i>Regulus calendula</i>)					
Total count	246	181	142	230	146
Median date	Oct. 11	Oct. 19	Oct. 16	Oct. 12	Oct. 16
Golden-crowned Kinglet					
Total count	888	1414	237	873	754
Median date	Oct. 17	Oct. 19	Oct. 16	Oct. 12	Oct. 16

The migration of the Hermit Thrush in the Chicago region resembles that of the Palm Warbler and the sparrows mentioned above. The peak counts of 40 to 60 birds all resulted from strong cold fronts from the northwest on October 13, 1947, October 1, 8, and 16, 1948, and October 7 and 11, 1950.

The average daily count was high after each of these waves, as some of the birds apparently remained in the park for a week or more. The cold front of September 27, 1949, brought a moderate flight of Hermit Thrushes, but there were no later cold fronts of consequence until October 21, so the 1949 count was low. The 1946 record was similar, a September 28 cold front bringing some Hermit Thrushes, but few came into the park with the cold fronts of October 7 and 11.

The migration of the Brown Creeper is definitely associated with air masses sweeping down from the northwest and north. The strong cold fronts during October generally bring small flights with peak counts of 10 to 20 birds. The record resembles those of other October migrants, with the highest count in 1948.

The record of the Golden-crowned Kinglet shows an average yearly count of 833, with notable departures from this average only in the 1947 count of 1414, and the extremely low 1948 count of 237. This is remarkable because the autumn of 1948 was characterized by a succession of strong cold fronts and peak or near-peak counts of all other late migrants. The eastern race of the Golden-crowned Kinglet nests from Manitoba and Minnesota eastward. The fact that this kinglet was so scarce in 1948 suggests that many of the birds that ordinarily migrate down the west side of Lake Michigan were deflected to the east of their usual route by the weather succession. The migration of these kinglets may ordinarily involve a southwesterly movement around the west end of Lake Superior, and perhaps a migration from the northeast through the Sault Ste. Marie region and thence down the west side of Lake Michigan. The 1948 migration period was unfavorable for such southwesterly movements.

The unusually large 1947 count of Golden-crowned Kinglets may have been related to the prevailing easterly winds in the Lake Superior region during late September and October. At Sault Ste. Marie the October hourly wind record was 63% SE to NE and 20% W to NW; at Duluth the record was 55% E to NE and 18% W to NW. In 1947 the Golden-crowned Kinglet was first seen in Lincoln Park on September 25, and arrived in force on September 30. The waves of Golden-crowns were associated with other migrants that accompanied NW to N cold front winds.

Early Migration Period

The migration of the warblers is presented as representative of the early part of the fall migration (excluding the late migrating Palm and Myrtle warblers already discussed). The warblers comprise the great majority of all migrating land birds at Chicago during August and much of September.

Most warblers do not remain in their northern nesting grounds until driven south by cold weather. The migration of most species begins in late July or early August. This applies both to northern nesting birds and those nesting farther south. The Yellow Warbler (*Dendroica petechia*), for example, leaves its nesting areas around Chicago in late July or early August, and birds nesting farther north migrate through the region during August. This is in the hot part of summer when insect food is most abundant. The Yellow Warbler is not common at Chicago in September.

TABLE 4
SUMMARY OF TOTAL WARBLER COUNT 1946-1950
(Exclusive of Palm and Myrtle Warblers)

	1946	1947	1948	1949	1950
Aug. 1-10	0	7	27	0	15
11-20	32	3	212	3	46
21-31	565	162	981	518	241
Sept. 1-10	1,131	465	1,557	1,500	1,485
11-20	788	822	1,760	1,074	1,118
21-30	695	384	534	458	612
Oct. 1-10	106	203	87	179	197
11-20	37	35	22	40	15
21-31	8	11	2	11	0
November	4	5	3	0	0
Totals	3,366	2,097	5,185	3,783	3,729
Median Date	Sept. 10	Sept. 15	Sept. 10	Sept. 10	Sept. 11

The warbler migration begins during the summer period of static weather and much of the migration passes in most years before the strong cyclonic circulation of autumn is well established, as already pointed out. Most summer cyclones and anticyclones are not strongly developed circulations, and the summer cold fronts are ordinarily mild. But there are exceptions: great masses of cool Arctic air do sometimes sweep down from the north during the summer. An important cold front at the beginning of August in 1948 appears to have had a profound effect on the autumn migration in that year; in 1947 the lack of any strong cold fronts until mid-September made that a year of opposite extreme.

A summary of the warbler count for each year is given in Table 4. The average number of warblers counted, exclusive of Palm and Myrtle, was 3,632 per year. The counts in 1946, 1949, and 1950 were about average, with a notably high count in 1948 and a very low count in 1947. The median dates were remarkably uniform, except 1947, which was a little late. The

record of the more abundant species is given in Table 5, with median dates. The census of the uncommon warbler species with median dates for all birds seen during the five years, is as follows:

	1946	1947	1948	1949	1950	Total	Median Date
Prothonotary (<i>Protonotaria citrea</i>)	—	—	2	—	—	2	Aug. 13
Louisiana Water-thrush (<i>Seiurus motacilla</i>)	3	11	17	—	—	31	Sept. 1
Canada (<i>Wilsonia canadensis</i>)	22	10	7	4	3	46	Sept. 1
Mourning (<i>Oporornis philadelphia</i>)	3	3	—	—	—	6	Sept. 5
Golden-winged (<i>Vermivora chrysoptera</i>)	1	—	4	—	—	5	Sept. 7
Connecticut (<i>Oporornis agilis</i>)	2	5	2	—	4	13	Sept. 7
Parula (<i>Parula americana</i>)	3	1	—	3	—	7	Sept. 15
Pine (<i>Dendroica pinus</i>)	—	1	5	—	—	6	Sept. 16
Kentucky (<i>Oporornis formosus</i>)	—	1	—	—	—	1	Sept. 16
Black-throated Blue (<i>Dendroica coerulescens</i>)	13	7	11	—	15	46	Sept. 22
Orange-crowned (<i>Vermivora celata</i>)	20	14	1	28	10	73	Oct. 13

The season counts of warblers and other species correctly show the relative frequency of observation, but not the actual abundance of the birds. For example, the Redstart finds the park a congenial place to linger, and many individuals probably do remain for a week or more. But the Blackburnian always appears to be in haste to move on. So the total five-year Redstart count of 4,571 does not mean that it is about 14 times more abundant as a fall migrant than the Blackburnian, with a total count of only 335. The large season counts give an exaggerated picture when compared to the low counts, as regards actual abundance. This applies not only to comparisons between species, but also to comparisons of large and small yearly counts of the same species.

Early Migration Period in 1947

The upper Mississippi Valley region experienced a heat wave in the late summer of 1947. The average August temperature at Chicago was 8.6° above normal and for 14 stations farther north from Alpena, Michigan, to Williston, North Dakota, the average was 7.0° above normal. The heat wave continued in September with equally abnormal temperatures, until finally broken by

TABLE 5
CENSUS RECORD OF THE ABUNDANT WARBLER SPECIES
Total season counts and median dates

	1946	1947	1948	1949	1950	5-yr. period
Yellow (<i>Dendroica petechia</i>)	20 Aug. 14	35 Aug. 24	160 Aug. 17	24 Aug. 29	58 Aug. 14	297 Aug. 18
Blackburnian (<i>Dendroica fusca</i>)	103 Sept. 1	31 Sept. 7	95 Sept. 2	41 Sept. 6	65 Sept. 4	335 Sept. 3
Wilson's (<i>Wilsonia pusilla</i>)	19 Sept. 2	19 Sept. 8	40 Sept. 8	16 Sept. 1	61 Sept. 4	155 Sept. 5
Tennessee (<i>Vermivora peregrina</i>)	263 Sept. 8	127 Sept. 11	211 Aug. 29	232 Sept. 6	261 Sept. 8	1,094 Sept. 7
Northern Water-thrush (<i>Seiurus noveboracensis</i>)	187 Sept. 5	226 Sept. 10	392 Sept. 3	332 Sept. 12	140 Sept. 1	1,277 Sept. 8
Black and White (<i>Mniotilta varia</i>)	175 Sept. 3	102 Sept. 13	307 Sept. 11	120 Sept. 8	70 Sept. 1	774 Sept. 9
Redstart (<i>Setophaga ruticilla</i>)	768 Sept. 7	661 Sept. 16	1,421 Sept. 7	967 Sept. 6	754 Sept. 14	4,571 Sept. 10
Blackpoll (<i>Dendroica striata</i>)	554 Sept. 16	196 Sept. 16	743 Sept. 8	641 Sept. 10	681 Sept. 11	2,815 Sept. 11
Bay-breasted (<i>Dendroica castanea</i>)	50 Sept. 15	10 Sept. 26	172 Sept. 12	127 Sept. 12	185 Sept. 10	544 Sept. 11
Cape May (<i>Dendroica tigrina</i>)	153 Sept. 12	28 Sept. 21	253 Sept. 9	204 Sept. 10	420 Sept. 12	1,058 Sept. 11
Magnolia (<i>Dendroica magnolia</i>)	379 Sept. 10	223 Sept. 20	547 Sept. 11	330 Sept. 9	364 Sept. 9	1,843 Sept. 11
Chestnut-sided (<i>Dendroica pensylvanica</i>)	160 Sept. 20	45 Sept. 21	136 Sept. 14	150 Sept. 8	113 Sept. 10	604 Sept. 13
Ovenbird (<i>Seiurus aurocapillus</i>)	66 Sept. 12	92 Sept. 16	165 Sept. 15	104 Sept. 19	47 Sept. 13	474 Sept. 15
Black-throated Green (<i>Dendroica virens</i>)	199 Sept. 10	160 Sept. 22	275 Sept. 18	192 Sept. 17	189 Sept. 12	1,015 Sept. 17
Northern Yellow-throat (<i>Geothlypis trichas</i>)	103 Sept. 21	40 Sept. 15	114 Sept. 15	112 Sept. 18	86 Sept. 15	455 Sept. 17
Nashville (<i>Vermivora ruficapilla</i>)	100 Sept. 14	49 Oct. 4	105 Sept. 21	256 Sept. 22	203 Sept. 11	713 Sept. 19

a cold front that reached Chicago in the late evening of September 14. During all of this long period the Mississippi Valley region was invaded by no important cool air masses from the north; there were no strong cold fronts. The similar weather in the New York and New England regions, and its effect on bird migration, has already been referred to.

The early migration period at Chicago was uneventful as a result of this abnormal period of late summer heat. There were no migration waves prior to the arrival of the September 14 cold front. Only 17 warblers were counted prior to August 24, all Yellow Warblers. Later the count of warblers in-

creased slowly to 52 on August 31 and 90 on September 8, but the census area count did not reach 100 until September 15, when the first strong cold front from the northwest brought a moderate increase, including the first Palm Warblers (23) and a few White-throated Sparrows and kinglets. The next strong cold front, on September 22, brought the wave of 140 Palm Warblers and the first important appearance of Myrtle Warblers, White-throated Sparrows, Fox Sparrows, juncos, and Hermit Thrushes. The season count of warblers (excluding Palm and Myrtle) was extremely low because of the unusual weather conditions up to mid-September. Under static conditions the birds evidently moved south leisurely, making many short flights instead of mass movements stimulated by cold front winds. Large concentrations did not accumulate along the west side of Lake Michigan or elsewhere in the region. The median dates were late.

Early Migrations of 1948 and 1950

The extremely large warbler count (excluding the Myrtle) in 1948 is interpreted as having its origin in the southward movement of a great mass of cool northern air during the first week of August. This and a favorable later weather sequence resulted in a large concentration of warblers in the Chicago region from late August into early October. The warbler count in Lincoln Park exceeded 100 on every day from August 28 to October 4, with a peak of 437 on September 19. The Arctic air mass accompanied a High that appeared on the coast of northwest Mackenzie on July 31, moving southeast to Lake Winnipeg (Aug. 4) and eastern Kentucky (Aug. 7). Northerly winds prevailed over a great area in Canada and the north-central United States during this period, with light frosts in Canada and the Lake Superior region and a low of 51° at Chicago (Aug. 6). Large numbers of warblers probably took advantage of the northerly winds to make migratory flights southward from their nesting grounds. Then the migration continued at a slow rate, except as accelerated by cold fronts reaching Chicago on August 18 and 22. The total warbler count to August 20 was 239, compared to an average of 27 for the other years. The August total was 1220, the average of the other years 398.

Reference has been made to the strong cold front that reached Chicago on September 7, 1948. The early wave of Palm Warblers that followed this cold front was also probably an aftermath of the Arctic air mass that moved southward in early August. The weather sequence, and particularly the strong early September cold front, apparently caused a large southeast movement of warblers, with concentration along the west side of Lake Michigan. Two weeks of warm static weather followed in September, and through-

out this period the daily count of warblers in Lincoln Park was unusually large, averaging 229.

The central and eastern parts of North America were also invaded by a great mass of Arctic air during August, 1950. A strong High appeared in northwest Canada on August 15, one center moving to Georgian Bay (August 18) and east, followed by the principal High center moving from northern Alberta (August 17) to Kansas (August 20) and east. The cold front reached Chicago in the evening of August 17, and was followed by four days of NW wind with morning temperature 48° to 46° , these being the lowest ever recorded at Chicago in August. There were frosts in the Canadian prairie provinces that did great damage to the wheat crop; there were also frosts in the Lake Superior region. In all this area no such August cold wave had ever been recorded before, and everywhere it was accompanied by a long period of NW wind.

This northern air invasion came in mid-August, when the slow southward migration of northern nesting warblers was in progress. It must have caused an early concentration south of their nesting grounds, with the usual shift to the southeast. But the effect of the early cold front was largely dissipated during a seven-week period of summer weather that followed, broken only by a moderate cold front that reached Chicago on September 3, with a warbler count of 185 the next morning. The warbler count averaged 155 during the first 14 September days, but was very low during the last half of the month, exceeding 100 on only three days. So, the 1950 total was only about average.

Migration of Early Warbler Species

A satisfactory analysis of the record of most of the warbler species is impossible because no adequate information is available concerning either the relative abundance of the warblers in different parts of their breeding ranges or their southward migration routes from the different breeding areas. The possibilities of migration across or around Lake Superior, and of westward migration from Ontario through the Sault Ste. Marie area to Upper Michigan and then south through Wisconsin, cannot be evaluated. The variations in season counts of each species have been studied, and also the same figures reduced to a percentage of the total warbler count for the season. Only a few generalizations appear to be justified.

The large season counts of the abundant early migrating warblers are interpreted as related closely to strong NW cold fronts, just as in the case of the later Palm and Myrtle warblers. This seems to be especially true of at least some of the species whose breeding ranges extend far to the west and northwest in Canada and, in some species, even into Alaska, particularly the

Blackpoll, Yellow, Wilson's, Bay-breasted, and Cape May warblers. Above average counts of these are evidently due largely to a favorable sequence of strong cold fronts, with southeast shift of migrants from the western parts of their breeding ranges.

The Yellow Warbler migrates early, during the late summer period of ordinarily static weather. The count was small in all years except 1948, when the exceptional, strong NW cold front at the beginning of August evidently caused a considerable eastward shift and concentration along the west side of Lake Michigan. As a result the 1948 count exceeded the combined total for the other four years. The next largest count, in 1950, was evidently caused by the strong NW cold front in mid-August, which came too late in the Yellow Warbler migration to be as effective as the earlier cold front in 1948.

The 1950 counts of Cape May, Wilson's, and Bay-breasted warblers were larger than in any other year, and of Blackpolls not much less than in 1948. The Nashville Warbler was very abundant and much earlier than usual. Each of these species comprised a larger percentage of the total warbler count than in any other year. The mid-August 1950 cold front must have caused a southeast movement of these species. The 1947 counts of Blackpoll, Cape May, Bay-breasted, and Nashville warblers were lower than in any other year, both in numbers and percentages of total warblers, which contrasts with the large totals of 1950 and 1948, when early cold fronts favored their migration through the Chicago region.

SUMMARY

This paper is a regional study of grounded night migrants, based on a daily census of birds in Lincoln Park, Chicago, during the autumn migrations of 1946 to 1950 inclusive. The writer concludes that the bird waves that characterize the autumn migrations, the wide variation in the season counts of the abundant species, and other features of the census record are due chiefly to variable weather conditions, and particularly to the invasion of the north-central states by cold fronts, followed by periods of strong northerly winds. During the five-year study period, without exception, every important autumn bird wave was associated with an advancing cold front. As a rule the big migration waves of a given species accompanied cold fronts in the early or middle part of that species' migration period. In each year the great bulk of the migration had passed Chicago even before the first freezing temperature occurred at Chicago, and before temperatures more than a few degrees below freezing had occurred at Winnipeg or anywhere south of Lake Superior. The birds seen later were chiefly Slate-colored Juncos, Fox Sparrows, Tree Sparrows, and Golden-crowned Kinglets.

The autumn migration waves are associated with cold fronts followed by strong NW to N winds. Cold fronts followed only by strong NE winds never brought migration waves to Lincoln Park and the census study produced no other evidence that birds migrate westward across Lake Michigan in any appreciable numbers. Conversely, it is believed that marked concentrations of birds migrating southeastward with NW winds occur along the west side of Lake Michigan. This results in a large count of birds at Chicago during subsequent days if later weather conditions do not cause a quick dispersal of the concentration. The large season counts of migrants passing through Lincoln Park are believed to be due chiefly to the southeast shift of birds migrating with NW winds, and resulting concentrations due to the barrier effect of Lake Michigan. Static weather conditions during the early and middle part of a species' migration period normally results in a low season count.

The migration of warblers (excluding the late-migrating Palm and Myrtle warblers) is presented as representative of the early part of the fall migration, which begins during the late summer period of normally static weather conditions. Much of the early migration usually passes before the strong cyclonic circulation of autumn is well established, generally about mid-September. But the early migrants do take advantage of any favoring cold front winds in their southward migration. Early cold fronts in late August and early September were always followed by important warbler migration waves. Above average warbler counts are evidently due largely to a favorable sequence of early cold fronts, with southeast shift of migrants from the western parts of their breeding ranges, just as in the case of the later migrants.

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134 SOUTH LASALLE STREET, CHICAGO 3, ILLINOIS, MAY 26, 1952

NEW BIRDS FOR THE STATE OF MICHOACAN, MEXICO

BY GEORGE MIKSCH SUTTON

FROM mid-December, 1948, to the end of March, 1949, Roger P. Hurd, of Millerton, Pennsylvania, and I visited several parts of Texas and México studying birds. From December 19 to January 6 we journeyed down the Texas side of the Rio Grande from Laredo to Brownsville. From January 6 to 29 we were in Tamaulipas—for several days at the Mesa de Llera, on the main highway just south of Victoria, and for about two weeks at Pano Ayuctle (Pumpkin Ford) on the Río Sabinas, not far from the hill village of Gómez Farías. Leaving Tamaulipas on January 29, we went to Lake Pátzcuaro, Michoacán. Our route took us through the cities of Querétaro, Celaya, Salamanca, and Morelia.

We remained in Michoacán from February 2 to March 10, working (1) along the Guadalajara highway about 11 kilometers west of the village of Quiroga, in pine forest at about 7500 feet elevation, February 2 and 3; (2) along the Tacámbaro highway 9 kilometers south of the city of Pátzcuaro, in oak-pine forest at about 8000 feet elevation, February 4 to 18; (3) about the village of Erongarícuaro, on the shore of Lake Pátzcuaro, February 19 and 20; (4) near the Estación Limnológica at the edge of the city of Pátzcuaro, February 21 to 23; (5) again along the Guadalajara highway 11 kilometers west of Quiroga, February 24 to 28; (6) along the Tacámbaro highway 29 kilometers south of Pátzcuaro, among firs and pines at about 10,000 feet elevation, February 28 to March 4; and (7) near the village of Chupio, along the Río de la Alberca, about 12 kilometers south of the city of Tecámbaro, March 5 to 9.

All but the last of the above-named localities were in or at the edge of the Pátzcuaro basin, but the Río de la Alberca is a tributary of the Mexcala (Balsas), and the country about Chupio was unlike any I had seen previously in México. Our campsite was near the point at which the Río de la Alberca, a small, swift stream, plunged into a deep gorge, there to become invisible for several hundred yards. Trees grew along the river proper, but back from the precipitous banks the ground was dry, rocky, and thinly covered with grass and shrubbery. Upstream a quarter of a mile, we ascended a dry tributary gorge to the level of the oaks and pines. Many of the lowland birds were wholly unfamiliar to me—among them a conspicuous, duet-singing, black-chested finch, which proved to be *Aimophila humeralis*; a hummingbird with boldly white under parts—*Amazilia violiceps*; another hummingbird, *Amazilia beryllina*, a green-throated species, which swarmed about certain blossoming trees; a whip-poor-will which we never heard calling, even on moon-

lit nights—*Caprimulgus ridgwayi*; and that beautiful fringillid, Leclancher's Bunting (*Passerina leclancheri*). Collecting was difficult not only because the dry ground everywhere was very slippery, but also because so many birds lived exclusively in the trees above the deep, dangerous gorge.

On March 10 we left Michoacán, driving by way of Toluca to Mexico City, where we remained two days. On March 13 we ascended almost to snowline on Popocatepetl, remaining there overnight. On March 14 we drove northward as far as Jacala, Hidalgo, where we camped two days. Arriving once more at the Río Sabinas, in Tamaulipas, on March 17, we climbed afoot to the Rancho del Cielo (elevation 3300 feet), where we were the guests of Mr. Frank Harrison. On March 24 we drove north to Linares, Nuevo León. From March 25 to 28 we stayed at the Mesa de Chipinque, near Monterrey, Nuevo León. We crossed the border at Reynosa, Tamaulipas, March 30.

Dr. Ernest P. Edwards has made an intensive study of the birds of the Lake Pátzcuaro basin in recent years (see Edwards and Lea, 1950. "Notes on Birds of the Lake Pátzcuaro Region, Michoacán, México," *Condor*, 52: 260-271). I have obtained his entire collection from that region—several hundred specimens in all. His survey has given him an acquaintance with the birds of the State of Michoacán, and I had his provisional state-list with me in the field, one of my purposes being to obtain, whenever possible, species not listed by him. Most of the following birds have not, so far as we know, been reported hitherto from Michoacán.

Asio otus wilsonianus. American Long-eared Owl.

Just after nightfall on February 11 I collected a female Long-eared Owl not far from the Tacámbaro highway, 9 kilometers south of Pátzcuaro. It was very fat. In its stomach were some short fur and small mammalian bones. A largish owl which I saw the following night along the old Pátzcuaro trail near camp probably was of the same species.

Aegolius acadicus acadicus. Acadian Saw-whet Owl.

In broad daylight on February 7, Roger Hurd and I flushed a Saw-whet Owl from a thicket of small oaks growing on a slope at the edge of the Tacámbaro highway, 9 kilometers south of Pátzcuaro. To our surprise the bird flew into the open and alighted on a rock. It proved to be a female. It was not fat. Its stomach was empty. Incoming white or white-edged belly feathers, many of which were still partly sheathed at the base, were of the first winter plumage; the fully developed buffy brown feathers of the under parts were of the outgoing immature plumage. The specimen (GMS 10737) represents the nominate race.

Bombycilla cedrorum. Cedar Waxwing.

Recorded along the Tacámbaro highway 9 kilometers south of Pátzcuaro as follows: a flock of about 25, flying over, February 8; a small flock in an oak, February 10; a single bird, flying over, February 11; and a small flock, flying over, February 13. Recorded near the Limnological Station at the edge of the city of Pátzcuaro as follows: a

small flock in the top of a willow near the main road, February 21; a few birds flying along the lake shore, February 22; and a small flock in a tree on the Station grounds, February 23. I was able to preserve a specimen (sex ?) which I found dead at the side of a dirt road on February 23. The secondaries were without waxy tips.

Vermivora crissalis. Colima Warbler.

Edwards informs me that on March 18, 1948, in mixed woods 11 kilometers west of Quiroga, Paul S. Martin saw two of these birds. I collected a male among shrubbery at the edge of pine-oak woods, 29 kilometers south of Pátzcuaro, a quarter of a mile from the Tacámbaro highway, March 2, 1949. The testes of this specimen were very slightly, if at all, enlarged.

Icterus abeillei. Abeillé's Oriole.

This handsome oriole was fairly common among the firs near our camp 29 kilometers south of Pátzcuaro in late February and early March. It may also have been common among the oaks and pines 9 kilometers south of Pátzcuaro, February 4-18, but during that period I was not familiar with the various plumages of the species and was, in consequence, confused by many of the female and subadult orioles which I did see. On February 17 I collected a subadult male *I. abeillei* (testes unenlarged) which was female-like in general appearance save for the narrow jet black throat-patch and a glossy black patch at either side of the chest. Among firs, giant flowering *Salvia*, and astoundingly tall thistles 29 kilometers south of Pátzcuaro, I took the following specimens: a subadult male with narrow black throat-patch but no black on the sides of the chest, February 18; an adult female, with a suggestion of black in the middle lower throat, March 2; and a fully adult male, March 3. All of these specimens had a pitch-like substance on their toes. On March 4, I was surprised to encounter among the firs several roving flocks composed largely of adult males. One bird which I watched for some time pounded with its bill a good-sized object held in one foot in the manner of a jay or a titmouse.

Piranga ludoviciana. Western Tanager.

We recorded this species near camp along the Tacámbaro highway 9 kilometers south of Pátzcuaro on February 10 (one bird) and February 13 (one bird), and along the Río de la Alberca, near Chupio, on March 5 (two birds), March 6 (several birds, one female of which I collected), March 7 (two birds), and March 9 (several birds). This species has been reported from Michoacán, but no specimen has heretofore been collected.

Chondestes grammacus. Lark Sparrow.

We noted this species as follows: a few along the highway not far from Morelia, February 2; several near the city of Pátzcuaro, February 3; several along the Tacámbaro highway 9 kilometers south of Pátzcuaro, February 9 and 10; one along the Tacámbaro highway about 10 kilometers south of Pátzcuaro, February 11; and several along the Río de la Alberca, near Chupio, March 8. A male (wing, 90 mm., tail, 73) taken March 8 is referable to *C. g. grammacus*. The general tone of the upper parts is darker than in a considerable series of *C. g. strigatus* at hand, and the chestnut markings of the head are fully as dark as those of the Michigan and West Virginia specimens in my collection. The Lark Sparrow has not, apparently, heretofore been collected in Michoacán.

BELL'S VIREO IN INDIANA

BY RUSSELL E. MUMFORD

THE paucity of published data concerning the status of the Bell's Vireo (*Vireo bellii*) in Indiana has prompted this note. During the past ten years, other persons and I have observed the bird in a number of areas over the state. It thus seems advisable to bring all of the records up to date. The records indicate that Bell's Vireo is well-established over a considerable portion of Indiana.

Bent (1950:254) says: "The species, *Vireo belli*, is widely distributed over the western United States and northern Mexico, but the type race is found only east of the Rocky Mountains, from southern South Dakota, northern Illinois, and northeastern [this probably was meant to be northwestern] Indiana to eastern Texas and Tamaulipas." Butler (1897:1179) carried the bird on the hypothetical list for Indiana but noted that Nelson took a specimen at Chicago in 1875. A young female which I collected near Lafayette, Tippecanoe County, Indiana, on August 10, 1951, appears to be the first Indiana specimen. All reports of Bell's Vireo from Indiana known to me (although I have probably missed some unpublished records) are presented, by years, below.

1943

A search of the literature has failed to reveal any Indiana record prior to the one reported by Mrs. W. E. Dittrich (Wright, 1949:54). She saw one at Highland, Lake County, Indiana, on April 30. Charles T. Clark found two Bell's Vireos at Camp Pottawotamie, Tippecanoe River State Park, on July 4. He wrote (in letter), "I heard one singing in some thickets . . . spent the better part of a half hour "running" it down. Finally obtained very close and satisfactory views."

1944

Clark found two birds on the Jasper-Pulaski State Game Preserve, Medaryville, Indiana, July 16. This information was relayed (by letter) to O. D. McKeever shortly thereafter, but was never published. The birds were located "just east of the road bordering the Bob-white pen section," according to Clark (letter to me).

1945

The next record was submitted by Dr. W. E. Ricker (Wright, 1948:48) from the Tippecanoe River State Park. He said, "Saw one pair of Bell's Vireos at Tippecanoe River State Park near Winamac [Pulaski County] in 1945. They raised a young cowbird [*Molothrus ater*] which I saw them feeding. Original identification was made by a local ornithologist of Knox." Clark, who was residing in Knox at this time, informed me by letter that he did not discover this nest. Unfortunately, we are unable to give credit for the first nesting record for the state.

1946

On May 13, Mrs. Dittrich reported Bell's Vireos from Highland. Bell's Vireo was first noted in Marion County that year, also, by Dale W. Rice and several others. They saw two on May 30, at the Geist Reservoir, near Indianapolis, "in a tangled thicket near the water's edge." Val Nolan, Jr., saw Bell's Vireo in this county on June 1, and on June 23, Charles Keller found a young one just out of the nest. The only other 1946 record was of four birds seen by Clark on July 6 at Jasper-Pulaski State Game Preserve.

1947

Henry C. West observed a single individual in Marion County on April 19, near the junction of Fall Creek and White River (in Indianapolis) in some "2nd, 3rd, and 4th year saplings of . . . willow" (West, letter).

Dittrich reported it from Highland on May 31. On May 29, Clark, T. J. Nork, and Richard Zusi found a nest in a willow (*Salix* sp.) at the Jasper-Pulaski State Game Preserve. The nest contained two eggs and two young.

1948

Bell's Vireo was found in the same three counties where it was recorded the previous year. It was observed at three different localities in Marion County and Rice found a nest there containing one egg on June 14. West reported single birds on April 17 and 24, in Marion County. The third was a bird heard singing by Rice in a "scrub-grown abandoned pasture" (Rice, 1948:18) on June 7, probably a breeding bird. It was noted at Highland by Dittrich on May 16 and Clark observed two on the Jasper-Pulaski State Game Preserve on May 21.

1949

On April 21 and 25, Bell's Vireo was reported in Lake County by Dittrich. There were nesting records from Marion County that year "in two of the same places . . . where it was seen last year" (Wright, 1949:54). Nork and Zusi heard one singing at the Jasper-Pulaski State Game Preserve on June 26.

1950

I found a singing bird at Brazil, Clay County, Indiana, on May 22. I located the nest the following day. I heard another singing male one mile from this area during that summer. I also heard a singing male in Clinton, Vermillion County, on July 1.

Rice and Edward Mockford reported at least four birds at separate areas near Morocco, Newton County, in July. The first Tippecanoe County record was obtained on May 29, by Marvin Davis, Hubert Davis, and Richard Phillips. They found at least two males in the willow thickets surrounding some old gravel pits close to the Purdue University Campus, Lafayette.

Leonard Brecher informed me (in letter) that he had been shown a nest at the Jasper-Pulaski State Game Preserve in 1950, while on a hike with Nork and Clark. He further wrote, "We heard a number of singing birds in the area . . ." Upon inquiry I learned that this nest had been observed on June 26 by Clark, Nork, Zusi, Brecher, and others. It contained three eggs on that date.

Rice reported that Bell's Vireo nested in Marion County again in 1950. Dittrich reported a bird in Lake County on October 9. In view of the migration dates listed by Bent (1950:262), this appears to be a late record.

1951

I found two pairs and five nests in Brazil, Indiana, in 1951. In addition, I also discovered two old nests on an area where none was found in 1950.

Dr. C. M. Kirkpatrick heard a singing bird near Lafayette in the spring of 1951, and I located the nest on June 20. At another site close to the above nest, Kirkpatrick and I heard at least one, and perhaps two, other singing males and found one nest. Four males were subsequently heard and observed by Kirkpatrick, Dr. I. W. Burr, M. S. Webster, and me at still another site, near the Purdue University campus, in a nursery. A nest was just being started on July 5, but was never completed. Persistent searching in the summer months, as well as in November, after the leaves had fallen, failed to disclose any nests. On July 14, I did find an old nest (evidently built in 1950) in this nursery, but in an area where no Bell's Vireo was present in 1951.

Clark reported the birds again at the Jasper-Pulaski State Game Preserve on May 19, and on June 3, James B. Cope and I observed a singing male there. It was still present in the same area on July 7, although we did not search for the nest.

1952

Records for 1952 which have come to my attention are as follows: Cope heard two singing males at the Jasper-Pulaski State Game Preserve on May 24. I found four birds at two different areas near Lafayette on May 24; both of these areas were occupied in 1951. A new locality was added to the list on May 30, when Kirkpatrick, Phillips, and I found a singing male in a dense thicket of quaking aspen (*Populus tremuloides*) near Schererville, Lake County, Indiana. On June 30, I heard a singing male on the new Willow Slough State Game Preserve, near Morocco, Newton County. The following day I found three additional males singing at widely separated areas in Newton County. These are likewise new sites in Indiana for this species.

HABITAT

In Indiana, Bell's Vireo seems to prefer areas with an abundance of low shrubs, thickets, briar tangles, and ground cover. Abandoned fields grown up to sassafras (*Sassafras albidum*), hawthorn (*Crataegus* spp.), wild plum (*Prunus* spp.), elder (*Sambucus canadensis*), and similar plants seem to be favored. In the strip-mining of coal in Clay County, many such areas are produced; it is on these sites that Bell's Vireo nests. A considerable portion of southwestern Indiana is characterized by this type of habitat, but no field work has been done in most of it.

Brushy fence-rows, almost a thing of the past in intensively farmed areas, are also utilized. Some of the birds located in Tippecanoe County in 1951 were nesting in thick, shrubby fence-rows composed mainly of hazelnut (*Corylus* sp.), poison ivy (*Rhus toxicodendron*), elder, shingle oak (*Quercus imbricaria*), and raspberry (*Rubus* sp.). Where such conditions exist in the northwestern portion of the state, Bell's Vireo may be present.

On poorly-drained areas which were once marsh land, cessation of farming allows the regrowth of quaking aspen, willows, and dogwoods (*Cornus* spp.). Bell's Vireo occurs in these situations on the Jasper-Pulaski and Willow

Slough State Game Preserves, the Moroceo areas, Tippecanoe River State Park, and in Lake County. There is a large amount of such habitat in northern Indiana, notably along the Kankakee River.



FIG. 1. Nesting habitat of Bell's Vireo at Brazil, Clay County, Indiana. A nest was found in the small tree in the foreground on May 23, 1950. Photographed by Russell E. Mumford.

The nest tree is usually close to, or a part of, dense cover, such as wild plum thicket, dogwood elump, hazelnut elump, or briar patch. Nine nest trees averaged 11 feet in height. Most of these trees were situated in the open at the edge of a thicket (see Fig. 1). Where the nest was in a fence-row or row of nursery trees, it was placed on the border and not in the dense, central portion. The ground cover of the openings where nests were located usually consisted of goldenrod (*Solidago* spp.), aster (*Aster* sp.), milkweed (*Asclepias* spp.), and other open field plants. Such ground cover reaches a height sufficient to obscure the lower branches of the nest tree. The nest is placed where the ground cover merges with the low, drooping branches of the nest

tree. Thirteen nests found in Indiana in 1951 were in the following kinds of trees: hazelnut, 3; white elm (*Ulmus americana*), 2 (both in same tree; second nest built after first nest deserted); hawthorn, 2; apple (*Malus* sp.), 2; black cherry (*Prunus serotina*), 1; sugar maple (*Acer saccharum*), 1; willow, 1; and elder, 1. Two other nests thought to have been constructed in 1950 were found in hawthorns, apparently one of the favorite nesting sites.

NESTING

Nesting apparently begins in mid-May in Indiana. I saw two birds building a nest at Brazil on May 13, 1951. A nest containing three eggs on May 26, 1950, at Brazil, probably was started about a week earlier. Another nest in the same area was completed on May 31, 1951. Clark found a nest containing two eggs and two newly-hatched young on May 29, 1947, at the Jasper-Pulaski State Game Preserve. This nest probably was started about May 11 or 12.

Most observers agree that incubation requires about 14 days (Bent, 1950:257). Nest building was determined to last from four to five days by Pitelka and Koestner (1942:99) in Illinois. The young are said, by these same authors, to remain in the nest about 11 days.

The nest is placed low in the tree. Thirteen nests in Indiana examined by me ranged from 20 inches to 40 inches in height. The average measured height of eight nests was 31 inches (Table 1). Every nest that I examined was placed in the fork of a small branch; in one case it was in a lateral fork instead of being in a terminal fork. The distance from the main stem of the nest tree to the nest varied from 9 to 43 inches; average, 24 inches. Additional nest data are presented in Table 1.

Typical nests were well-made and neatly-woven cups. All of the eight nests collected bore a marked resemblance to one another. The outside of the nest was often woven from the inner layers of milkweed stems, and other grayish materials. Occasionally, shreds of birch (*Betula*) bark, grapevine (*Vitis* sp.) stem, dead leaves, and bits of paper were utilized in the outer covering. The nests were always lined with the fine, reddish-brown stems of grasses. Each nest was bedecked with spider webs and cocoons, evenly distributed over the outside wall of the nest. Similar nest construction has been reported by Holland, Du Bois, Nice, and Simmons (*in* Bent, 1950:254-256).

BEHAVIOR AT THE NEST

On two occasions, I found both adults taking part in the construction of the nest. Pitelka and Koestner (1942:102) reported that the female built the nest unaided, in the five nests studied by them in Illinois. On May 13, 1951, I spent a short time observing a pair of birds at work on the nest at Brazil.

TABLE 1
NESTS OF BELL'S VIREO IN INDIANA, 1943-1951

NEST NO.	HEIGHT FROM BOTTOM OF NEST TO GROUND	INSIDE DIAM ¹	OUTSIDE DIAM. ¹	INSIDE DEPTH ¹	OUTSIDE DEPTH ¹	DISTANCE FROM TRUNK
1	about 20 in.					
2	about 36 in.					
3	23 in.	43 × 56	66 × 78	30	60	27 in.
4	40 in.	43 × 43	58 × 59	38	62	16 in.
5	22 in.	51 × 62	77 × 83	35	73	26 in.
6	36 in.	48 × 50	67 × 70	34	57	43 in.
7	28 in.	40 × 48	59 × 70	30	57	24 in.
8	28 in.	42 × 65	63 × 84	36	82	9 in.
9	about 30 in.					
10	40 in.	40 × 47	50 × 66	36	71	26 in.
11	30 in.					
12	about 36 in.					
13	"2¼ ft."					
Averages ²	31 in.	44 × 53	63 × 73	34	66	24 in.

¹ Measurements in millimeters.

² Estimated heights not included in average.

The male was singing and I soon located him at the nest. He then left, returning in about a minute closely behind the female, which was carrying plant material. The female went directly to the nest, while the male flew into the nest tree and sang as the female worked on the nest. In a short time, the female flew from the nest, whereupon the male hopped down to it and appeared to be arranging the nesting material for several seconds. He then flew off low under the protection of an adjacent wild plum thicket in the direction taken by his mate. Soon both returned, the female with more nesting material, but the male with none that was visible. The same procedure was followed as before, except that this time the male sang as he was arranging the nest. Both birds left again. The female stayed away from the nest for the next few minutes, but the male returned four times and seemed to be adding something to it. This may have been spider silk, although it was not visible with a binocular from 60 feet away. On one of his visits, the male flew down to a leaning milkweed stem and unsuccessfully attempted to strip off some of the silky inner layers of the plant. Later, I saw both adults carrying nesting material from a point about 100 yards from the nest.

I hid near the above nest on May 21, 1951, to observe this pair. On this date the nest already contained two cowbird eggs and was hanging loosely

from its support. The male was singing near the nest at 9:30 a.m. At 9:35 a.m., a female cowbird alighted in the nest tree and was immediately chased away by the male vireo. As he flew after the cowbird, he gave a loud scolding note.

Both adults participated in incubation; on June 24, 1951, I flushed a male from Nest 4 (see below). He commenced singing after leaving the nest.

SONG

The song of Bell's Vireo can hardly be considered a musical one, but it is distinctive and emphatic. Parts of it could be likened to that of the White-eyed Vireo (*Vireo griseus*), but the entire song is different. From a distance, the last and loudest portion of the song resembles that of the Alder Flycatcher (*Empidonax traillii*). This is only true when the rest of the song is inaudible. Males sing in the nest tree and this trait may possibly lead to destruction of the nest by the cowbird or other enemies. The typical song has been well-described by several authors, but Nolan has recorded in his notes a song that I have never heard. In speaking of this, he wrote, "They sang often, the regular gurgling song sometimes being replaced by a long, wild, squeaky performance which went on and on. It had no melody and was completely tuneless—it had the jerky, sputtering quality that characterizes part of the Ruby-crowned Kinglet's [*Regulus calendula*] song."

The existence of a territory is quickly perceived. As the observer approaches, the male begins to sing, often coming to meet the intruder. Males under observation sang at all hours of the day. One male at Lafayette sang once at 8:17 p.m. (Central Daylight Saving Time) on July 2, 1951, after I had "squeaked" a number of times to initiate singing. I found that squeaking often induced the male to sing, especially when the observer was near the nest site.

The song period in Indiana, from present records, ranged from April 24 (1948) to September 3 (1951). Singing rapidly diminished after August in Tippecanoe County, in 1951, however. On June 21, I timed a singing male for 15 minutes at Lafayette. This bird uttered his song from 9 to 17 times per minute; average, 13. During the last five minutes of this period, I was probably near the nest (though I did not locate it) and the bird increased his tempo so that he averaged 15 songs per minute. At 17 songs per minute, there is little pause between phrases and they pour out at a rapid rate. It is difficult to imagine how the bird could possibly sing more than 17 songs per minute. Apparently singing tempo decreases as the observer retires from the nest area, but quickly increases as he approaches.

NESTING SUCCESS

It is common knowledge that the Bell's Vireo is often parasitized by the cowbird. Cowbird interference was noted at seven of the 13 nests observed. In only one instance was a young cowbird raised. In most of the cases, the nest was deserted soon after cowbird eggs were laid.

Three young vireos disappeared from one nest when they were eight days old. This nest was not torn up or disturbed, possibly indicating that the predator was a snake. Keller observed a recently fledged vireo at Indianapolis, June 23, 1946, and I collected a fledgling at Lafayette on August 10, 1951. These are, to my knowledge, the only definite records of young birds being successfully produced in Indiana.

Data on six nests studied in 1950 and 1951 follow:

NEST 1 (1950)

- May 23 — 4:30 p.m. Female on nest.
- 26 — 8:30 a.m. Female on nest. Nest held four vireo eggs.
- June 2 — 7:45 a.m. Female on nest. Nest held three vireo eggs.
- 5 — Nest contained three vireo eggs.
- 7 — 9:45 a.m. Female on nest. Nest held one vireo egg and two very small young.
- 9 — Three young in nest.
- 15 — Nest empty but not torn up. Nest collected.

NEST 2 (1951)

- May 13 — 8:15 a.m. Both adults building nest.
- 19 — 9:00 a.m. Nest contained a cowbird egg. Lining of nest not completed. Nest hanging loosely from fork.
- 21 — 9:30 a.m. Nest still contained cowbird egg. Took nest and discovered a second cowbird egg almost buried in the bottom of the nest.

NEST 3 (1951)

- June 7 — New nest, in same tree as nest No. 2 above, completed except for lining.
- 8 — Nest empty.
- 9 — Nest empty.
- 12 — Female on nest; nest contained three vireo eggs.
- 14 — 4:40 p.m. An adult on nest. Nest held four vireo eggs.
- 15 — 6:25 p.m. Nest held one cowbird egg and no vireo eggs. No trace of vireo eggs on ground below nest.
- 17 — Cowbird eggs still in nest.
- July 3 — Collected deserted nest.

NEST 4 (1951)

- June 20 — 7:35 p.m. Male on nest. Nest held one vireo and one cowbird egg.
- 24 — Dr. I. W. Burr reported one vireo egg in nest.
- July 2 — Nest empty. No vireos near site. Collected nest.

NEST 5 (1951)

- May 28 — 3:20 p.m. Both adults building. Nest completed except for lining.
- 30 — Nest empty.
- June 2 — Nest appeared completed but empty.
- 4 — 3:15 p.m. Female on nest. Nest contained one vireo and two cowbird eggs.

- 6—10:40 a.m. Nest held two vireo eggs and two cowbird eggs. I removed cowbird eggs.
 7—4:10 p.m. Nest empty. One broken vireo egg on ground showed imprint of bird's beak.
 8—Nest empty. Male vireo singing nearby.
 12—Collected nest.

NEST 6 (1951)

- July 3—Nest located 50 yards from nest No. 5. A cowbird egg on ground below nest contained puncture as if made by beak of bird. Nest empty. No other data.

At nest No. 3, the cowbird apparently removed all four of the vireo eggs. Similar treatment was apparent at nest No. 5, from which two vireo eggs disappeared. On the other hand, at nests Nos. 4 and 6, I think it likely that the vireos removed the cowbird eggs.

SUMMARY

Bell's Vireo has been recorded in eight Indiana counties from 1943 to 1952. The first specimen was taken August 10, 1951, near Lafayette, Tippecanoe County, Indiana.

In Indiana, Bell's Vireo prefers areas where shrubby growths border, or are contained in, abandoned fields. Ground cover at the nest site is usually dense. Hawthorn is one of the favorite nest trees.

Nesting apparently begins in mid-May in Indiana. The nest is placed low in the tree, at an average height of about 31 inches.

Both adults participated in nest building and, apparently, incubation.

Singing was heard from April 24 to September 3. Nolan reported a variation of the song which is apparently little known. Males sometimes sang at the rate of 17 times per minute; average for 15 minutes of one which was timed, 13.

Cowbird interference resulted in a low nesting success.

ACKNOWLEDGMENTS

I wish to thank Dr. George M. Sutton for his comments and suggestions on the manuscript. I also wish to thank all of the persons who have graciously supplied me with their records and have given me permission to quote from their field notes.

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ROUTE 1, CORTLAND, INDIANA, JULY 3, 1952

NEW LIFE MEMBER



Alexander Wetmore, life member, has found birds his prime interest in life since his boyhood years in south-central Wisconsin. Educated at the University of Kansas and George Washington University, he was in the service of the old Biological Survey until 1924, and subsequently in the Smithsonian Institution. After 27 years as Assistant Secretary and Secretary of the Smithsonian, he is relinquishing heavy administrative duties at the end of 1952 to devote his entire time to research in ornithology. His principal contributions in several hundred papers have been in systematic classification, fossil birds, geographic distribution, and migration. His great pleasure is in active field work in tropical America. The photograph was taken in March, 1952, on the coast of western Panamá.

MORE BIRD WEIGHTS FROM SURINAM

BY FR. HAVERSCHMIDT

THE present list of bird weights from Surinam should be considered a continuation of my earlier list (1948. *Wilson Bulletin*, 60:230-239).

In the first list I gave weights of 216 species of birds; the present one contains the weights of a hundred additional species, many of them smaller birds which I was unable to weigh earlier. I also have included the weights of several species in the first list where more complete data were available now.

Nomenclature in the following list is based on Peters (1931-1951. "Check-list of birds of the world," Vols. 1-7, Cambridge, Mass.), Cory, Hellmayr, and Conover (1918-1949. *Field Mus. Nat. Hist. Zool. Ser.*, 13, Pts. 1-11), and Zimmer (1931-1951. "Studies of Peruvian birds, Nos. 1-61," *American Museum Novitates*). I should like to correct a mistake in my first list: *Melanerpes cruentatus* (*op. cit.*:235) should read *Melanerpes rubrifrons*.

			Grams
PELICANS. PELECANIDAE			
<i>Pelecanus o. occidentalis</i>	Dec.	? imm.	3000
HERONS. ARDEIDAE			
<i>Pilherodius pileatus</i>	Jan.	♂	518
SWANS, GEESE, AND DUCKS. ANATIDAE			
<i>Nononyx dominicus</i>	Dec.	♀	298
CONDORS AND VULTURES. CATHARTIDAE			
<i>Coragyps atratus</i>	Mch.	?	1250
	May	♂	1500
<i>Cathartes aura ruficollis</i>	Apr.	?	1000
	Jly.	?	1250
<i>Cathartes urubitinga</i>	May	♀	1480
HAWKS. ACCIPITRIDAE			
<i>Chondrohierax u. uncinatus</i>	Jly.	♂	257
	Aug.	♀	247
<i>Helicolestes hamatus</i>	Aug.	♂	448
<i>Buteo m. magnirostris</i>	Sep.	2 ♀ ♀	310, 350
<i>Buteo n. nitidus</i>	Jly.	♂	492
	Nov.	♂	430
<i>Busarellus n. nigricollis</i>	Nov.	♀	758
<i>Circus brasiliensis</i>	May	♂	391
<i>Geranospiza caerulescens</i>	Nov.	♀	328
FALCONS, FALCONIDAE			
<i>Daptrius ater</i>	Apr.	♀	354
<i>Milvago chimachima paludivagus</i>	Jne.	♂, ♂ imm.	304, 329
		♀ imm.	351
<i>Falco peregrinus anatum</i>	Mch.	♀ imm.	934
PHEASANTS AND QUAIL. PHASIANIDAE			
<i>Colinus cristatus sonnini</i>	Feb.	♂	153
	Aug.	♀	131
<i>Odontophorus g. gujanensis</i>	Dec.	♀	298
RAILS. RALLIDAE			
<i>Aramides c. cajanea</i>	May	♂	408
<i>Laterallus v. viridis</i>	Jan.	♀	73

PLOVERS. CHARADRIIDAE

<i>Hoploxypterus cayanus</i>	May	♀	84
<i>Charadrius hiaticula semipalmatus</i>	Oct.	♀	35
<i>Charadrius collaris</i>	Feb.	♀	29.1
	Aug.	♂	28.2

SANDPIPERS. SCOLOPACIDAE

<i>Tringa flavipes</i>	Jne.	♂	88
<i>Tringa melanoleuca</i>	Feb.	2 ♀ ♀	140, 178
	Sept.	?	180
	Oct.	♂	155
	Dec.	♂	174
<i>Capella p. paraguaiae</i>	Jan.	♂	113
	Sep.	♀	103
	Nov.	2 ♀ ♀	109, 121
	Dec.	♂	109

PIGEONS. COLUMBIDAE

<i>Columba c. cayennensis</i>	Sept.	♂	251
<i>Columba speciosa</i>	Sept.	♂	285
<i>Columba subvinacea purpureotincta</i>	Nov.	♂	110
<i>Columbigallina passerina griseola</i>	Jan.	♀	33
<i>Claravis pretiosa</i>	Jly.	♂	66
<i>Leptotila r. rufaxilla</i>	Apr.	♀	137
	Jne.	♀	131
	Oct.	♀	135
<i>Oreopeleia montana</i>	May	♂ imm.	78

PARROTS. PSITTACIDAE

<i>Ara ararauna</i>	Dec.	♂, ♀	1286, 1157
<i>Ara manilata</i>	Mch.	2 ♂ ♂	358, 360
<i>Ara n. nobilis</i>	Apr.	♀	144
<i>Brotogeris c. chrysopterus</i>	Jan.	♂, 2 ♀ ♀	69, 68, 68
<i>Pionus fuscus</i>	Jan.	♀	210
<i>Amazona a. amazonica</i>	Dec.	♂	403
<i>Deropterus a. accipitrinus</i>	Sep.	♀	253

CUCKOOS. CUCULIDAE

<i>Piaya c. cayana</i>	Jan.	♀	103
<i>Crotophaga major</i>	Nov.	♂	171

TYPICAL OWLS. STRIGIDAE

<i>Otus choliba crucigerus</i>	Oct.	♂	138
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POTOOS. NYCTIBIIDAE

<i>Nyctibius grandis</i>	Jne.	♂	500
	Sep.	♂	604

GOATSUCKERS. CAPRIMULGIDAE

<i>Chordeiles a. acutipennis</i>	Feb.	♂	42
	Nov.	3 ♂ ♂	48, 48, 50
		2 ♀ ♀	46, 46
	Dec.	♂	52
<i>Caprimulgus c. cayennensis</i>	Mch.	♂	38
	Jne.	♀	37
	Aug.	♂, 2 ♀ ♀	36, 35, 33
<i>Caprimulgus n. nigrescens</i>	Apr.	♀	39
<i>Hydropsalis climacocerca schomburgki</i>	Oct.	♂	34

SWIFTS. APODIDAE

<i>Chaetura s. spinicauda</i>	Sep.	♀	15
<i>Chaetura b. brachyura</i>	Apr.	♀	20.2
<i>Reinarda s. squamata</i>	Mch.	♀	10.5
	Jne.	2 ♂ ♂	9.4, 9.7

HUMMINGBIRDS. TROCHILIDAE

<i>Glaucis h. hirsuta</i>	Jan.	♂	5.0
	Mch.	♂	7.2

<i>Phaethornis s. superciliosus</i>	Mch.	♀	5.8
<i>Phaethornis l. longuemareus</i>	Jan.	♀	3.75
	Feb.	♀	2.92
	May	♀	3.16
	Jly.	♀	3.27
	Aug.	♂	3.75
	Sep.	♀	3.3
	Dec.	♂	2.9
<i>Caupylopterus l. largipennis</i>	Mch.	♀	7.2
<i>Florisuga m. mellivora</i>	Apr.	2 ♂ ♂	6.97, 7.35
	Jly.	♀	6.9
<i>Anthracothorax viridigula</i>	Apr.	2 ♂ ♂	9.4, 9.8
	Nov.	2 ♂ ♂	10.4, 9.9
		♀	9.2
<i>Anthracothorax u. nigricollis</i>	Mch.	2 ♀ ♀	6.9, 7.4
	Apr.	3 ♂ ♂	7.2, 7.8, 8.2
	Aug.	♂, ♀	6.2, 6.3
<i>Chrysolampis mosquitos</i>	Mch.	♀	4.1
	Apr.	♂, ♀	4.4, 3.9
<i>Chlorestes u. uotatus</i>	Apr.	♂	3.75
<i>Hylocharis cyanus viridiventris</i>	Apr.	♂	4.25
	May	2 ♂ ♂	3.48, 3.8
<i>Smaragdites t. theresiae</i>	Feb.	♂	3.6
	Jly.	♀	3.5
	Aug.	♂, ♀	3.58, 3.8
	Sep.	♂	3.9
	Nov.	♀	3.5
<i>Amazilia f. fimbriata</i>	Mch.	♂	4.5
	Apr.	♂, 2 ♀ ♀	4.8, 4.9, 5.8
	Nov.	♂	4.5
<i>Amazilia l. leucogaster</i>	Apr.	♂	4.9
	Nov.	♂, ♀	5.4, 4.7
	Dec.	♂, ♀	4.7, 4.6
TROGONS. TROCONIDAE			
<i>Trogon s. strigilatus</i>	Jan.	♀	84
	Oct.	♀	81
	Nov.	♂	98
<i>Trogon v. violaceus</i>	Sep.	♀	50
KINGFISHERS. ALCEDINIDAE			
<i>Ceryle t. torquata</i>	Jly.	♀	295
JACAMARS. GALBULIDAE			
<i>Jacamerops a. aurea</i>	Sept.	♀	58
PUFF-BIRDS. BUCCONIDAE			
<i>Chelidoptera t. tenebrosa</i>	Feb.	♀	39
BARBETS. CAPITONIDAE			
<i>Capito n. niger</i>	May	♀	54
TOUCANS. RAMPHASTIDAE			
<i>Pteroglossus aracari roraimae</i>	Jan.	♀	264
	Jly.	♂	237
	Sep.	♀	266
<i>Pteroglossus v. viridis</i>	Mch.	♂, 2 ♀ ♀	146, 136, 128
	Aug.	♂, ♀	136, 125
	Sep.	♂	143
<i>Ramphastos v. vitellinus</i>	Mch.	♂	358
	Jly.	♀	298
	Nov.	♂	423
	Dec.	♀	387
<i>Ramphastos tucanus</i>	Dec.	♀	514

WOODPECKERS. PICIDAE

<i>Picus j. flavigula</i>	Jne.	♀	58
	Sep.	♀	44
<i>Celeus elegans hellmayri</i>	Apr.	♂	161
<i>Celeus u. undatus</i>	Jan.	♂, ♀	61, 64
<i>Celeus j. flavus</i>	Jly.	2 ♀ ♀	102, 108
<i>Melanerpes c. cruentatus</i>	Mch.	♂	60
<i>Melanerpes rubrifrons</i>	Dec.	♂, ♀	57, 60
<i>Veniliornis cassini</i>	Jan.	♀	32
<i>Phloeoceastes m. melanoleucos</i>	Jan.	2 ♂ ♂	269, 251
<i>Phloeoceastes r. rubricollis</i>	Jan.	♀	193
	May	♂	236

WOOD-HEWERS. DENDROCOLAPTIDAE

<i>Dendrocincla j. fuliginosa</i>	Jan.	♀	32
	Mch.	♀	37
<i>Xiphorhynchus guttatus polystictus</i>	Dec.	♂, ♀	61, 62
<i>Lepidocolaptes a. albo-lineatus</i>	Feb.	♂	19
	Sep.	♂	24
	Dec.	♀	20.3

OVEN-BIRDS. FURNARIIDAE

<i>Synallaxis albescens josephinae</i>	Mch.	♂, 2 ♀ ♀	14.7, 14.7, 14.6
	Apr.	♀	20
	Nov.	♂	16
	Dec.	♀	15
<i>Philydor pyrrhodes</i>	Jan.	♂	32.5
<i>Automolus ochrolaemus turdinus</i>	Apr.	♂, ♀	35, 36.1
	May	2 ♀ ♀	33, 33
<i>Sclerurus rufigularis fulvigularis</i>	Jan.	♀	23.1

ANT-BIRDS. FORMICARIIDAE

<i>Frederickena viridis</i>	Feb.	♂	71
<i>Thamnophilus m. murinus</i>	Jan.	♂	19
<i>Pygiptila stellaris occipitalis</i>	Feb.	♂	23.8
	Apr.	♂	25.8
	Jne.	♀	24.2
	Oct.	♂	25
<i>Myrmotherula b. brachyura</i>	Aug.	♀	7.8
<i>Myrmotherula a. axillaris</i>	May	2 ♂ ♂	9, 9.2
<i>Herpsilochmus s. sticturus</i>	Jan.	♂	11
<i>Formicivora g. grisea</i>	Feb.	♂	11.5
<i>Myrmoborus leucophrys angustirostris</i>	Dec.	2 ♂ ♂, ♀	21, 22, 21
<i>Hypocnemis c. cantator</i>	Jan.	♂, ♀	13, 14
	Feb.	♀	11.5
	Mch.	♂	12.3
	Apr.	♂	11.7
	Oct.	♂	12
	Dec.	♀	14
<i>Hypocnemoides m. melanopogon</i>	Dec.	2 ♂ ♂, ♀	14, 14, 16
<i>Percnostola r. rufifrons</i>	Sep.	♂	30
<i>Myrmeciza j. ferruginea</i>	Oct.	♂	25.9

COTINGAS. COTINGIDAE

<i>Cotinga cayana</i>	Jly.	♂	64
<i>Xipholena punicea</i>	May	♂, ♀ imm.	69, 60
<i>Laniocera hypopyrrha</i>	Mch.	♂	47.2
<i>Lipaugus cineraceus</i>	Apr.	♂	73
	Oct.	2 ♂ ♂	74, 73
<i>Pachyramphus rufus</i>	Mch.	♀	18.8
	Apr.	♀	18.6
	Jly.	♂	19.9

<i>Pachyramphus polychopterus tristis</i>	Apr.	♂	20.7
	May	♀	22.4
	Jne.	2 ♂ ♂, ♀	20.5, 20, 22.3
	Aug.	♂	24.5
	Sep.	♀	22.2
	Nov.	♂, ♀	23, 23
<i>Pachyramphus marginatus nanus</i>	Jan.	♂	18
<i>Platypsaris minor</i>	May	♂	38
	Sep.	♂, ♀	44, 39
<i>Querula purpurata</i>	Feb.	♂, ♀	104, 91
<i>Gymnoderus foetidus</i>	Sep.	♀	241
MANAKINS. PIPRIDAE			
<i>Pipra a. aureola</i>	May	2 ♂ ♂, ♂ imm.	14.9, 15.4, 16.3
	Dec.	♀	18
<i>Pipra e. erythrocephala</i>	Jan.	♂ imm.	11
	Feb.	♀	10.8
	Jne.	3 ♂ ♂	11.1, 11.2, 11.6
	Oct.	♂	10.2
	Dec.	♂	12
<i>Pipra p. pipra</i>	Dec.	2 ♂ ♂	9.1, 9.6
<i>Manacus m. manacus</i>	Mch.	♀	14.5
	Sep.	♂	17.7
	Dec.	♂	16.1
<i>Schiffornis turdinus wallacii</i>	Mch.	♀	31.3
	Feb.	3 ♂ ♂	30, 37, 31
	Apr.	♂	34
<i>Neopelma chrysocephalum</i>	Mch.	♂	15.7
	Nov.	♂	16
TYRANT FLYCATCHERS. TYRANNIDAE			
<i>Fluvicola p. pica</i>	Feb.	♂, ♀	15, 11.9
<i>Tyrannus dominicensis vorax</i>	Mch.	♀	55
<i>Empidonomus varius rufinus</i>	Feb.	2 ♂ ♂	23.9, 26
	Mch.	2 ♂ ♂, ♀	24, 23, 24
	Nov.	♂	23
	Dec.	♀	25
<i>Empidonomus varius varius</i>	May	♀	27
	Jly.	♀	27
<i>Myiodynastes maculatus solitarius</i>	May	2 ♂ ♂	44, 47
<i>Myiarchus f. ferox</i>	Jan.	♀	29
	Feb.	♂	30.2
	Mch.	3 ♀ ♀	28.7, 29.2, 29.5
	Apr.	♂	30
	Jly.	♂	29
	Sep.	2 ♂ ♂, ♀	28.9, 29, 30
	Nov.	3 ♂ ♂	26, 28, 23
		♀	26
	Dec.	2 ♂ ♂	28, 26
		2 ♀ ♀	29, 30
<i>Myiobius b. barbatus</i>	Apr.	♂	10.4
<i>Myiophobus f. fasciatus</i>	Dec.	♂	11
<i>Tolmomyias sulphurescens cherriei</i>	Jly.	♂	13
	Nov.	♂	13
<i>Tolmomyias poliocephalus sclateri</i>	Jly.	♀	11.1
	Aug.	2 ♀ ♀	11, 11.3
	Nov.	♂, 2 ♀ ♀	12, 12, 12.1
<i>Tolmomyias flaviventris collingwoodi</i>	Mch.	♀	13.4
	May	♀	13.6
	Jly.	♂	13
	Aug.	♀	13.5

<i>Rhyachocyclus olivaceus guianensis</i>	Feb.	♀	20
<i>Ramphotricon ruficauda</i>	Jan.	♀	16.2
	Jne.	2 ♂ ♂	15, 17.5
		♀	17.9
<i>Todirostrum chrysocrotaphum pictum</i>	Oct.	♂	6.53
<i>Todirostrum c. cinereum</i>	Feb.	♂	6.9
	Aug.	♀	6.6
<i>Todirostrum m. maculatum</i>	Jne.	♀	7.2
	Oct.	♂	7.6
<i>Colopteryx galeatus</i>	Mch.	♂	6.9
	Oct.	♂	7.4
<i>Elaenia f. flavogaster</i>	Nov.	♂	26
	Dec.	♂, ♀	25, 24
<i>Elaenia cristata</i>	Feb.	♀	19.3
	May	♀	17.4
	Nov.	♀	18
<i>Elaenia gaimardii guianensis</i>	Apr.	♀	11.1
	Sep.	♂	12.8
<i>Elaenia flavivertex</i>	Dec.	♀	11
<i>Phaeomyias murina incomta</i>	Feb.	♂	10.3
<i>Camptostoma obsoletum napaeum</i>	Feb.	♂	9.5
	Mch.	♀	7.7
	Jne.	♂	8.0
	Jly.	♂	9.4
	Sep.	♀	7.75
<i>Tyrannulus e. elatus</i>	Jan.	♂	8
	Aug.	♀	7.3
<i>Pipromorpha o. oleaginea</i>	Oct.	♀	10.4
<i>Pipromorpha m. macconnelli</i>	Oct.	♂	14.5
SWALLOWS. HIRUNDINIDAE			
<i>Progne s. subis</i>	Oct.	♀	52
<i>Progne c. chalybea</i>	Jan.	♀	40
	Jne.	♀	37
	Aug.	2 ♂ ♂	45, 50
	Dec.	♂	39
<i>Phaeoprogne t. tapera</i>	Jan.	♂	34
	Nov.	♀	36
	Dec.	3 ♀ ♀	32, 34, 45
		♂	30
WRENS. TROGLODYTIDAE			
<i>Thryothorus leucotis albipectus</i>	Dec.	2 ♀ ♀	23, 25
<i>Thryothorus c. coraya</i>	Mch.	♂, ♀	15.4, 17.3
	Nov.	♀	15
<i>Troglodytes musculus clarus</i>	Apr.	♂, ♀	12.2, 13.4
	May	♀	11.7
	Jne.	♂	12.6
<i>Henicorhina l. leucosticta</i>	Apr.	♂	15.5
MOCKINGBIRDS. MIMIDAE			
<i>Mimus g. gilvus</i>	Jan.	♂ imm.	52
THRUSHES. TURDIDAE			
<i>Turdus n. nudigenis</i>	Jne.	♀	69
<i>Turdus leucomelas ephippialis</i>	Jne.	♀	75
WARBLERS, GNATCATCHERS, AND KINGLETS. SYLVIIDAE			
<i>Polioptila p. plumbea</i>	Jly.	♂	6.9
	Oct.	♂, ♀	7, 7
<i>Ramphocaenus uelanus albiventris</i>	Apr.	2 ♂ ♂, ♀	8.2, 8.7, 8.3
VIREOS. VIREONIDAE			
<i>Hylophilus pectoralis</i>	Feb.	♂, ♀	11.7, 11.8
	Mch.	♀	11.7

HONEY-CREEPERS. COEREBIDAE

Cyanerpes c. cyaneus

Feb.	♂	12.7
Mch.	♀	13.1
Apr.	♂	14
May	♀	12.2
Nov.	♂	12.2
May	♀, ♂	9.6, 10.8
Mch.	♀	9.5
May	♂	8.2
Aug.	♂	9.9

*Cyanerpes c. caeruleus**Coereba flaveola minima*

WOOD WARBLERS. PARULIDAE

Dendroica petechia aestiva

Mch.	3 ♀ ♀	8.6, 10.5, 13.2
Sep.	♀	11

TROUPIALS. ICTERIDAE

Xanthornus d. decumanus

Feb.	♀	157
Aug.	♂, ♀	291, 148
Sep.	♀	151
Mch.	♂	103

Cacicus c. cela

	4 ♀ ♀	59, 62, 63, 68
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*Molothrus bouariensis minimus**Icterus chryscephalus*

Jly.	♀	36
Jne.	♂	42
Dec.	♂	44

*Icterus n. nigrogularis**Leistes m. militaris*

Apr.	♂, ♂ imm.	40, 36
Jan.	♂	48
May	2 ♂ ♂	47, 48
Dec.	♂ imm.	41

Sturnella magna subsp.

Jan.	♂ imm., 2 ♀ ♀	79, 77, 74
Feb.	♂	95
Mch.	♂, ♀	86, 72
Apr.	♂, ♂ imm.	86, 72
Oct.	♂	91
Nov.	♂	91
	3 ♀ ♀	81, 73, 64
Dec.	♂, 3 ♀ ♀	92, 80, 73, 72

TANAGERS. THRAUPIDAE

Tanagra v. violacea

Aug.	♂, ♀	13.8, 12.7
Oct.	♀	14.7
Dec.	♂	13.0

Tangara c. cayana

Feb.	♂, ♀	20.3, 19
Apr.	♂, ♀	19, 17
May	♂	17
Dec.	♂	19

Thraupis e. episcopus

Feb.	♂	28
Jne.	♂	37

Rauphocoelus c. carbo

Sep.	3 ♂ ♂	25.5, 26, 29
Nov.	♂ imm.	27.5

*Tachyphonus cristatus intercedens**Tachyphonus phoenicius*

Feb.	♂	19.5
Jan.	♀	25
Mch.	♂ imm.	21.2
Apr.	♂ imm.	22
Nov.	♂, ♂ imm.	22, 20

*Eucometis p. penicillata**Newosia pileata surinauensis*

Dec.	♀	29
Apr.	♂, 2 ♀ ♀	16.3, 17, 17.5
Jne.	♂	14.5
Jly.	♂, ♀ imm.	16, 20.7

Hemithraupis guira nigrigula

Mch.	♂	11.4
Sep.	♂	11.2

Schistochlamys m. melanopsis

Jan.	♂	30
May	♀	29
Nov.	♂	33

FINCHES. FRINGILLIDAE

<i>Saltator coerulescens olivascens</i>	Jly.	♂	54
<i>Caryothraustes c. caudensis</i>	Jan.	♂, 2 ♀ ♀	34, 36, 36
<i>Sporophila plumbea whiteleyana</i>	Mch.	♂	9.7
<i>Sporophila m. minuta</i>	Feb.	♂	7.3
	May	♂	7.4
	Aug.	♀	7.9
	Nov.	♂	8.3
	Dec.	♂	9
<i>Sporophila castaneiventris</i>	Jan.	♂	6.8
<i>Oryzoborus angolensis torridus</i>	Mch.	3 ♂ ♂	11.4, 12.7, 13.1
	Dec.	♂	12
<i>Volatinia jacarina splendens</i>	Mch.	♂	9.6
<i>Myospiza h. humeralis</i>	Dec.	♀	18

P. O. BOX 644, PARAMARIBO, SURINAM, DUTCH GUIANA, DECEMBER 28, 1951

THE WILSON ORNITHOLOGICAL CLUB LIBRARY

The following gifts have been recently received. From:

Irwin M. Alperin—2 magazines	Philip S. Humphrey—1 reprint
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William C. Grimm—1 book	Wisconsin Conservation Department—1 pamphlet
Fr. Haverschmidt—1 reprint	
Harold M. Holland—2 reprints	

GENERAL NOTES

Mortality of migrating birds at Mt. Washington, New Hampshire.—The following observation was reported to me by Herbert Drury of Norwich, Vermont, who was a Dartmouth College student at the time.

On April 15, 1951, Mr. Drury, in company with Mr. Brad Richardson and several other students, were skiing in Tuckerman's Ravine on Mt. Washington, New Hampshire. Mr. Drury wrote: "It was cold, snowing and blowing so hard that . . . visibility was reduced to less than 50 feet. At six that morning it had been clear with no wind. At the base of the Headwall and at least a third of the way up to the lip of the Headwall, we found several dead birds frozen in the loose snow that was blowing down into the Ravine toward Pinkham Notch. The birds were somewhat battered up. Those that I identified included: 4 Golden-Crowned Kinglets [*Regulus satrapa*]; 4 Winter Wrens [*Troglodytes troglodytes*]; one Yellow-bellied Sapsucker [*Sphyrapicus varius*]; one Robin [*Turdus migratorius*]; one female Purple Finch [*Carpodacus purpureus*]. Undoubtedly there were more birds buried under the snow; and other birds were picked up by other skiers and carried down the mountain. The downdraft winds attained velocities of 40 to 50 m.p.h. that day. We suspect that migrating flocks coming over the mountain from the opposite [west] side were caught in these downdrafts and buffeted by the swirling snow until they perished."—DOUGLAS E. WADE, *Dept. of Entomology and Zoology, Clemson Agricultural College, Clemson, South Carolina, March 28, 1952.*

Turkey Vultures attacking Great Blue Heron.—In the vicinity of Pymatuning Lake, Ashtabula County, Ohio, there is a large Great Blue Heron (*Ardea herodias*) nesting colony and a Turkey Vulture (*Cathartes aura*) roost. This colony and this roost are in a sugar maple (*Acer saccharum*)-beech (*Fagus grandifolia*) climax forest. Most of the heron nests are in beech trees, a few trees having as many as twelve nests.

Approximately 100 vultures took flight when J. B. Ross, of Decatur, Georgia, and I entered the forest on the evening of August 14, 1949. Shortly after this flight a disturbance was detected at the top of a beech. There four Turkey Vultures were attacking one adult Great Blue Heron in a nest. The vultures flew at the heron from all sides. The heron made rapid thrusts at its attackers, and after five minutes of battle, the vultures left the heron. This Great Blue Heron was the only one observed in the rookery, all of the other herons having left about the first of August. The question arises as to why this adult bird was attached to a nest late in the summer. The nest was high in a beech, and it was not investigated.

Heron colonies in the Pymatuning area have been deserted without any apparent reason. One colony was abandoned after the eggs had been laid, another after the young had hatched (Todd, 1940. "Birds of Western Pennsylvania," pp. 48-52). Perhaps activities of the Turkey Vulture could be a factor in the moving of heron colonies.—JOHN F. MEHNER, *Pymatuning Laboratory, Department of Biological Sciences, University of Pittsburgh, Pittsburgh, Pennsylvania, September 1, 1951.*

Light intensity and waterfowl flight; pre-flight activities.—In spring and fall, scatterings of waterfowl often appear on the reservoirs in Baltimore, Maryland. The birds stay from a few hours to several days. When they depart, it is occasionally at a daytime hour, but usually in late evening. Rarely, after an evening departure, a similar flock is present again the next day, as if the same individuals had returned from a

night rafting place. Generally, however, the waterfowl leave for good on their first evening, so that it appears they have resumed migratory flights. During several years that I lived near one reservoir, I obtained some observations which suggest a correlation between departure times and light intensities. Although my data are too few to be conclusive, I offer them now because I have no prospect of obtaining more.

Within any species, departures on cloudy evenings were practically always earlier than those on clear ones. Two species appeared often enough in unmixed flocks to provide several observations in similar weather; each showed a fairly uniform departure time, in relation to sunset, under given conditions. One species was noteworthy for generally leaving before, instead of after, sunset; wider observations might disclose some specific differences in this respect. There was no correlation observed between departure times and temperature, wind direction, or wind force.

Either bathing or diving was an almost invariable preliminary to flight on the part of every species observed. Some of the birds also did wing-flapping, made little rushes on the water, or swam to and fro in a "nervous" manner shortly before taking off. Some species indulged in several or all of these activities on different evenings, or even on the same evening. The activities were usually performed intermittently, and the amount of time devoted to them before the take-off varied as much as from 1 to 30 minutes for single species.

On occasions when all the birds involved were of one species, departures were made as follows:

	No. of Birds	Date	Sunset	Departure		Sky
				Hour	Min. after Sunset	
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	2	Sep. 27 '41	5:57	6:30	33	Clear
	1	Sep. 29 '41	5:54	6:28	34	Clear
	2	Sep. 23 '42	6:05	6:41	36	Clear
Scaup (<i>Aythya</i> sp.)	18	Apr. 12 '42	6:40	7:10	30	Clear
	17	Apr. 13 '42	6:40	7:16	36	Clear
	6	Apr. 16 '42	6:44	7:17	33	Clear
	1	Sep. 30 '41	5:52	6:32	40	Light clouds
	6	Apr. 3 '42	6:31	7:00	29	Cloudy
	6	Oct. 25 '42	5:14	5:35	21	Cloudy
Bufflehead (<i>Bucephala albeola</i>)	3	Dec. 17 '39	4:44	5:23	39	Clear
	1	Nov. 9 '41	4:56	5:31	35	Partly cloudy
Old-squaw (<i>Clangula heyemalis</i>)	1	Nov. 3 '39	5:05	4:56	- 9*	Clear
	2	Nov. 6 '41	4:59	4:41	-18*	Cloudy
	1	Dec. 30 '38	4:51	still present at 4:54		Clear
Ruddy Duck (<i>Oxyura jamaicensis</i>)	3	Nov. 13 '41	4:52	5:31	39	Clear
Coot (<i>Fulica americana</i>)	1	Oct. 7 '42	5:41	6:22	41	Clear

*Before sunset.

When mixed bunches of birds were on the reservoir, the various species sometimes left separately and sometimes together; a given species might act differently on different occasions. Observations were:

	No. of Birds	Date	Sunset	Departure		Sky
				Hour	Min. after Sunset	
Ruddy Duck	6	Nov. 8 '39	4:59	5:30	31	Cloudy
Scaup	1			5:30	31	
Pied-billed Grebe	1	Oct. 11 '41	5:35	6:03	28	Clear
Coot	1			6:10	35	
Unidentified duck	1			6:15	40	
Bufflehead	1	Oct. 28 '41	5:11	5:41	30	Clear
Pied-billed Grebe	2			5:51	40	
Bufflehead	2	Nov. 12 '41	4:53	5:22	29	Clear
Ruddy Duck	1			5:23	30	
Ring-necked Duck	1			5:23	30	
(<i>Aythya collaris</i>)						
Scaup	1			5:23	30	
Scaup	9	Apr. 14 '42	6:42	7:17	35	Clear
Pied-billed Grebe	1			7:17	35	

Examples of the pre-flight activities are:

Pied-billed Grebe. September 23, 1942, two birds: Between 5:35 and 6:25 p.m. the only activities were some food dives (up to 12 seconds in length) by one bird at 5:48, and four minutes of bathing, preening and wing-flapping by both from 6:01 to 6:05. From 6:25 to the take-off at 6:41 frequent dives perhaps three seconds in length were made, and one bird once flapped its wings and preened a bit.

Scaup. April 3, 1942, six: From 6:08 to 6:40 p.m. the birds steadily dived for food, then they idled. At 6:57 several flapped their wings. At 7:00 all flew.

April 12, 1942, eighteen: From 6:49 to 7:03 p.m. the birds dived for food, then idled. At 7:08 several flapped their wings. At 7:10 all left.

October 25, 1942, six: From 4:49 to 5:15 they slept. On waking, they swam down the reservoir. At 5:21 one flapped its wings. From 5:30 to the 5:35 take-off all repeatedly ducked completely under water, between-times swam to and fro in a nervous way, and twice one or a few did some wing-flapping.

Bufflehead. December 17, 1939, three: From 4:35 to 5:02 p.m. all slept. On waking, they swam a little; one flapped its wings. Five times between 5:07 and 5:22, at intervals of one to six minutes, all bathed. At 5:22 all made one sudden dive of about five seconds, on arising bathed once more, then left at 5:23.

Coot. October 7, 1942, one: From 6:08 to 6:18 p.m. it idled. At 6:18 it ducked completely under water, then ducked its head and neck. At 6:22 it left.—HERVEY BRACKBILL, 4608 Springdale Avenue, Baltimore 7, Maryland, March 1, 1952.

EDITORIAL

The editors are grateful to the following persons for editorial assistance in preparing the current volume of *The Wilson Bulletin* for publication: Aaron M. Bagg, Andrew J. Berger, Eugene Eisenmann, James S. Findley, Richard and Jean Graber, W. W. H. Gunn, Robert M. Mengel, A. D. Moore, Margaret M. Nice, Kenneth C. Parkes, Robert W. Storer, George M. Sutton, J. Van Tyne, John A. White, Robert W. Wilson, Albert Wolfson.

The Membership Committee

Everyone who has an interest in birds should, we think, belong to The Wilson Ornithological Club. Every member knows someone who would profit by fellowship with us. The club would profit by having stronger support, greater influence, and an additional reservoir of material for the *Bulletin*.

The nomination form accompanying dues notices is one way the membership committee hopes to obtain the names of these interested people. We as a committee know but a fraction of them. Your committee would like to report next June that the club has a membership of two thousand. With your help it can be done. Send the nomination forms to the Treasurer along with your dues, or to any of the membership committee listed below:

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ORNITHOLOGICAL LITERATURE

FLEAS, FLUKES AND CUCKOOS . . . A STUDY OF BIRD PARASITES. By Miriam Rothschild and Theresa Clay. (The New Naturalist series.) Collins, London, 1952, $5\frac{3}{4} \times 8\frac{1}{2}$ in., xiv + 304 pp., 40 pls., 5 numbered and many unnumbered text figs. 21 s. (\$2.94).

Behind a rather enigmatic title we find here a work which not only answers an urgent need for the average ornithologist, but does so in a most entertaining fashion. The field of bird parasitology has but a handful of specialists; yet it is one to which many are in a position to contribute, if only their interest is aroused by more readily obtainable basic information. Though the authors may have tried to crowd too much within the space of one small volume, they have done an admirable job, supporting their fresh popular account with plenty of sound scientific fact, and abundant suggestion for work to be done. Who would not be impressed by the mite adapted for life in the white areas of a nightjar's wings, or by the quill-louse known only from the remiges of a curlew! But this is no rambling series of parasitological oddities. The bird, with its parasites, is pictured as a little world, presenting all the problems of adaptation, competition, and evolutionary convergence and divergence found elsewhere.

The first part has brief and stimulating discussions of some of the problems of parasitism in general. Then follows what is to me the best section, closely comparing the bird-lice (Mallophaga) with the bird-fleas, groups upon which the junior and senior authors are respectively authorities. The Mallophaga are seen as an ancient, closely adapted, and much diversified group; the fleas (so far as birds are concerned) as a recent one, small in number of species and still imperfectly adjusted. In looking at the problems of the two groups side by side, we gain a much greater feeling of familiarity with both. The remainder of the book is a condensed survey of all the other major groups of bird parasites, including birds themselves, with consideration of typical life-histories and of the complex faunas of bird nests. Only in a few small groups could any attempt be made even to list the British species; but some sort of skeleton classification is usually presented, and the reader would find some help in starting identification.

Ornithologists will view with mingled feelings the recurring comments on parasites as indicators of avian relationships. There is in most cases remarkable confirmation of accepted systems. But attention is called, for example, to suggestions that the ostriches and rheas must after all be closely related, and that the flamingos do in fact belong with the anseriforms; and to such absurdities as linking (if we consider Mallophaga alone) the hawks, owls, and cuckoos. The authors take a fair-minded stand on the whole matter, urging the ornithologist to "accept the evidence from this source at least as a clue to relationship," while themselves pointing out some pitfalls threatening the parasitologist.

There are some typographical errors, one or two of which involve references to plates or pages and prove a trifle annoying. The excellent plates, many of them photomicrographs, will prove helpful in many ways. The indexing seems adequate, though in some ways unnecessarily complicated. Readers inspired to extend their studies of any group will find the fourteen-page bibliographical appendix extremely useful. It gives every evidence of being critically and expertly selected.

Books thus aimed at bringing together different fields of specialization are all too few. Though dealing specifically with the British fauna, this work outlines broader principles that are just as applicable elsewhere. I hope it is made readily available in

this country, to find its way to the shelf of every bird student interested in broadening his point of view.—William A. Lunk.

BIRDS AS INDIVIDUALS, By Len Howard. Collins, London, 1952:223 pp., 32 plates. 10s. 6d. (\$1.47).

Miss Howard is an English musician and amateur ornithologist who has succeeded, through extraordinary patience and tolerance, in overcoming completely the normal fear of humans in the small passerine birds around her Sussex cottage. Not only do birds come fearlessly to her hand while out-of-doors, but they also have complete freedom of the house; some even roost in the bedroom with the author. She wisely lists the disadvantages as well as the pleasures of such a living arrangement at the start of the book. Probably no other writer has ever been so closely acquainted with so many unconfined wild birds, and Miss Howard's observations and conclusions will be of interest to all students of avian behavior.

The book is divided into two sections. The first section, of 150 pages, is entitled "Bird Behavior." In this portion the author narrates her experiences with birds of her neighborhood, particularly Great Tits (*Parus major*) and Blackbirds (*Turdus merula*). This makes pleasant reading and includes many interesting and important notes on the great differences in behavior shown by individuals within a species. One such note tells of a Great Tit which, after being seriously injured and defeated in combat with another male, recovered his territory from the erstwhile victor by improvising highly elaborate bluff and threat displays. Another is the account of a Blackbird which always used an oak leaf held in his beak as an aid in courtship and territorial activity. Observations of this sort illustrate well the intraspecific plasticity which may lead to the evolution of new and striking behavior patterns.

The first section is concluded with a chapter entitled "The Mind of a Bird" which is probably the most controversial part of the book. In this chapter the author criticizes modern behavior theory for not attributing a greater and more human degree of intelligence and emotion to birds. Miss Howard makes a good case for the intelligence of some of the birds with which she is intimately acquainted, but whether or not some of the activities she describes should be attributed to reasoning or human-like emotions is largely a matter of opinion. No ornithologist would deny that birds often seem closely attached to their mates or young ("love"), or are aggressive toward rivals ("jealousy"), etc., but it is certainly debatable that birds feel such emotions in a way similar to humans. The reader may decide for himself whether Miss Howard is correct in taking the affirmative. Beyond this, probably few biologists will agree with her proposal that birds have some system of thought transference or mental telepathy, despite the claims of parapsychologists.

The second and shorter section of the book is an analysis of technique in bird song, written primarily from the standpoint of a musician. Miss Howard's perceptive discussion will be enjoyed by American readers even though they may be unfamiliar with the songs of the species described, and the author's deep appreciation and feeling for music has moved her to some charming descriptive passages. Miss Howard is consciously anthropomorphic in some of her interpretations, but, as before, she offers reasons for her opinions.

The book is written in a clear and simple manner, but the style is marred by the

rather frequent use of comma splices and other unfortunate constructions which more rigorous editing could have eliminated. Only vernacular names of birds are used, and these are of the British *Handbook*. Julian Huxley has contributed a brief foreword, and Eric Hosking has supplied excellent high-speed photographs illustrating most of the species discussed.—Thomas R. Howell.

THE GREENSHANK. By Desmond Nethersole-Thompson. Collins, St. James's Place, London, 1951: $5\frac{1}{4} \times 7\frac{13}{16}$ in., 244 pp., with four color photographs, 42 black-and-white photographs, and 12 maps and diagrams. 15s (\$2.10).

"The Greenshank" is the twenty-second volume to be published in The New Naturalist series. As stated by the publisher the aim of this series "is to interest the general reader in the wild life of Britain by recapturing the inquiring spirit of the old naturalists. The Editors believe that the natural pride of the British public in their native fauna and flora, to which must be added concern for their conservation, is best fostered by maintaining a high standard of accuracy combined with clarity of exposition in presenting the results of modern scientific research." The success of the earlier volumes is evidence of the wisdom of this editorial policy. The Collins Press is to be commended on its awareness of the importance of having a conservation-minded public.

Mr. and Mrs. Nethersole-Thompson spent 15 years gathering the data for this life-history of the Greenshank (*Tringa nebularia*). The various aspects of breeding biology were studied thoroughly. An excellent compilation of the meager information previously published on the Greenshank makes interesting reading and serves, also, to emphasize the contribution made by the present study.

The distribution of the Greenshank in Britain and abroad, migration, habitat, population density, enemies, and food are treated in early chapters. Later chapters discuss voice, courtship, egg-laying, clutch-size, incubation, hatching, and behavior of the young. Especially interesting and pertinent are the discussions of comparative data on other species. Some of the subjects discussed are: choice of nest-site (pp. 143-146), egg-laying (pp. 151-153), "The probable existence of local strains, as evidenced by egg-types peculiar to a particular district" (pp. 158-159), behavior changes of adults when young are hatching (pp. 175-178), development of the "fear reaction" (p. 193), and "Psychology and Emotion" (Chapter 19).

In the chapter on "Nest-Hunting" the author explains why so few nests of the Greenshank had been found previously and describes the technique which enabled the Nethersole-Thompsons to find "over 150" nests. One finds little in literature which deals with the technique of finding birds' nests, although this is an important aspect of life-history study.

A chapter on "Triangles" describes, among others, the relationship of a male Greenshank mated to two females and the actual laying of these two females in the same nest. The author reports that "Over sixty normally monogamous birds, to my knowledge, have been proved or suspected as bigamists or polygamists . . ." There follows a stimulating discussion of several notable examples from literature.

The book concludes with six appendices, a bibliography, and an index. The appendices present information on the following subjects: forests "in which Greenshanks have been found during the Breeding-Season," vernacular names, "A Musical Appreciation of the Calls of the Greenshank" by M. E. W. North, egg-laying data, "Brooding Diaries,"

egg-shell disposal and hatching behavior. The admirable photographs increase one's understanding of the Greenshank and its breeding habitat.

One hesitates to criticise adversely the excellent work of the Nethersole-Thompsons, yet I cannot refrain from expressing regret that these keen field observers did not attempt to color-mark their birds. Plate 2, "Eggs laid 1921-33 by same hen Greenshank (*Elizabeth*)," would be much more convincing if "Elizabeth" had been banded. The author identified the female Greenshanks "by their eggs and behaviour." It must be admitted that people working with certain falconiform birds feel strongly, perhaps rightly so, that it is possible to identify a given female by egg color-pattern. Furthermore, anyone working intensively with passerine birds frequently has the feeling that he can identify a given bird by peculiarities of song or behavior. Nevertheless, such feeling is not proof and such an approach cannot be considered adequate in modern ornithological studies. Mr. Nethersole-Thompson himself is fully cognizant of this fact, for he stated (p. 66): "If I had my time over again I should certainly try to devise a method of capturing and marking them [i.e., hen Greenshanks] with coloured rings . . ."

There is a great need for research on the genetics of egg color-pattern in wild birds. It has not yet been proven conclusively that egg color-pattern is a reliable criterion for identifying a given female during a particular breeding season or over a period of years. Nor do we know, with very few exceptions, what influence the male has on the egg color-pattern of his female descendants. Punnett (1933. *Jour. Genetics*, 27:466-467) has shown that in the domestic chicken the male and female are of equal importance in transmitting one hereditary factor which determines one particular egg color. Chance (1940. "The truth about the Cuckoo," p. 194) assumed the same to be true of the European Cuckoo (*Cuculus canorus*), but Baker (1942. "Cuckoo Problems," pp.107-109) thought it highly unlikely that the male has any effect on the egg pattern, and (p. 179) stated: "The coloration and character of eggs are inherited from mother to daughter. The male Cuckoo cannot influence the character or colour of egg laid by its mate, nor of those laid by its progeny." For a summary of current knowledge on related problems see Chapter II of F. B. Hutt's recent (1949) book "Genetics of the Fowl."

The author closes his book with the following statement: "We watch birds, try to interpret their actions and behaviour, but shall we ever succeed in understanding them? I dedicate my book to those who will follow me and who will walk more steadily where I have only stumbled." How far more advanced would be our knowledge of the life-histories of birds had more of us "stumbled" as intelligently as the Nethersole-Thompsons!
—Andrew J. Berger.

BREEDING BIRDS OF KASHMIR. By R. S. P. Bates and E. H. N. Lowther. Oxford University Press, London, 1952:6×8¾ in., xxxiii + 365 pp., with 5 color plates, 151 photographs, and end-paper maps. (\$7.50).

It is always very satisfactory to find a book written by the greatest authorities on the subject, and such is this one. No more competent observers of the avian life of Kashmir exist than Colonel Bates and Mr. Lowther. Their photographs and shorter articles have graced the pages of the *Journal of the Bombay Natural History Society* for many years, and will, I hope, for many more to come. Their observations in Kashmir date back to 1920, a considerable span of time, but a necessary one when the large

avifauna is considered together with the paucity of previous notes or observations in so many cases.

The book considers 221 species with an additional provisional list of over 40. Many of these species have been photographed at the nest by one or other of the authors for the first time. Each species is carefully described for field identification, with references to its more detailed description in standard works. The Kashmiri name is given in addition to the English name, and a Latin name which will at least identify the bird even if it is not always entirely up-to-date. There are good notes on distribution, and—here is the meat of the book—excellent notes on habits and nesting. These last, to any ornithologist or student of Asian birds, are priceless. They are accurate, painstaking, and informative. They are models of their kind. Finally there is a detailed description of the nest and eggs.

Six illustrative colored plates of Kashmir birds by Mrs. D. V. Cowen, and clear and comprehensive end-paper maps complete the volume. This book is a mine of information for amateur and professional bird watchers or ornithologists and should be a standard reference work for any such person going to India or its neighborhood. I hope that it will achieve the greatest possible popularity.—S. Dillon Ripley.

WILSON ORNITHOLOGICAL CLUB NOTES

1953 Annual Meeting

At the invitation of the University of Michigan and the Michigan Audubon Society, the thirty-fourth Annual Meeting of the Wilson Ornithological Club will be held at the University of Michigan Biological Station, at Douglas Lake, near Cheboygan, Michigan, from Sunday, June 14, to Wednesday, June 17, 1953.

Official notification of the meeting, details of arrangements, and request for papers will be mailed to the membership in the spring, but members are urged to plan now to attend what promises to be a most interesting meeting in this northern scenic area.

Committee Appointments

The President has made the following appointments, to serve for the 1952-1953 year: *Conservation Committee*, Robert A. McCabe, Chairman; *Illustrations Committee*, Robert M. Mengel, Chairman; *Investing Trustees*, A. W. Schorger, Chairman (term expires 1953), Aaron Moore Bagg (term expires 1954), Burt L. Monroe (term expires 1955); *Library Committee*, George J. Wallace, Chairman; *Local Committee on Arrangement for the 1953 Meeting*, Olin Sewall Pettingill, Jr., Chairman, Nicholas L. Cuthbert, Vice-Chairman; *Membership Committee*, Ralph M. Edeburn, Chairman; *Research Grant Committee*, John T. Emlen, Jr., Chairman; *Representative on the American Ornithologists' Union Council*, Burt L. Monroe.

THE WILSON ORNITHOLOGICAL CLUB

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Boyd, Ivan L., Dept. of Biology, Baker Univ., Baldwin, Kansas	1951
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Brown, Clarence D., 222 Valley Road, Montclair, New Jersey	1938
Brown, E[llmer] E[vans], Davidson College, Davidson, North Carolina	1945
Brown, Jerram L., 19 Hitchcock Road, Amherst, Massachusetts	1950
Brown, N[orman] Rae, Faculty of Forestry, Univ. of New Brunswick, Frederic- ton, New Brunswick, Canada	1945
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Burland, Lee J[ohnson], Snook Apts., Castleton-on-Hudson, New York	1939
Burleigh, Thomas D[earborn], School of Forestry, Univ. of Idaho, Moscow, Idaho	1950
Burlingame, Mrs. Virginia S[truble] (Mrs. M. G.), 812 So. 8th St., Bozeman, Montana	1946
Burner, Miss Florence H[elen], 5350 Reisterstown Rd., Baltimore 15, Maryland	1948
Burnett, Miss Frances L., Proctor St., Manchester, Massachusetts	1950
Burns, Robert David, 1805 Greenleaf Dr., Royal Oak, Michigan	1948
Burr, Irving W[ingate], 265 Littleton St., W. Lafayette, Indiana	1945
Burr, Miss Margaret, 943 Summit Ave., St. Paul 5, Minnesota	1952
Burt, William Henry, Museum of Zoology, Univ. of Michigan, Ann Arbor, Michigan	1928
Bushman, John, 1621 Major St., Salt Lake City 4, Utah	1951
Butchart, [Mrs.] G. Reeves, Museum of Zoology, Univ. of Michigan, Ann Arbor, Michigan	1943
Butsch, Robert Stearns, University Museums, Univ. of Michigan, Ann Arbor, Michigan	1947
Byers, Mrs. Esther, 2031 University Museums, Univ. of Michigan, Ann Arbor, Michigan	1951
Bytzko, Miss Anne, 13563 Arlington, Detroit 12, Michigan	1948
Cade, Tom, 1511-C Dixon St., Glendale, California	1950
Cadmus, Richard A[lfred], 712 Standish Ave., Westfield, New Jersey	1952
Cagle, Fred R., Dept. of Zoology, Univ. of Tulane, New Orleans 15, Louisiana	1942
Cahalane, Victor H[arrison], National Park Service, Washington 25, District of Columbia	1933
Calhoun, John B[lumpuss], Neuropsychiatry Div., A.M.S.G.S., Army Medical Center, Washington 12, District of Columbia	1949
Calvert, Earl Wellington, Route 2, County Home, Lindsay, Ontario, Canada	1937
Calvert, William J[onathan], Jr., 615 No. Pelham Road, Jacksonville, Alabama	1942
Calvin, Robert L[eal], Route 3, Fairhill Drive, New Castle, Pennsylvania	1951
Camburn, F. Lawrence, Edwin S. George Reserve, Pinckney, Michigan	1947
Cameron, D[onald] Angus, Rural Route, Upper Jay, New York	1951
Campbell, John David, 1222 W. State St., Geneva, Illinois	1944
Campbell, Louis W[alter], 4531 Walker Ave., Toledo 12, Ohio	1926
Campbell, Miss Mildred F[lourence], 29 No. Hawthorne Lane, Indianapolis 19, Indiana	1938
Canfield, Mrs. Donald T[rent], 903 Fifth St., West Lafayette, Indiana	1952
Caperton, R. A., Box 82, Grand Saline, Texas	1952
Carl, Harry G., 2304 Davie St., Davenport, Iowa	1949
* Carnes, Mrs. Herbert E., 25 Kenwood Rd., Tenafly, New Jersey	1944
Carpenter, Charles C., Dept. of Zoology, Univ. of Mich., Ann Arbor, Michigan	1951
Carpenter, Floyd S., 2402 Longest Ave., Louisville 4, Kentucky	1934
Carpenter, Forrest A[lmon], 7345 Bryant Ave., So., Minneapolis 19, Minnesota	1948
** Carrothers, Miss Vera, 14704 Alder Ave., East Cleveland 12, Ohio	1938
Carson, L[enwood] B[allard], 1306 Lincoln St., Topeka, Kansas	1948
Carson, Miss Rachel L., 204 Williamsburg Dr., Silver Springs, Maryland	1951
Carter, Dennis [Lee], 715 Ohio St., Webster City, Iowa	1947
* Carter, Mrs. E. W. (Bertha May), Rural Route 2, Perrysburg, Ohio	1946
Cartwright, Bertram William, c/o Ducks Unlimited, 201 Bank of Commerce Bldg., Winnipeg, Manitoba, Canada	1930
* Case, Mrs. C[harles] M[erritt], Jr., Route 3, Wayzata, Minnesota	1951

Cassel, J[oseph] Frank[lin], Dept. of Zoology, North Dakota Agricultural College, Fargo, North Dakota.....	1940
Castenholz, Richard William, 431 So. East Ave., Oak Park, Illinois.....	1949
Cater, Milam B[rison], 1036 McCormick Blvd., Clifton Forge, Virginia.....	1944
*Chalif, Edward Louis, 37 Barnsdale Road, Short Hills, New Jersey.....	1947
Challey, John [Raymond], 1349 2nd St., North. Fargo, North Dakota.....	1948
Chambers, Miss Amy C., 2905 Irving, South, Minneapolis 8, Minnesota.....	1950
*Chambers, W[illie] Lee, Route 1, Box 294, Topanga, California.....	1909
Chance, Edgar P[ereival], Ambarrow Wood, Sandhurst, Berkshire, England.....	1941
Chapin, James P[aul], American Museum of Natural History, 79th St. and Central Park, W., New York 24, New York.....	1945
Chapin, John L[adner], Univ. of Colorado Medical School, Physiology Dept., Denver 7, Colorado.....	1947
Chapman, Floyd B[arton], 392 Walhalla Road, Columbus 2, Ohio.....	1932
*Chapman, Herman Floraine, 712 So. Dakota Ave., Sioux Falls, South Dakota.....	1947
Chapman, Lawrence B., Rural Route, Hubbardston, Massachusetts.....	1940
Chapman, Mrs. Naomi Fran, Box 177, Flossmoor, Illinois.....	1945
Charles, Bruce, 262 St. Clair Ave., W., Toronto 5, Ontario, Canada.....	1952
Chase, Henry B., Jr., 517 Deatur St., New Orleans 16, Louisiana.....	1932
Chell, Thomas Ross, 428 W. Virginia, Peoria, Illinois.....	1952
Chido, Michael A[nthony], 93 Church St., Waterloo, New York.....	1952
Childs, Henry E[verett], Jr., San Joaquin Experimental Range, O'Neals, California.....	1948
*Church, C[hables] T[homas], 70 Pine St., New York 5, New York.....	1945
Chutter, Miss Mildred C., Box 229, Athens, Ohio.....	1936
Clark, Mrs. Ben P., 948 Forrest Ave., Gadsden, Alabama.....	1952
Clark, Miss Martha L., P. O. Box 1176, Danville, Virginia.....	1949
**Clarkson, Mrs. Edwin O., Wing Haven, 248 Ridgewood Ave., Charlotte 7, North Carolina.....	1940
Clausen, Arthur W[illiam], 120 W. Main St., Dwight, Illinois.....	1947
Clay, William M[arion], Dept. of Biology, Univ. of Louisville, Louisville 8, Kentucky.....	1947
Clem, Robert Verity, 129 Gillies Road, Hamden, Connecticut.....	1951
Clement, Roland C[hables], P. O. Box 31, Providence 1, Rhode Island.....	1941
**Clements, H[iram] Everest, 49 Stoneham Road, Rochester 10, New York.....	1949
Clow, Miss Marion, Box 163, Lake Forest, Illinois.....	1929
Cobb, Augustus S., 7403 Emlen St., Philadelphia 19, Pennsylvania.....	1949
Cobb, Boughton, 25 East End Ave., New York, New York.....	1949
Cochrane, A. W., Box 174, Highland Creek, Ontario, Canada.....	1952
Cockrum, E. Lendell, Museum of Natural History, Univ. of Kansas, Lawrence, Kansas.....	1952
Coffey, Ben Barry, Jr., 672 No. Belvedere, Memphis 7, Tennessee.....	1927
Coffey, Lula C[oooper] (Mrs. Ben B., Jr.), 672 No. Belvedere, Memphis 7, Tennessee.....	1952
*Coghill, Robert D., 701 Prospect Ave., Lake Bluff, Illinois.....	1951
Cogswell, Howard L[yman], Dept. of Zoology, Mills College, Oakland 13, California.....	1944
Cole, Richard D., 615 Lake Dr., Towson 4, Maryland.....	1949
Collias, Nicholas E[lías], Route 2, Ithaca, New York.....	1945
Collins, Henry H., Jr., 136 Parkview Ave., Bronxville 8, New York.....	1952
Comfort, James F., 27 No. Iola Drive, Webster Groves, 19, Missouri.....	1947
Compton, Lawrence Verlyn, Biology Division, Soil Conservation Service, Washington 25, D.C.....	1923
Condit, John M., 353 E. Lincoln St., Worthington, Ohio.....	1950
Congdon, Dr. R[ussell] T[hompson], Medical Arts Bldg., Wenatchee, Washington.....	1944
Conkey, John H., 11 Chestnut St., Ware, Massachusetts.....	1947
Conn, Robert Carland, 769 Park Ave., Bound Brook, New Jersey.....	1945
Conrad, Charles L[ouis], 1206 Warwood Ave., Wheeling, West Virginia.....	1937
Conway, Albert E., Dept. of Psychology, Lafayette College, Easton, Pennsylvania.....	1939

Cook, Bill J[ames], 969 Congress Ave., Glendale, Ohio.....	1948
Cook, Miss Fannye Adine, 1119 Pinehurst, Jackson, Mississippi.....	1923
Coolidge, Herman W[illiam], Route 6, Isle of Hope, Savannah, Georgia.....	1952
Coombes, Robert Armitage Hamilton, The Zoological Museum, Tring, Hertfordshire, England.....	1936
Cope, James B[onwill], Earlham College, Richmond, Indiana.....	1949
Cors, Paul B[eaumont], 722 Woodside Ave., Ripon, Wisconsin.....	1952
*Cottam, Clarence, Fish and Wildlife Service, Dept. of the Interior, Washington 25, D.C.....	1929
Cottrell, George William, Jr., 70 Lake View Ave., Cambridge 38, Massachusetts.....	1941
Cottrille, Dr. W[illiam] Powell, 6075 Brown's Lake, Jackson, Michigan.....	1949
Cottrille, Mrs. W. Powell, 6075 Brown's Lake, Jackson, Michigan.....	1950
Craighead, John J., Moose, Wyoming.....	1950
*Crawford, Alan, Jr., White Horse Road, Devon, Pennsylvania.....	1949
*Creager, Joe C[lyde], L. A. Cann Road, Drawer 1267, Ponca City, Oklahoma.....	1947
Crewson, Ray[mond] [Charles], 111 E. Texas Ave., Sebring, Ohio.....	1947
Crooks, Malcolm P., Box 541, Charleston, West Virginia.....	1950
Cross, Frank C., 9413 Second Ave., Silver Spring, Maryland.....	1949
Crouter, Miss Frances Jean, 200 So. Third St., Stillwater, Minnesota.....	1951
Crowder, Orville W[right], Chase, Maryland.....	1946
Crowell, John B., Jr., 535 Jefferson Ave., Elizabeth 4, New Jersey.....	1952
Cruikshank, Allan Dudley, Highland Hall, Rye, New York.....	1939
Cumming, Fairman Preston, 824 Sutton Hill Road, Nashville 4, Tennessee.....	1950
Cummings, G[eorge] Clark, 61 Broadway, New York 6, New York.....	1952
Cunningham, James W., 3009 E. 19th Terrace, Kansas City, Missouri.....	1935
Cunningham, Miss Nance C., 702 Marshall, Houston 6, Texas.....	1950
Curtis, Miss Elizabeth L[ong], 5648 Beach Drive, Seattle 6, Washington.....	1935
Curtis, (Mrs.) Vee K[aelin], 1450 Bancroft Way, Berkeley 2, California.....	1950
Cuthbert, Nicholas L., Biology Dept., Central Michigan College, Mt. Pleasant, Michigan.....	1950
Dambach, Charles A., Ohio Division of Wildlife, State Office Bldg., Columbus 15, Ohio.....	1934
Damon, David, 3604 Childress St., Ft. Worth, Texas.....	1933
Dana, Edward Fox, 57 Exchange St., Portland 3, Maine.....	1939
*D'Angelo, Angelo [Ralph], 809 Palisade Ave., Union City, New Jersey.....	1949
Daniels, Ben S[weet], 4706 Wood St., Willoughby, Ohio.....	1949
Darby, Richard T[horn], 5046 Chancellor St., Philadelphia 39, Pennsylvania.....	1948
*Darden, Mrs. Colgate W[hitehead], Jr. (Constance S.), Univ. of Virginia, Charlottesville, Virginia.....	1943
*Dater, Eleanor E. (Mrs. John Y., Jr.), 259 Grove St., Ramsey, New Jersey.....	1949
Davant, Miss Mary, 861 No. McLean Blvd., Memphis 7, Tennessee.....	1952
Davey, Stuart Price, 119 No. Forest Ave., Ann Arbor, Michigan.....	1951
Davey, Dr. Winthrop N[ewbury], University Hospital, Ann Arbor, Michigan.....	1941
Davidson, Miss Sarah A., 344 Summit Ave., St. Paul 2, Minnesota.....	1949
Davidson, William Mark, 1504 Bodell St., Orlando, Florida.....	1933
Davis, Clifford Vernon, Dept. of Zoology & Entomology, Montana State College, Bozeman, Montana.....	1945
Davis, David E[dward], School of Hygiene & Public Health, Johns Hopkins University, Baltimore 5, Maryland.....	1940
*Davis, Earle A., Jr., Dept. of Zoology, Univ. of Illinois, Champaign, Illinois.....	1951
Davis, Howard Henry, Esq., Little Stoke, Patchway, Bristol, England.....	1947
Davis, John, Moore Laboratory, Box 388, Occidental College of Los Angeles, Los Angeles 41, California.....	1939
Davis, L[ouie] Irby, Box 988, Harlingen, Texas.....	1933
Davis, Russell S., Clayton, Illinois.....	1947
Davis, W[illiam] B., Dept. of Wildlife Management, College Station, Texas.....	1938
Davis, William Franklin, 423 W. 46th St., Ashtabula, Ohio.....	1947
Davisson, A. Paul, 1112 Fleming Ave., Edgemont, Fairmont, West Virginia.....	1947
Dawn, Walter H[enry], 53-55 64th, Ridgewood Plateau, Maspeth 78, Long Island, New York.....	1945

Dawson, Richard G[illem], 6114 Indiana Ave., Kansas City 4, Missouri.....	1949
Dean, Mrs. Blanche Evans, 1503 Ridge Rd., Homewood, Birmingham 9, Alabama.....	1947
Dean, Sue McEldowney (Mrs. Frederick C.), 14 Middle St., Orono, Maine.....	1949
Dear, Lieut. Col. Lionel S[extus], P.O. Box 127, Port Arthur, Ontario, Canada.....	1939
Dechen, Mrs. Lillian Orvetta, 14 Summer St., Port Dickinson, Binghamton 6, New York.....	1939
Decker, C[harles] O., 6450 Kenwood Ave., Chicago 37, Illinois.....	1938
Decker, James H., 1543 32nd St., Des Moines 11, Iowa.....	1951
Deevey, Edward S[mith], Jr., Osborn Zoological Laboratory, Yale Univ., New Haven 11, Connecticut.....	1948
DeGarmo, William Russell, Beverly, West Virginia.....	1946
Degroot, Dudley Sargent, 2808 General Chennault, Albuquerque, New Mexico.....	1948
Dehner, Rev. Eugene W[illiam], St. Benedict's College, Atchison, Kansas.....	1944
* * Delacour, Jean Theodore, c/o Los Angeles County Museum, Exposition Park, Los Angeles 7, California.....	1944
Delavan, Wayne G., Route 2, Box 61, Bronson, Kansas.....	1943
* DeLury, Ralph Emerson, 330 Fairmont Ave., Ottawa, Ontario, Canada.....	1920
Delzell, David E., Dept. of Zoology, McMaster Univ., Hamilton, Ontario, Canada.....	1951
Denham, Reginald [Francis], 100 Central Park, South, New York 19, New York.....	1948
Denton, J[ames] Fred, 1510 Pendleton Road, Augusta, Georgia.....	1935
* deSchauensee, Rodolphe Meyer, Devon, Pennsylvania.....	1945
* * Desmond, Hon. Thomas C[harles], Box 670, Newburgh, New York.....	1942
Deusing, Murl, Milwaukee Public Museum, Milwaukee 3, Wisconsin.....	1937
* Dick, John Henry, Dixie Plantation, Meggett, South Carolina.....	1949
Dickinson, J[oshua] C[lifton], Jr., Museum of Comparative Zoology, Harvard University, Cambridge 38, Massachusetts.....	1939
Dickinson, Mrs. William Winston (Miriam S.), 2006 Reid Ave., Bluefield, West Virginia.....	1942
Diesselhorst, G[erd] [Felix], Emmering Hauptstrasse 32, Fürstentfeldbruck bei München, Bayern, Germany, American Zone.....	1949
* Dingle, Edward von Siebold, Huger, South Carolina.....	1921
Dittimore, Lester P., 1207 Byron Ave., Topeka, Kansas.....	1950
Divoky, Robert E[ugene], 1168 E. 78th St., Kansas City 5, Missouri.....	1950
Dixon, Miss Clara, Albion College, Albion, Michigan.....	1947
Dixon, J[ames] B[enjamin], Route 3, Box 1143, Escondido, California.....	1936
Dixon, Keith Lee, Dept. of Wildlife Management, A. & M. College of Texas, College Station, Texas.....	1946
Dobson, Jerome John, Route 1, Box 144, Exeter, California.....	1951
* Dodge, Victor K[ennedy], 137 Bell Court, W., Lexington 23, Kentucky.....	1935
* Doering, Hubert R., 414 Rivard Blvd., Grosse Pointe 30, Michigan.....	1945
Domm, Lincoln V[alentine], Dept. of Anatomy, Univ. of Chicago, Chicago 37, Illinois.....	1936
Donald, Miss Mary [Frances], 6918 Belmont Lane, Milwaukee 11, Wisconsin.....	1951
Dorney, Robert Starbird, Box 191, Ladysmith, Wisconsin.....	1949
* Douglass, Donald W., Game Division, Michigan Dept. of Conservation, Lansing 13, Michigan.....	1929
Dowling, Paul Bruce, 332 W. Dallas St., Mt. Vernon, Missouri.....	1950
Doyle, William E[ugene], 1426 Alumni Place, Lawrence, Kansas.....	1952
* Dresser, Mrs. James, Jr., (Jean Bullock), 9620 Von Thaden St., Route 4, Wichita, Kansas.....	1951
Drum, Miss Margaret, 217 South St., Owatonna, Minnesota.....	1937
Drury, William H[olland] Jr., 79 Garden St., Gray Herbarium, Cambridge 38, Massachusetts.....	1951
Duffield, Mrs. John W. (Marjorie O.), Box 552, Placerville, California.....	1948
Duffy, John Joseph, Jr., 1707 So. Henning Ave., Evansville, Indiana.....	1950
* * Dugan, Dr. William Dunbar, 221 Pierce Ave., Hamburg, New York.....	1945
Du Mont, Phillip A[tkinson], 4114 Fessenden St., N.W., Washington 16, D.C.....	1928
Dunbar, Munro, North Portal, Saskatchewan, Canada.....	1950
Dunbar, Robert J[ohn], 106 Glendale Lanc, Oak Ridge, Tennessee.....	1952
Dundas, Lester Harvey, Rice Lake Wildlife Refuge, East Lake, Minnesota.....	1943

Dunning, John Stewart, Granby, Connecticut.....	1951
Dunstan, Girvin Raleigh, 5030 Huron River Drive, Route 1, Dexter, Michigan.....	1950
Durango, Sigfrid, Täby, Sweden.....	1952
Dusi, Julian L[uigi], Dept. of Zoology & Entomology, Alabama Polytechnic Institute, Auburn, Alabama.....	1941
*Duvall, Allen Joseph, Fish & Wildlife Service, Washington 25, D.C.....	1942
Dyer, William A., 402 John St., Union City, Michigan.....	1947
Eastman, Whitney H[askins], 2240 W. Lake of Isles Blvd., Minneapolis 5, Minnesota.....	1941
Eastwood, Sidney Kingman, 5110 Friendship Ave., Pittsburgh 24, Pennsylvania.....	1928
Eaton, Stephen W[oodman], Dept. of Biological Sciences, St. Bonaventure College, St. Bonaventure, New York.....	1942
Eckelberry, Don [Richard], Foster Lane No. 4, Babylon, Long Island, New York.....	1948
Eddy, Garrett, 4515 Ruffner St., Seattle 99, Washington.....	1947
**Edeburn, Ralph M[ilton], Dept. of Zoology, Marshall College, Huntington 1, West Virginia.....	1947
Edge, Mrs. Charles N[loel], 1215 Fifth Ave., New York 29, New York.....	1931
Edwards, Ernest P[reston], Box 611, Amherst, Virginia.....	1947
*Edwards, James L., 27 Stanford Place, Montclair, New Jersey.....	1947
Edwards, Robert Davis, McClellanville, South Carolina.....	1945
**Edwards, Robert L[omas], 46 Lincoln Ave., Waltham, Massachusetts.....	1945
Edwards, R[oger] York, Wildlife Section, Parks & Recreation Div., B. C. Forestry Service, Victoria, British Columbia, Canada.....	1948
Edwards, Mrs. Sylvia P. (Mrs. Robert L.), Dept. of Biology, Harvard Univ., Cambridge 38, Massachusetts.....	1946
Egerton, Frank N[icholas] III, 411 N. Gregson St., Durham, North Carolina.....	1952
Eich, Mrs. Marion Moon, 2023 Day St., Ann Arbor, Michigan.....	1951
*Eichler, Herbert Philip, 2211 Andrews Ave., New York 53, New York.....	1949
Eifert, Mrs. Herman D. (Virginia Snider), 705 W. Vine St., Springfield, Illinois.....	1941
*Eisenmann, Eugene, 110 W. 86th St., New York, New York.....	1942
Eisenmayer, Miss Betty Jean, 1917 N. Main Ave., Springfield 1, Missouri.....	1948
Ekblaw, George Elbert, 511 W. Main St., Urbana, Illinois.....	1914
*Ekdahl, Conrad H[oward], Box 1246, Daytona Beach, Florida.....	1949
*Eklund, Dr. Carl M[ilton], Rocky Mountain Laboratory, Hamilton, Montana.....	1945
Elder, William H[anna], Wildlife Conservation Bldg., Univ. of Missouri, Columbia, Missouri.....	1938
Elkins, Mrs. Hervey B., 303 Mill St., Belmont, Massachusetts.....	1951
Ellarson, Robert S[cott], 424 Univ. Farm Place, Madison 5, Wisconsin.....	1948
Elliott, Dr. Richard M., 1564 Vincent St., St. Paul 8, Minnesota.....	1940
Ellis, Miss Hazel Rosetta, Keuka College, Keuka Park, New York.....	1942
*Ellwood, James R[orich], Sheldon Road, Route 2, Valencia, Pennsylvania.....	1951
Elstone, Robert Oliver, 249 Charlton Ave., West, Hamilton, Ontario, Canada.....	1949
Emerson, David L[owell], 155 Burt St., Taunton, Massachusetts.....	1939
*Emerson, Guy, 16 E. 11th St., New York 3, New York.....	1938
*Emilio, S[hepard] Gilbert, Route 4, Laconia, New Hampshire.....	1929
*Emlen, John Thompson, Jr., Dept. of Zoology, Univ. of Wisconsin, Madison 6, Wisconsin.....	1936
English, P[ennoyer] F[rancois], Dept. of Zoology, Pennsylvania State College, State College, Pennsylvania.....	1934
Ephraim, William A., 1630 Grand Ave., Bronx 53, New York, New York.....	1952
Erickson, Miss Elsie C., 17012 Endora Road, Cleveland, Ohio.....	1951
*Erickson, John G[erhard], 611 No. Lilac Drive, Minneapolis 22, Minnesota.....	1949
Erickson, Mary M[arilla], Santa Barbara College, Santa Barbara, California.....	1930
Erickson, Ray C[harles], Box 113, Malheur National Wildlife Refuge, Burns, Oregon.....	1939
Ernst, Roger, 170 Sargent Road, Brookline, Massachusetts.....	1951
Errington, Paul L[ester], Iowa State College, Ames, Iowa.....	1932
Eschelman, Karl F[erdinand], No. 8 North Drive, Buffalo 9, New York.....	1951
Eshleman, S[ilas] Kendrick, III, 4045 Pine St., Philadelphia 4, Pennsylvania.....	1947
Eslinger, Kenneth N., c/o Josten's, 2019 Crawford St., Terre Haute, Indiana.....	1950

Estes, J. K., 1909 Speedway, Wichita Falls, Texas	1950
* Esther, John R[obert], 2606 Denver St., Kansas City 1, Missouri	1952
* Eustice, Mrs. Alfred L., 1138 Sheridan Road, Evanston, Illinois	1944
Evans, Dr. Evan Morton, 550 Park Ave., New York, New York	1929
Evans, Z[accheus] Bond, Aurora, Preston County, West Virginia	1952
Evenden, Fred G[eorge], Jr., 3434 57th St., Sacramento 20, California	1948
* Everest, David Clark, Rothschild, Wisconsin	1949
Everett, Miss Constance Antoinette, 206 Ninth St., N. E., Waseca, Minnesota	1948
Eynon, Alfred E., 5 Beach Road, Verona, New Jersey	1947
Eyster, Marshall Blackwell, Dept. of Biology, Box 545, Southwestern Louisiana Institute, Lafayette, Louisiana	1947
Fairbanks, Mrs. Paul H. (Mrs. Virginia), U. S. Forest Service, Pinehurst Ranger Station, Miramonte, California	1949
Fales, John H[ouse], 1917 Elkhart St., Silver Spring, Maryland	1939
Falls, J. Bruce, 173 Arlington Ave., Toronto, Ontario, Canada	1948
* Fargo, William G[ilbert], 506 Union St., Jackson, Michigan	1923
* Farmer, Earl Wilson, Box 1362, Steubenville, Ohio	1946
Farrand, H. F., 7 Guest Lane, Wilmington 3, Delaware	1950
Fast, Arthur H., 4924 Rock Spring Road, Arlington, Virginia	1950
* Fawks, Elton, Box 112, Route 1, East Moline, Illinois	1951
Fedore, Robert Ryuan, 2781 Greytower Road, Route 7, Jackson, Michigan	1949
Feighner, Miss Lena Veta, 298-1, So. Tremont St., Kansas City 1, Kansas	1935
** Feighley, Miss Margaret D[enny], 544 Chestnut St., Winnetka, Illinois	1944
Fennell, Chester M[artin], (DAC) Civ. Personnell Sec., Hq. Japan Logistical Command, APO 343, c/o P.M., San Francisco, California	1949
Ferguson, William, 5907 Mason St., Omaha, Nebraska	1946
Fichter, Dr. Edson Harvey, 256 So. 11th Ave., Pocatello, Idaho	1948
Fickett, Steve Burrows, Jr., P.O. Box 343, Branford, Florida	1950
Fillebrown, T[homas] S[cott], P.O. Box 27, Woodstock, Vermont	1951
Findley, J[ohn] Scott, 1201 S. Center Ave., Sioux Falls, South Dakota	1949
Finninger, Paul Charles, Mexico City College, Mexico, D.F., Mexico	1950
Finseth, Olle] A., 612 No. 61st Ave., West, Duluth 7, Minnesota	1950
Finster, Miss Ethel B., Louisburg College, Louisburg, North Carolina	1931
* Fish, William Ralph, 302-B Entwistle St., China Lake, California	1950
Fisher, Charles Dean, 1164 W. North St., Decatur, Illinois	1952
Fisher, Dorothy A[lice], 125 Ensley St., Huntington, West Virginia	1952
Fisher, Mrs. Glen, Route 3, Box 168, Oshkosh, Wisconsin	1948
Fisher, Harvey [rvin], Dept. of Zoology, Univ. of Illinois, Urbana, Illinois	1949
Fischer, Richard B[ernard], Laboratory of Ornithology, Fernow Hall, Cornell University, Ithaca, New York	1942
Fleisher, Edward, Brooklyn College, Brooklyn 10, New York	1947
Fleugel, James Bush, 1104 American National Bank Bldg., Kalamazoo, Michigan	1942
Flexner, John Morris, 518 North Broadway, Baltimore 5, Maryland	1948
Flinton, Laurel, Jr., 1288 Lloyd George Ave., Crawford Park, Verdun, Quebec, Canada	1952
Fluekiger, Miss Dora Whitman, Hotel Dauphin, Broadway and 67th St., New York 23, New York	1948
Flyger, Vagn F., 10 West 15th St., Jamestown, New York	1950
Folger, Miss Edith Virginia, 6 Falker Apts., Oxford, Ohio	1946
Foote, Maurice E[dwin], 269 Lawrence St., Ravenna, Ohio	1932
Fordham, Stephen Crane, Jr., Delmar Game Farm, Delmar, New York	1948
Foster, John Bristol, 136 Dawlish Ave., Toronto 12, Ontario, Canada	1950
* Foster, John H[awley], P.O. Box 204, Wayne, Pennsylvania	1952
* Foster, Thomas Henry, West Road, Bennington, Vermont	1950
Fox, Adrian C., Box 1451, Lincoln, Nebraska	1937
Francis, George [Reid], 382 Hillsdale Ave., E., Toronto 12, Ontario, Canada	1949
Fredrickson, Richard William, Apt. 6-D, Sunnyside, Lawrence, Kansas	1947
Freeman, F[rank] J[erome], 2827 Val Verde, N. E., Albuquerque, New Mexico	1951
Fries, Waldemar Hans, 220 Valley Road, Merion Station, Pennsylvania	1947
Fritzel, Kenneth E., 1125 Reeves Drive, Grand Forks, North Dakota	1952

Frohling, Robert C[harles] (Ensign), USNR, LSS LSM 462, FPO San Francisco, California.....	1949
Frost, Herbert Hamilton, Ricks College, Rexburg, Idaho.....	1941
Frye, O. Earle, Jr., Game & Fresh Water Fish Commission, Tallahassee, Florida.....	1940
Fryman, Miss Kathryn E[lizabeth], 114 Oak St., Wyandotte, Michigan.....	1943
Fuller, Miss A[nne] Verne, 912 No. Park, Kalamazoo, Michigan.....	1952
Furniss, Owen C[ecil], P.O. Box 756, Alberni, Vancouver Island, British Columbia, Canada.....	1934
Futcher, J[ohn] S[tahley], 1011 14th Ave., No., Minneapolis 11, Minnesota.....	1951
*Gabrielson, Ira N[oe], Route 2, Box 195, Vienna, Virginia.....	1913
Gaede, Adela, 3903 E. 176th St., Cleveland 28, Ohio.....	1951
Gairloch, Stanley S[tanford], Route 2, North Scituate, Rhode Island.....	1948
Gale, Larry R[ichard], 167 Harrod Ave., Frankfort, Kentucky.....	1948
*Galley, John E[dmund], 1610 W. Holloway Ave., Midland, Texas.....	1945
Gallup, Frederick Norman, P.O. Box 614, Escondido, California.....	1947
**Gammell, Dr. R[obert] T[hodore], Kenmare, North Dakota.....	1943
*Ganier, Albert F[ranklin], 2112 Woodlawn Drive, Nashville 5, Tennessee.....	1915
Gardner, Kenneth V., Route 1, Groton, New York.....	1952
Garlick, Gordon Mark, Route 1, Box 408, Lake Orion, Michigan.....	1951
Garner, William V[alughn], 447 E. Wadsworth St., Philadelphia 19, Pennsylvania.....	1948
Garrett, Miss [Mary] Lois, 1709 Chestnut St., Kenova, West Virginia.....	1942
Garrison, David L[loyd], Old Lexington Road, Lincoln, Massachusetts.....	1940
Garrity, Devin A[dair], 23 E. 26th St., New York 10, New York.....	1949
Gashwiler, Jay S., U. S. Fish & Wildlife Service, 110 Pioneer Post Office Bldg., Portland, Oregon.....	1944
Gates, Miss Doris [Berta], 401 South Ash St., North Platte, Nebraska.....	1948
Gates, Mabelle F. (Mrs. Clough), 714 Sixth Ave., E., Superior, Wisconsin.....	1949
*Gay, Mrs. J. Adele (Mrs. Leslie N.), "Gay Willows," Hollins Ave., Baltimore 10, Maryland.....	1949
Geibel, Miss Margaret, 127 Mercer St., Butler, Pennsylvania.....	1952
Gensch, Robert Henry, 105 Clark Ave., Billings, Montana.....	1939
Geoghegan, John T[homas], 40 Sherman St., Port Chester, New York.....	1951
*George, John L[othar], Division of Conservation, Vassar College, Poughkeepsie, New York.....	1939
Gerstell, Richard, 355 North West End Ave., Lancaster, Pennsylvania.....	1939
Getzendaner, Mrs. Georgia Belle, 1814 Santa Fe, Corpus Christi, Texas.....	1950
Gibson, George G[ordon], 265 Sheldrake Blvd., Toronto, Ontario, Canada.....	1949
Gibson, Col. Robert Howard, Route 2, Box 336, St. Helena, California.....	1949
Gier, Herschel T[homas], Dept. of Zoology, Kansas State College, Manhattan, Kansas.....	1937
Gifford, Harold, 3636 Burt, Omaha 3, Nebraska.....	1936
Gilbert, Miss Kathryn Helen, 714 First Ave., W., Grand Rapids, Minnesota.....	1945
Gill, Geoffrey, 24 Overlook Drive, Huntington, Long Island, New York.....	1950
*Gillen, Harold W., Denslow Road, New Canaan, Connecticut.....	1944
Gilliard, Ernest Thomas, American Museum of Natural History, Central Park West and 79th St., New York 24, New York.....	1949
Gilreath, Miss M. Ruth, Box 23, Travelers Rest, South Carolina.....	1952
Ginn, William Edward, 511 E. Van Buren, Columbia City, Indiana.....	1941
Glazier, William H[enry] M[onroe], 36 High St., Peterborough, New Hampshire.....	1948
Glenn, Robert W., 509 Orchard Ave., Avalon, Pittsburgh 2, Pennsylvania.....	1934
Gliek, Bruce, 2062 17th Ave., Columbus, Ohio.....	1949
Glore, W[alter] S[cott], Jr., 350 Maple Ave., Danville, Kentucky.....	1947
Glover, Fred A[rthur], Wildlife Management, Humboldt State College, Arcata, California.....	1947
Goebel, Herman [John], 78-52 80th St., Brooklyn 27, New York.....	1946
Goellmer, Karl Eugene, Coe College, Cedar Rapids, Iowa.....	1950
*Goetz, Christian John, 3503 Middleton Ave., Cincinnati 20, Ohio.....	1930
Good, Ernest E[ugene], Dept. of Zoology & Entomology, Ohio State University, Columbus 10, Ohio.....	1937
Good, Wallace M., 3 Reiderest, Kansas City, Kansas.....	1949

Goodman, Donald C[harles], 705 W. Main St., Urbana, Illinois.....	1952
Goodman, John David, Biology Dept., Univ. of Redlands, Redlands, California.....	1944
Goodpasture, Mrs. Ernest W., 408 Fairfax Ave., Nashville 5, Tennessee.....	1950
Goodwin, Clive Edmund, 38 Walsh Ave., Weston, Ontario, Canada.....	1952
Goslin, Charles R[ussell], 726 E. King St., Lancaster, Ohio.....	1940
Gosner, K[enneth] Lynn, 698 Clifton Ave., Newark, New Jersey.....	1948
Gowanloch, James Nelson, Dept. of Wildlife & Fisheries, 126 Civil Courts Bldg., New Orleans, Louisiana.....	1950
Graaskamp, Lester William, Washington Ave., Irvington-on-Hudson, New York.....	1949
Graber, Richard R., 1013 Polk St., Topeka, Kansas.....	1949
*Gram, Mrs. Margaret [Edwards] (Mrs. H. James, Jr.), 87 Moran Road, Grosse Pointe Farms 30, Michigan.....	1941
Grange, Wallace, Babcock, Wisconsin.....	1930
Grant, Cleveland P[utnam], 245 Davis St., Mineral Point, Wisconsin.....	1928
Grayce, Robert, 141 Main St., Rockport, Massachusetts.....	1946
**Greeley, Fred[erick], University Houses, 15-B, Eagle Heights, Madison, Wisconsin.....	1942
Green, Mrs. Charlotte Hilton, 3320 White Oak Road, Raleigh, North Carolina.....	1952
Green, N[orman] Bayard, Zoology Dept., Marshall College, Huntington 1, West Virginia.....	1943
*Greene, Albert E., 517 Oswego St., Ann Arbor, Michigan.....	1939
Greenhalgh, Clifton M., P.O. Box 326, Murray, Utah.....	1939
Greenwalt, Ernest J., Wichita Refuge, Cache, Oklahoma.....	1950
*Greer, Rev. Edward C., 422 E. 10th St., Davenport, Iowa.....	1948
Gregory, Stephen S[trong], Jr., Box N., Winnetka, Illinois.....	1922
Griffee, W[illet] E., 510 Yeon Bldg., Portland 4, Oregon.....	1947
Griffin, William W[elcome], 3232 Pine Ridge Road, N. E., Atlanta, Georgia.....	1946
*Grimes, S[amuel] A[ndrew], 4627 Peachtree Circle, E., Jacksonville 7, Florida.....	1924
Grimm, William C[arey], Route 2, Box 95H, Georgetown, South Carolina.....	1939
**Grinnell, Lawrence [Irving], 710 Triphammer Road, Ithaca, New York.....	1939
**Griscom, Ludlow, Museum of Comparative Zoology, Cambridge 38, Massachusetts.....	1937
Groesbeck, William M[aynard], 376 Seneca Road, Hornell, New York.....	1947
Grose, E. R., Box 38, Sago, West Virginia.....	1939
*Groskin, Horace, 210 Glenn Road, Ardmore, Pennsylvania.....	1937
Gross, Alfred Otto, 11 Boody St., Brunswick, Maine.....	1927
Grossenheider, Richard P., 6328 Laura Ave., St. Louis 20, Missouri.....	1952
Grow, Raymond J., 513 W. Fifth Ave., Apt. 7, Gary, Indiana.....	1951
Grube, G[eorge] E[dward], Biology Dept., Gettysburg College, Gettysburg, Pennsylvania.....	1948
Gruenewald, Robert Franklin, Clifton, Illinois.....	1948
Guhl, A[lfhaeus] M[atthew], Dept. of Zoology, Kansas State College, Manhattan, Kansas.....	1948
Gullion, Gordon W[right], 624 Avenue I, Boulder City, Nevada.....	1947
Gumbart, William B., P.O. Box 1936, New Haven 9, Connecticut.....	1952
Gunderson, Harvey Lorraine, Museum of Natural History, Univ. of Minnesota, Minneapolis 14, Minnesota.....	1941
Gundy, Samuel C[harles], Box 1, Stony Creek Mills, Pennsylvania.....	1950
*Gunlogson, G. B., Cross Creek Road, Racine, Wisconsin.....	1951
*Gunn, W[illiam] W[alker] H[amilton], 178 Glenview Ave., Toronto 12, Ontario, Canada.....	1945
Günther, Klaus, Berlin Lankwitz, Wasunger Weg 14, Germany.....	1952
Hadeler, Miss Catherine [Wilma], 900 Harmon Ave., Dayton 9, Ohio.....	1945
*Hagar, Mrs. Jack, Box 339, Rockport, Texas.....	1930
*Hagar, Joseph A., Pleasant St., Marshfield Hills, Massachusetts.....	1949
Hagmeier, Edwin M[eyer], 37 Margaret Ave., Kitchener, Ontario, Canada.....	1951
*Hague, Florence S., Sweet Briar College, Sweet Briar, Virginia.....	1931
Haines, Bertram W., 620 Ninth Ave., S.W., Rochester, Minnesota.....	1952
Haines, Robert L[ee], 54 E. Main St., Moorestown, New Jersey.....	1947

Haines, T. P., 1395 Adams St., Apt. E., Macon, Georgia.....	1941
Hale, James B[all], 405 Washburn Place, Madison 3, Wisconsin.....	1947
Hall, Fran, 518 Union St., Northfield, Minnesota.....	1950
*Hall, Fred T., Buffalo Museum of Science, Humboldt Park, Buffalo 11, New York.....	1937
*Hall, George A[rthur], Jr., Dept. of Chemistry, West Virginia University, Morgantown, West Virginia.....	1946
Hall, Mrs. Gladys A[reta], 912 Douglas Ave., Kalamazoo 52, Michigan.....	1947
Halladay, Ian R[ussel], 218 Belsize Drive, Toronto 12, Ontario, Canada.....	1948
Haller, Frank D[enver], Route 1, Cortland, Indiana.....	1940
**Haller, Capt. Karl W., AO-864839, 2nd T.S.S. Sandia Base, Albuquerque, New Mexico.....	1934
Hallman, Roy Cline, Box 435, Port St. Joe, Florida.....	1928
*Hamann, Carl F[erdinand], Maple Lane, Aurora, Ohio.....	1947
Hamerstrom, Mrs. Frances (Mrs. Frederick N., Jr.), Plainfield, Wisconsin.....	1948
Hamerstrom, Frederick N., Jr., Plainfield, Wisconsin.....	1934
Hamilton, Carmen W[arnke] (Mrs. Don F.), Melody Hill, Route 2, Box 89, Hopkins, Minnesota.....	1951
*Hamilton, Charles W[hiteley], 2639 Fenwood Road, Houston 5, Texas.....	1948
Hamilton, Terrell Hunter, 1926 Swenson Ave., Abilene, Texas.....	1952
Hamilton, William J[ohn], Jr., Dept. of Conservation, Cornell Univ., Ithaca, New York.....	1933
Hamme, Leander Guy, York County, Brodbeck's, Pennsylvania.....	1952
*Hammond, Merrill C[lyde], Lower Souris Refuge, Upham, North Dakota.....	1939
Hampe, Irving E., 5559 Ashbourne Road, Halethorpe, Baltimore 27, Maryland.....	1945
Hamrum, Charles L[owell], Dept. of Biology, Gustavus Adolphus College, St. Peter, Minnesota.....	1949
Hancock, James W[illiam], Route 1, Madisonville, Kentucky.....	1946
Handley, Charles Overton, 6571 Roosevelt Ave., Charleston 4, West Virginia.....	1925
Handley, Charles O[verton] Jr., Division of Mammals, U.S. National Museum, Washington 25, D.C.....	1941
*Hann, Harry W[ilbur], Dept. of Zoology, Univ. of Michigan, Ann Arbor, Michigan.....	1930
Hanna, Wilson Creal, 712 No. 8th St., Colton, California.....	1936
Hansen, Norman J., 223 No. Franklin St., Ames, Iowa.....	1950
Hansman, Robert H[erbert], 1215 Avenue F, Fort Madison, Iowa.....	1948
Hanson, E[lmier] C[harles], 1305 Wisconsin Ave., Racine, Wisconsin.....	1940
Hardy, [Cecil] Ross, Long Beach State College, 6201 E. Anaheim Rd., Long Beach 4, California.....	1940
Hardy, Frederick C., Greenwood, Kentucky.....	1948
Hardy, J[ohn] William, 235 Kensington Rd., East Lansing, Michigan.....	1952
Harford, Dr. Henry M[inor], 926 Argyle Bldg., Kansas City 6, Missouri.....	1946
Hargis, Mrs. Dorothy J., 223 Third St., Ann Arbor, Michigan.....	1951
Hargrave, Lyndon L[anel], Box 505, Benson, Arizona.....	1952
Harley, James Bickel, Route 1, Box 394, Pottstown, Pennsylvania.....	1947
Harmon, Dr. Karl S., 209 So. Walnut St., Eldon, Missouri.....	1947
Harper, Francis, Route 1, Mount Holly, New Jersey.....	1930
Harrigan, Dr. William LeRoy, 412 E. Broadway St., Mount Pleasant, Michigan.....	1952
Harrington, Dr. Paul, 813 Bathurst St., Toronto 4, Ontario, Canada.....	1948
*Harriot, Samuel C[arman], 200 W. 58th St., New York City 19, New York.....	1934
*Harris, S. Arthur, 1308 W. Minnehaha Pkwy, Minneapolis, Minnesota.....	1951
Harris, William G[eorge] F., 147 Hillside St., Milton 86, Massachusetts.....	1951
*Harrison, Hal H., 1102 Highland St., Tarentum, Pennsylvania.....	1941
Harry, Gordon Bryan, 6160 Flushing Road, Flushing, Michigan.....	1950
Hartley, Albert Thomas, Columbiana, Ohio.....	1944
Hartley, Charles F[red], 19463 Carrie Ave., Detroit 34, Michigan.....	1951
Hartley, Harold S., 602 Randolph St., Northville, Michigan.....	1951
Hartman, Frank A[lexander], Hamilton Hall, Ohio State Univ., Columbus 10, Ohio.....	1941
Hartmeister, Felix A., 410 N. Cedar St., Horicon, Wisconsin.....	1949

Hartwell, Reginald Warner, 121 No. Fitzhugh St., Rochester 14, New York	1947
Harwell, Charles Albert, 2630 Hilgard Ave., Berkeley 9, California	1948
Hatch, Miss [Clara] Grenville, 1548 Wilhelmina Rise, Honolulu 17, Hawaii	1948
Hausler, Mrs. M., 7348 Paxton Ave., Chicago, Illinois	1936
*Havemeyer, Henry O[borne], Mahwah, New Jersey	1930
Haverschmidt, Fr., P.O. Box 644, Paramaribo, Surinam, Dutch Guiana	1946
Hawk, Grover C., Route 1, Hedrick, Iowa	1951
Hawkins, B. L., Hamline Univ., St. Paul 4, Minnesota	1936
Hawkins, Miss Naomi M., 132 No. Galveston, Arlington, Virginia	1948
Hawksley, Oscar, Biology Dept., Central Missouri State College, Warrensburg, Missouri	1948
Hayden, H. Vincent, Suptown Rd., Route 6, Concord, New Hampshire	1950
Hayman, Robert G[ene], Route 1, Carey, Ohio	1952
Hazard, Frank Orlando, Wilmington College, Wilmington, Ohio	1946
Hazard, Norwood [Cady], 2815 Sheridan St., Davenport, Iowa	1949
Heaps, Miss Pearl, 1916 Park Ave., Baltimore 17, Maryland	1949
*Hebard, Frederick V[anuxem], 1500 Walnut St. Bldg., Philadelphia 2, Pennsylvania	1940
Hecht, William Robert, 3965-A Shenandoah, St. Louis 10, Missouri	1950
Heckler, Sydney B., 1207 No. 7th St., St. Louis 6, Missouri	1942
Hedges, Harold C[hables], Route 2, Lake Quivira, Kansas City 3, Kansas	1940
Hed, William B[atbles], Dept. of Zoology, Univ. of Texas, Austin 12, Texas	1947
*Hefley, Harold M[artin], Div. of Biological Sciences, Mississippi Southern College, Station A, Box 94, Hattiesburg, Mississippi	1942
Heiser, J[oseph] M[atthew], Jr., 1724 Kipling St., Houston, Texas	1939
Helbert, Dr. Hollen G[arber], 338 Monticello Ave., Harrisonburg, Virginia	1952
Helfer, Miss Louise, 111 Ninth St., Watkins Glen, New York	1938
Helleiner, Frederick M., Chaput Hughes P.O., Ontario, Canada	1952
Helms, Carl W., 336 W. Evers Ave., Bowling Green, Ohio	1952
Henderson, J[ames] Neil, 5442 S. Harper Ave., Chicago 15, Illinois	1951
Henderson, Hon. William L., Gibson Island, Maryland	1950
*Hendrickson, George O[scar], Dept. of Zoology & Entomology, Iowa State College, Ames, Iowa	1933
Hengst, Mrs. James M., 2111 Park Hill Dr., Columbus 9, Ohio	1948
Henry, C. J., Seney National Wildlife Refuge, Germfask, Michigan	1933
Hensley, M[arvin] Max, Dept. of Biology, Gettysburg College, Gettysburg, Pennsylvania	1947
Henwood, Mrs. Ethel May, 806 S. Lincoln, Urbana, Illinois	1941
Herbert, Richard A., 961 Fox St., Bronx 59, New York, New York	1951
Herman, Carlton M., Patuxent Research Refuge, Laurel, Maryland	1946
Herreman, Mrs. H. M., 2931 W. Roxboro Road, N. E., Atlanta, Georgia	1951
Herz, Mrs. Malvin E., Route 4, Excelsior, Minnesota	1951
Hessin, Miss Twila, Route 2, Nashport, Ohio	1949
Hesterberg, Gene A[rthur], Forestry Dept., Michigan College of Mining and Technology, Houghton, Michigan	1948
Hetrick, Louis Howard, Gettysburg Lutheran Seminary, Gettysburg, Pennsylvania	1950
Hewitt, Oliver H., Fernow Hall, Cornell Univ., Ithaca, New York	1943
Hibbard, Edmund Arthur, 602 12th St., Bismarek, North Dakota	1950
Hiekey, J[oseph] J[ames], 424 University Farm Place, Madison 5, Wisconsin	1940
**Hieks, Lawrence Emerson, 8 Chatham Road, Columbus, Ohio	1925
Hicks, Thomas W[illiam], Dept. of Biol., Science Hall, Univ. of Florida, Gainesville, Florida	1949
Hielt, Lawrence D[avison], 1945 Ottawa Dr., Toledo 6, Ohio	1929
Higgins, Thomas Francis, Box 95, Miller Place, Long Island, New York	1947
Hill, Herbert Oliver, 1811 Bonita, Berkeley, California	1938
Hill, Julian Werner, 1106 Greenhill Ave., Wilmington 56, Delaware	1935
Hill, R[aymond] W., 3316 Kenmore Rd., Shaker Heights, Cleveland 22, Ohio	1941
Hillmer, Davis B., 8228 Woodward Ave., Detroit 2, Michigan	1926
Hinds, Frank J., Biology Dept., Western Michigan College of Education, Kalamazoo, Michigan	1935

Hinshaw, Thomas D[loane], 1827 San Juan Ave., Berkeley 7, California.....	1926
Hipple, Byron T., Jr., 46 Dove St., Albany 10, New York.....	1952
Hobson, Mrs. L. G. (Dorothy Madden), 4515 Marcy Lane, Apt., 239, Indianapolis 5, Indiana.....	1935
Hochbaum, Hans Albert, Delta Waterfowl Research Sta., Delta, Manitoba, Canada.....	1942
Hock, Raymond J[ames], Box 960, Arctic Health Research Center, Anchorage, Alaska.....	1946
Hodges, Mrs. Elizabeth D[ole], 6210 Paseo, Kansas City 4, Missouri.....	1948
Hodges, James, 324 W. 31st St., Davenport, Iowa.....	1946
Hoffmeister, Linus C[hristian], 504 W. Ripa Ave., Lemay 23, Missouri.....	1939
Hofslund, Pershing B[ernard], Biology Dept., Duluth Branch, Univ. of Minnesota, Duluth, Minnesota.....	1944
Holberg, Arnold, Route 3, Box 226, El Dorado, Arkansas.....	1951
*Holden, Fenn M[itchell], Box 428, Grayling, Michigan.....	1947
Holland, Harold May, Box 615, Galesburg, Illinois.....	1915
Horn, Frank E., 538 E. 21st St., Brooklyn 26, New York.....	1952
Horton, Mrs. Louise D. (Mrs. M. B.), 360 Prospect St., Fall River, Massachusetts.....	1941
Hostetter, D[avid] Ralph, Eastern Mennonite College, Harrisonburg, Virginia.....	1937
Hough, Mrs. Eleanor Sloan, 1645 Sunset Blvd., Boulder, Colorado.....	1941
Houston, C[larance] Stuart, Box 279, Yorkton, Saskatchewan, Canada.....	1948
Howard, Julian A., Aransas National Wildlife Refuge, Austwell, Texas.....	1951
Howe, [Henry] Branch, Jr., 1710 Hoyt St., Madison, Wisconsin.....	1943
Howell, Joseph C., Dept. of Zoology & Entomology, Univ. of Tennessee, Knoxville 16, Tennessee.....	1938
Howell, Thomas R[aymond], Dept. of Zoology, Univ. of California, Los Angeles 24, California.....	1947
Hoyt, Mrs. Sally F. (Mrs. Southgate Y.) "Aviana," Box 54, Etna, New York.....	1952
Hubert, Philip Arthur, Jr., 161 Henry St., Apt. 5-S, Brooklyn 2, New York.....	1948
Huenecke, Howard S[everin], Des Lacs National Wildlife Refuge, Kenmare, North Dakota.....	1952
Hughes, Wallace, 624 S.W. 51st St., Oklahoma City, Oklahoma.....	1947
Hulbert, Lloyd Clair, Dept. of Botany, Univ. of Minnesota, Minneapolis 14, Minnesota.....	1938
Humphrey, Philip Strong, Museum of Zoology, Univ. of Michigan, Ann Arbor, Michigan.....	1948
*Hundley, Marion Lee, 155 3rd St., S.E. Carrollton, Ohio.....	1950
Hunnell, Miss Louisa, 848 Washington St., Wellesley, Massachusetts.....	1951
Hunt, Ormond Edson, Rathmor Rd., Bloomfield Hills, Michigan.....	1937
Huntington, Charles Ellsworth, 38 Kildeer Rd., Hamden 14, Connecticut.....	1950
Hurd, Roger P., Route 1, Tioga County, Millerton, Pennsylvania.....	1951
Hurley, John B[eatty], 401 S. 17th Ave., Yakima, Washington.....	1937
Hurrie, David, 8-C Devonshire Apts., Brockville, Ontario, Canada.....	1952
Hutchinson, Arthur E., 2640 Glendessary Lane, Santa Barbara, California.....	1940
Imhof, Thomas A[nthony], 307 38th St., Fairfield, Alabama.....	1950
*Ingersoll, Albert M[ills], 908 "F" St., San Diego 1, California.....	1921
Irving, Laurence, Box 960, Anchorage, Alaska.....	1951
Ivor, H. Roy, Route 1, Cooksville, Ontario, Canada.....	1945
Jabinson, Marguerite N. (Mrs. L. R.), 1503 N. Pennsylvania Ave., Apt. 31, Indianapolis 2, Indiana.....	1946
Jackson, C[icero] F[lloyd], Univ. of New Hampshire, Durham, New Hampshire.....	1936
Jacobson, Dr. Malcolm A[rthur], 13 W. 36th St., New York 19, New York.....	1947
Jahn, Laurence Roy, 314 W. Lake St., Horicon, Wisconsin.....	1950
James, Douglas Arthur, Vivarium Bldg., Univ. of Illinois, Champaign, Illinois.....	1946
James, Miss Pauline, Biology Dept., Texas College of Arts & Industries, Kingsville, Texas.....	1952
*Janes, Anita A. (Mrs. Henry L.), 1032 College Ave., Racine, Wisconsin.....	1949
Janssen, Robert B., 5128 Indianola Ave., Minneapolis 10, Minnesota.....	1952
Janvrin, Dr. Edmund R[andolph] P[leaslee], 38 E. 85th St., New York 28, New York.....	1942

*Jaques, F[rancis] L[ee], 610 W. 116th St., New York 27, New York.....	1939
Jaques, Florence Page, 610 W 116th St., New York 27, New York.....	1950
Jaques, H[arry] E[dwin], 709 N. Main St., Mt. Pleasant, Iowa.....	1949
Jenkins, James H[obart], Dept. of Biology, Univ. of Georgia, Athens, Georgia.....	1939
Jenkinson, Miss Mary Caroline, Box 715, Bryson City, North Carolina.....	1952
Jenner, William A., 3426 78th Place, S. E., Washington 19, D.C.....	1933
Jeness, P. M., 107 Oregon St., Greenville, South Carolina.....	1952
Jensen, Mrs. Ove F., Rural Route, Maple City, Michigan.....	1948
*Jeter, Horace Hearne, 4534 Fairfield Ave., Shreveport, Louisiana.....	1950
Johnson, Albert George, 271 South St., Jamaica Plain 30, Massachusetts.....	1947
Johnson, Daniel P., 147 Winter St., Hyannis, Massachusetts.....	1951
Johnson, Harris E., Route 1, Warren, Pennsylvania.....	1951
Johnson, Mrs. Irene W. (Mrs. Oscar), 38 Portland Place, St. Louis 8, Missouri.....	1931
Johnson, J[ohn] O[scar], 112 7th St., S.E., Watertown, South Dakota.....	1948
Johnson, Miss Mabel Claire, 30 Westfield Rd., West Hartford, Connecticut.....	1946
Johnson, Robert A[nthony], 98 East St., Oneonta, New York.....	1930
Johnson, William M[cNutt], Route 6, Knoxville, Tennessee.....	1939
Johnston, David Ware, Dept. of Zoology, Univ. of California, Berkeley 4, California.....	1943
Johnston, Richard F., Museum of Vertebrate Zoology, Berkeley 4, California.....	1949
Jones, Fred M[inson], P.O. Box 1864, Williamsburg, Virginia.....	1951
Jones, Glenn Ellis, 1115 W. Garver St., Norman, Oklahoma.....	1950
Jones, Harold C[harles], Box 61, East Carolina Teachers College, Greenville, North Carolina.....	1929
Jones, John C[ourts], 5810 Namakagan Rd., Washington 16, D.C.....	1931
Jones, S[olomon] Paul, 509 West Ave., N., Waukesha, Wisconsin.....	1921
Jones, Vincent C[lement], 417 Sterling Ct., Apt. A, Madison 5, Wisconsin.....	1951
Jorae, Miss Irene Frances, Central Michigan College of Education, Mt. Pleasant, Michigan.....	1942
*Jordan, John N., 52 Brook Ave., No., Montreal, W., Quebec, Canada.....	1951
Joseph, Stanley R[obert], Route 8, York, Pennsylvania.....	1952
Joul, Mrs. Earl W., 5641 Grand Ave., So., Minneapolis, Minnesota.....	1952
Jubon, John M., P.O. Box 16, Millstone Rd., East Millstone, New Jersey.....	1951
Jung, Clarence [Schram], 6383 N. Port Washington Rd., Milwaukee 9, Wisconsin.....	1921
Jurica, E., Lisle, Illinois.....	1940
Kaerne, William H[arald], 127 Ruby St., Winnipeg, Manitoba, Canada.....	1949
Kahn, Mrs. Dina H[ope] (Mrs. Reuben L.), 1122 Michigan Ave., Ann Arbor, Michigan.....	1938
Kalmbach, Edwin Richard, Fish & Wildlife Service, 2654 Forest St., Denver 7, Colorado.....	1926
Kampf, Roy C., 555 Ruth St., Bridgeport, Connecticut.....	1948
*Kase, John C[harles], 501 Chestnut St., Mifflinburg, Pennsylvania.....	1937
Kasper, John L[oren], 392 23rd St., Oshkosh, Wisconsin.....	1947
*Keating, Dr. F[rancis] Raymond, Jr., 620 Tenth Ave., S.W., Rochester, Minnesota.....	1944
Keeley, Miss Katherine, 503 Greenlawn Dr., Apt. 103, Hyattsville, Maryland.....	1950
Keeton, Luther F., 26 N. Belvedere Blvd., Memphis 4, Tennessee.....	1952
*Kelker, George H., School of Forestry, Utah State Agricultural College, Logan, Utah.....	1938
Keller, C[harles] E[dward], 637 Eastern Ave., Indianapolis 1, Indiana.....	1946
Keller, Richard T[homas], 717 S. 16th St., St. Joseph 36, Missouri.....	1943
Kelley, Mrs. Eliza Mabel, 6 Ashton St., Worcester, Massachusetts.....	1948
Kelley, Neil Thomas, 13137 Balfour, Huntington Woods, Michigan.....	1951
Kelley, William N[eal], New Haven, Missouri.....	1948
Kelsey, Homer Stone, Skyview Aeres, Route 1, Pomona, New York.....	1945
Kelsey, Paul Manning, Route 1, State Rd., Dryden, New York.....	1948
Kelso, Leon H[ugh], 1370 Taylor St., N.W., Washington 11, D.C.....	1930
Kelson, Keith R[eynold], Museum of Natural History, University of Kansas, Lawrence, Kansas.....	1952
Kemnitzer, Allen E[dward], 969 Five Mile Line Rd., Webster, New York.....	1949

Kemper, Thomas L., 705 Oak St., Winnetka, Illinois.....	1952
Kemsies, Emerson, 102 Farragut Rd., Greenhills 18, Ohio.....	1948
Kenaga, Eugene E., 1629 Isabella Road, Route 5, Midland, Michigan.....	1949
Kendeigh, S[amuel] Charles, Univ. of Illinois, Vivarium Bldg., Champaign, Illinois.....	1923
*Kennedy, Bruce A[lbert] H[amilton], 389 W. 10th Ave., Columbus 1, Ohio.....	1947
*Kennerly, Thomas E., Jr., Dept. of Zoology, Univ. of Texas, Austin 12, Texas.....	1951
*Kent, Tom, 302 Richards St., Iowa City, Iowa.....	1951
Kenyon, Karl W[alton], U.S. Fish & Wildlife Service, 2725 Montlake Blvd., Seattle 2, Washington.....	1948
Kersey, Mrs. Glenn B. (Lula Brooks), 647 Gordon Terrace, Chicago 13, Illinois.....	1948
Kersting, Cecil Carl, 3722 E. Apple, Route 6, Muskegon, Michigan.....	1950
Kessel, Miss Brina, Dept. of Biological Sciences, Univ. of Alaska, College, Alaska.....	1946
Kessel, Mrs. Jean H. Omoto, 8325 Cottage Grove, Chicago 19, Illinois.....	1949
**Kieran, John, 4506 Riverdale Ave., New York 63, New York.....	1942
Kildow, T[homas] Monroe, Box 520, Tiffin, Ohio.....	1948
Kilham, Dr. Lawrence, 8302 Garfield St., Bethesda 14, Maryland.....	1952
Killip, Dr. Thomas, III, 904 South Ave., Rochester, New York.....	1946
Killpack, Merlin L[eo], Roosevelt High School, Roosevelt, Utah.....	1950
Kimball, Miss Mary Boydston, 809 Main St., Sistersville, West Virginia.....	1950
Kincaid, Edgar, Jr., 702 Park Place, Austin, Texas.....	1951
King, John Arthur, Roscoe B. Jackson Memorial Laboratory, Box 847, Hamil- ton Sta., Bar Harbor, Maine.....	1947
*King, Mrs. Stanley (Louise E.), 5533 Bryant Ave., So., Minneapolis, Minnesota.....	1944
Kirkpatrick, Charles M., Dept. of Forestry, Purdue Univ., West Lafayette, Indiana.....	1948
*Klein, Richard P[aul], Jackson Road, Route 4, Chagrin Falls, Ohio.....	1946
*Kletzly, Robert C[hables], Conservation Commission, Romney, West Virginia.....	1948
Klimstra, W[illard] D[avid], Zoology Dept., Southern Illinois Univ., Carbon- dale, Illinois.....	1948
Klonick, Allan S., 828 Grosvenor Road, Rochester 18, New York.....	1941
Kluge, Miss Helen H[enrika], Woodtick Road, Waterbury 12, Connecticut.....	1942
Knisely, Holton, Gregory, Michigan.....	1951
Knox, Miss Margaret R[ichardson], 4030 Park Ave., Indianapolis 5, Indiana.....	1937
Kolb, C[hables] Haven, Jr., 5915 Meadow Road, Baltimore 6, Maryland.....	1937
*Kortright, Francis H[erbert], 633 Eastern Ave., Toronto 8, Ontario, Canada.....	1943
*Kosmopoulos. [Alice] Leslie Walker, 2024 Garden St., Santa Barbara, California.....	1949
Kossack, Charles W[alter], 715 S. Division St., Barrington, Illinois.....	1945
Kozicky, Edward L[ouis], Wildlife Research Unit, Dept. of Zoology & Entomol- ogy, Iowa State College, Amcs, Iowa.....	1943
Kramar, Nada, 1906 "K" St., N.W., Washington 6, D.C.....	1947
Kraus, Douglas L[awrence], Univ. of Rhode Island, Dept. of Chemistry, Kingston, Rhode Island.....	1942
Krebs, Mrs. R. W. (Juanita F[ile]), 1272 Alfred St., Baton Rouge 12, Louisiana.....	1946
Krug, Howard H[enry], Chesley, Ontario, Canada.....	1944
Krumm, Kenneth, Lacreek National Wildlife Refuge, Martin, South Dakota.....	1948
Kugel, Miss Agnes R[ose], Botany Dept., Grand Rapids Junior College, Grand Rapids, Michigan.....	1946
Kuhn, Kenneth H[erbert], 3734 No. 53rd St., Milwaukee 16, Wisconsin.....	1949
Kuitert, Louis Cornelius, Agricultural Experiment Sta., Univ. of Florida, Gainesville, Florida.....	1938
Kutz, George C[arl], 705 So. Holcombe St., Stillwater, Minnesota.....	1944
Kyllingstad, Henry C[arrell], Box 592, Brigham City, Utah.....	1940
Lacey, Miss Mifton H., Box 614, Canton, Ohio.....	1939
Lacey, Mrs. Trammell Calhoun, Box 4, North St. Sta., Nacogdoches, Texas.....	1950
Lagler, Karl F., Dept. of Fisheries, Univ. of Michigan, Ann Arbor, Michigan.....	1941
Lambert, Mrs. Adaline T[rain] (Mrs. Howard T.), 1903 Ross St., Sioux City, Iowa.....	1947
Lamore, Donald Hart, 10-A Parkway Road, Greenbelt, Maryland.....	1952

*Lancaster, Douglas A[lan], 1332 Fifth St., N., Fargo, North Dakota.....	1949
Land, Hugh Colman, 3372 8th St. Road, Huntington, West Virginia.....	1950
Larrabee, Austin Park, 534 99th Ave., N.E., Bellevue, Washington.....	1921
*Laskey, Mrs. Frederick Charles (Amelia Rudolph), 1521 Graybar Lane, Nashville 4, Tennessee.....	1928
Latimer, Miss Alice Roana, Editorial Office, Agricultural Experimental Sta., Pennsylvania State College, State College, Pennsylvania.....	1950
Latzko, Gordon Charles, Apt. 37, Vets' Housing, Muhlenberg College, Allen- town, Pennsylvania.....	1948
Laude, Peter P[ercy], 302 W. Park Road, Iowa City, Iowa.....	1951
Lawrence, Mrs. Louise de Kiriline, Rutherglen, Ontario, Canada.....	1946
Lawson, Ralph, 88 Washington Square, Salem, Massschusetts.....	1951
Lea, Dr. Robert B[ashford], 1640 Dufossat, New Orleans 15, Louisiana.....	1940
Leavitt, Benjamin Burton, Department of Biology, University of Florida, Gainesville, Florida.....	1947
Lee, [William] Donald, 3219 White Oak Drive. Dayton 10, Ohio.....	1947
Lee, Miss Zell Charlotta, 815 Jackson St., Apt. 4, Sioux City, Iowa.....	1946
Leedy, Daniel L[oney], U.S. Fish & Wildlife Service, Branch of Wildlife Research, Washington 25, D.C.....	1936
Leggett, Fred C[arlisle], Rural Route, McIvor, Michigan.....	1952
*Lengemann, Miss Martha A., 360 Cedar St., Imlay City, Michigan.....	1946
Leonard, James P[atricks], 1605 Arlington Avenue, Davenport, Iowa.....	1951
Leopold, A[ldo] Starker, Museum of Vertebrate Zoology, Berlekey 4, California.....	1940
Leopold, Frederic, 111 Clay St., Burlington, Iowa.....	1950
Leppla, Miss Doris E., 510 West Front St., Ashland, Wisconsin.....	1951
*Levi, Herbert W., University of Wisconsin, Extension Center, Wausau, Wisconsin.....	1949
Levy, Alice K[lund] (Mrs. H. P.), 840 Seward St., Hollywood 38, California.....	1941
Lewis, C. Bernard, The Science Museum, Institute of Jamaica, Kingston, Jamaica, British West Indies.....	1947
Lewis, Harrison F[lint], West Middle Sable, Shelburne County, Nova Scotia, Canada.....	1939
Lewis, Brother Hubert, La Salle Institute, Glencoe, Missouri.....	1940
Lewy, Alfred, 2051 E. 72nd Place, Chicago 49, Illinois.....	1915
Lieftinck, John E[dmund], c/o Goodyear S.A., Luxembourg City, Luxembourg.....	1945
Lien, Mrs. Boyd M. (Mrs. Helen J.), 5148 29th Avenue So., Minneapolis 17, Minnesota.....	1944
*Ligas, Frank J., Stone Institute of Hydrobiology, Put-In-Bay, Ohio.....	1951
Ligon, J[ames] Stokley, P.O. Box 950, Carlsbad, New Mexico.....	1948
Lincoln, Frederick Charles, Fish & Wildlife Service, Washington 25, D.C.....	1914
Lindauer, Millard R., 8509 Atlantic Ave., Margate, New Jersey.....	1949
Linsdale, Jean M[yron], Jamesburg Route, Robles Del Rio, California.....	1928
*Linton, M[orris] Albert, 315 E. Oak Ave., Moorestown, New Jersey.....	1941
Lloyd, C[lark] K., 11 No. Elm St., Oxford, Ohio.....	1925
Lloyd, Hoyes, 582 Mariposa Ave., Rockcliffe Park, Ottawa, Ontario, Canada.....	1922
*Lockwood, Robert Minturn, Veterans Administration Hospital, McKinney, Texas.....	1949
Loetscher, Frederick W[illiam], Jr., 507 W. Main St., Danville, Kentucky.....	1946
*Logan, Dulaney, Rural Route 1, Box 449, Louisville 1, Kentucky.....	1947
Long, Ralph, Jr., 300 West Ave., Ithaca, N. Y.....	1951
Longley, William H[oward], P.O. Box 362, Kasson, Minnesota.....	1943
Lord, Dr. Frederic P[omeroy], 39 College St., Hanover, New Hampshire.....	1939
Loring, George G[ardner], Bridge 57, Manchester, Massachusetts.....	1949
Lovell, Harvey B., 3011 Meade Ave., Louisville 13, Kentucky.....	1936
*Low, Seth Haskell, Patuxent Research Refuge, Laurel, Maryland.....	1931
*Lowery, George H[ines], Jr., Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana.....	1937
Lowther, Malcolm Alfred, 706 Hazelwood, Detroit, Michigan.....	1944
Ludwig, Claud C[ecil], 279 Durand St., East Lansing, Michigan.....	1938
*Ludwig, Dr. Frederick Edwin, 2864 Military St., Port Huron, Michigan.....	1941
Lueshen, Mrs. John [Willetta], Wisner, Nebraska.....	1952

Lukens, William Weaver, Jr., Upper Gulph Road, Radnor, Pennsylvania.....	1947
Lund, Mrs. Oscar. Baroda, Michigan.....	1952
Lundin, Harry. Sparbanksvägen 11, Hägersten, Sweden.....	1948
*Lunk, William A., 2849 Whitewood, Pittsfield Village, Ann Arbor, Michigan.....	1937
Lupient, Mrs. Mary [Louise], 212 S. E. Bedford St., Minneapolis 14, Minnesota.....	1944
Luthy, Ferd, Jr., 306 N. Institute, Peoria, Illinois.....	1937
Lyons, Mrs. Rhoda Green (Mrs. Robert), 25 Woodland St., Huntington, New York.....	1940
MacLeod, Charles Franklyn, Box 5215, State College Station, Raleigh, North Carolina.....	1949
MacLulich, D[uncan] A[lexander], 342 Marshall Court, Ottawa, Ontario, Canada.....	1933
MacMillan, (Mrs.) Jeanette Courte, 2878 Ziegler Ave., Cincinnati 8, Ohio.....	1952
*MacMullan, R[alph] Austin, Houghton Lake Wildlife Experiment Station, Box 44, The Heights, Michigan.....	1940
MacQueen, Mrs. Peggy Muirhead, 48 New Jersey Ave., Bergenfield, New Jersey.....	1940
McAlister, [James] Don, 1723 Cardiff Road, Columbus 12, Ohio.....	1949
McAtee, Waldo Lee, 3 Davie Circle, Chapel Hill, North Carolina.....	1911
*McCabe, Robert A[lbert], 424 University Farm Place, Madison, Wisconsin.....	1942
McCamey, [Benjamin] Frank[lin], [Jr.], c/o E. E. Weeks, Storrs, Connecticut.....	1945
McCart, William L[arrey], 1309 St. Louis Ave., Fort Worth 4, Texas.....	1950
*McClure, H[owe] Elliott, 406 Medical Gen. Lab., A.P.O. 500, San Francisco, California.....	1942
McClure, John Francis, 7050 N. Oatman Ave., Portland 17, Oregon.....	1949
*McConoughey, Frank Perry, 1547 Northland Ave., Lakewood 7, Ohio.....	1951
McCormick, John M., 2356 Cheltenham Road, Toledo 6, Ohio.....	1951
*McCue, Earl Newlon, Box 104, Morgantown, West Virginia.....	1941
McCullagh, Dr. E[lnest] Perry, 2020 E. 93rd St., Cleveland, Ohio.....	1937
McDonald, Malcolm E., Box 236, Schenectady, New York.....	1936
McEntee, Mrs. Howard G. (Elinor G.), 490 Fairfield Ave., Ridgewood, New Jersey.....	1948
*McGaw, Mrs. G. Hampton (Elizabeth Taylor), 18 Beech St., Woodsville, New Hampshire.....	1945
McGeen, Daniel S., 22 Shaw St., West Roxbury, Massachusetts.....	1944
McKay, Arlie K[yle], Rural Route 2, Box 252, Baytown, Texas.....	1949
McKeever, Christopher Killian, 1043 Carroll St., Brooklyn 25, New York.....	1948
McKeever, [James] L[awrence], Rural Route 3, Peterborough, Ontario, Canada.....	1949
McKinley, Daniel L[awson], Mountain Grove, Missouri.....	1948
McKinley, Dr. George G[ael], 104 North Western Pkwy., Louisville 12, Kentucky.....	1945
McKinney, Robert G[erhard], 86 Hurstbourne Road, Rochester 9, New York.....	1948
*McKinney, Mrs. Walter A., 2932 So. Woodward Blvd., Tulsa 5, Oklahoma.....	1945
McKnight, Edwin T[hor], 5038 Park Place, Friendship Station, Washington 16, D. C.....	1936
*McLeod, John Allen, Jr., 113 E. Hendrix St., Greensboro, North Carolina.....	1951
*McMath, Robert R., Lake Angelus, Rural Route 4, Box 104, Pontiac 4, Michigan.....	1934
McMillan, John Frank, 1414 E. 59th St., Chicago 37, Illinois.....	1950
McMurray, Arthur A., 1216 W. Bethune, Apt. B-6, Detroit 2, Michigan.....	1939
McQuarrie, Harold James, Gore Bay, Manitoulin Island, Ontario, Canada.....	1950
Mack, H[orace] G[ordon], c/o Gilson Mfg. Co., Ltd., Guelph, Ontario, Canada.....	1937
Mackenzie, Mrs. Charles (Clara Lyga), 425 Tatepaha Blvd., Faribault, Minnesota.....	1951
*Mackenzie, Dr. Loeki Litton, 829 Park Ave., New York 21, New York.....	1947
*Madtes, George R[ummel], 337 E. Ravenwood Ave., Youngstown 5, Ohio.....	1949
Magath, Dr. Thomas Byrd, Mayo Clinic, Rochester, Minnesota.....	1935
Magner, [John] Marshall, 516 Bacon Ave., Webster Groves 19, Missouri.....	1948
Magney, Mrs. G. R., 5329 Washburn Ave., So., Minneapolis 10, Minnesota.....	1951
Maher, William Joseph, 915 Oakland Ave., Ann Arbor, Michigan.....	1951
Mahlburg, Milton William, 1109 Grant Ave., Rockford, Illinois.....	1949
*Mainster, Raymond Waite, 3716 Croydon Road, Baltimore 7, Maryland.....	1949
*Mallory, Dr. Dwight H[areourt], 17 Sherwood St., Brockville, Ontario, Canada.....	1946
Manley, Thomas L., 1919 Semple Ave., St. Louis 12, Missouri.....	1952

Manners, Edward Robert, 216 New Broadway, Brooklawn, New Jersey.....	1942
Manning, T. H., 37 Linden Terrace, Ottawa, Canada.....	1950
*Mannix, Mrs. Lucille Marie (Mrs. J. R.), 11424 Cedar Road, Apt. E-2, Cleveland, Ohio.....	1947
Manville, Richard H[lydel], Dept. of Zoology, Michigan State College, East Lansing, Michigan.....	1941
*Mara, Robert M[ichael], The Dearborn Inn, Dearborn, Michigan.....	1949
Marfield, George R[owland], 1820 So. Olive Ave., Alhambra, California.....	1948
Markle, Millard S., Earlham College, Richmond, Indiana.....	1948
Marks, Jack Loran, 115 City Hall, Director of Zoo, Portland 4, Oregon.....	1949
Marshall, A. J., Dept. of Zoology & Comparative Anatomy, St. Bartholomew's Hospital Medical College, Charterhouse Square, London E.C. 1, England.....	1950
Marshall, Joe T[ruesdell], Jr., Dept. of Zoology, University of Arizona, Tucson, Arizona.....	1951
Marshall, Raymond O[scar], Route 2, Columbiana, Ohio.....	1945
Marshall, Terrell, 372 Skyline Drive, Park Hill, North Little Rock, Arkansas.....	1944
Marshall, William H[ampton], Div. of Entomology & Econ. Zoology, University Farm, St. Paul 1, Minnesota.....	1942
Martin, Keith Emrie, 232 Douglas Ave., Naperville, Illinois.....	1952
Martin, Paul S[chultz], Division of Herpetology, Museum of Zoology, Ann Arbor, Michigan.....	1946
*Marvel, Carl S[hippl], 404 W. Pennsylvania Ave., Urbana, Illinois.....	1949
*Maslowski, Karl H[erbert], 1034 Mayeliff Place, Cincinnati 30, Ohio.....	1934
Mason, C[harles] N[athan], Sr., 6432 31st St., N.W., Washington 15, D.C.....	1947
Mason, Miss Esther, 2523 Montgomery St., Louisville 12, Kentucky.....	1941
*Mathison, Janet, 401 Oakwood St., New Kensington, Pennsylvania.....	1951
Maxwell, Miss Florence Helen, Rural Route 3, Mt. Pleasant, Michigan.....	1952
Mayfield, G[eorge] R[adford], Vanderbilt University, Nashville, Tennessee.....	1917
*Mayfield, Harold F[lord], 2557 Portsmouth Ave., Toledo 12, Ohio.....	1940
*Mayr, Ernest, American Museum of Natural History, 79th St. & Central Park, W., New York 24, New York.....	1933
Mazzeo, Rosario, 120 Elm St., North Cambridge 40, Massachusetts.....	1947
Meacham, Frank B., State Museum, Raleigh, North Carolina.....	1945
Mead, Frank Waldreth, 2286 Indianola Ave., Columbus 2, Ohio.....	1948
*Meade, Gordon M[ontgomery], Trudeau Sanatorium, Trudeau, New York.....	1937
Meanley, Brooke, 4710 Keswick Road, Baltimore 10, Maryland.....	1950
Mehner, John F., 1003 James St., Pittsburg 34, Pennsylvania.....	1949
*Meitzen, Logan H[erman], Star Route 2, Box 63, Anahuac, Texas.....	1947
Mellinger, E[nos] O[ren], Chincoteague National Wildlife Refuge, Box 62, Chincoteague, Virginia.....	1939
*Melone, Miss Theodora G[ardner], Division of Geol. Sciences, California Institute of Technology, Pasadena, California.....	1947
Meltvedt, Burton W., Paullina, Iowa.....	1930
*Meng, Heinz Karl, 116 Miller St., Ithaca, New York.....	1943
*Mengel, Jane S[trahan] (Mrs. Robert M.), 20 East Shore Drive, Whitmore Lake, Michigan.....	1948
*Mengel, Robert M[orrow], 20 E. Shore Drive, Whitmore Lake, Michigan.....	1937
*Menninger, Phil B., 1724 Collins Ave., Topeka, Kansas.....	1949
Meredith, Col. Russell Luff, c/o General Delivery, Augusta, Montana.....	1946
Meritt, James Kirkland, 99 Battle Road, Princeton, New Jersey.....	1944
*Mers, W[illiam] H[enry], 1659 Marlowe Ave., Cincinnati 2, Ohio.....	1949
Messner, Clarence John, 308 McKinley, Grosse Pointe 30, Michigan.....	1944
*Metcalf, H[omer] N[oble], Department of Horticulture, Montana State College, Bozeman, Montana.....	1944
*Metcalf, Zeno P[layue], State College Station, Raleigh, North Carolina.....	1900
Metcalf, Mrs. Bruce, Thistleton, Ontario, Canada.....	1952
Mewaldt, L[eonard] R[ichard], Department of Zoology, Washington State College, Pullman, Washington.....	1947
Meyer, Henry, Biology Department, Ripon College, Ripon, Wisconsin.....	1939
*Meyerriecks, Andrew J[oseph], 119-30 146th St., So. Ozone Park 20, New York.....	1948

- Meyers, Dr. Kenneth Lewis, 2601 Far Hills Ave., Dayton 9, Ohio 1949
- Michaud, Howard H[enry], 824 No. Chauncey St., West Lafayette, Indiana 1938
- Michaux, Mrs. Frank W. (Joy Houston), 1607 Bluff St., Wichita Falls, Texas 1947
- Michener, Mrs. Harold, 418 N. Hudson Ave., Pasadena 4, California 1950
- Mickey, Arthur B[ayard], 1516 Rainbow Ave., Laramie, Wyoming 1935
- Middleton, Douglas S[arsfield], 7443 Buhr Ave., Detroit 12, Michigan 1946
- Middleton, Mary Elizabeth (Mrs. Archie D.), Brady, Nebraska 1948
- Middleton, Miss May A., Mohave Road, Medford Lakes, New Jersey 1951
- Mikkelson, Mrs. Herbert G. (Edyth A.), Box 142, Minnetonka Beach, Minnesota 1948
- Miles, Mrs. Philip E. (Eleanor Burgess), 1900 Arlington Place, Madison 5,
Wisconsin 1943
- Millar, Mrs. Margaret S[mith], 1028 S. Franklin St., Mt. Pleasant, Michigan 1952
- Miller, Alden H[olmes], Museum of Vertebrate Zoology, Berkeley 4, California 1930
- Miller, Mrs. Alice, 1150 Brewer Road, Leonard, Michigan 1944
- Miller, Mrs. Clarence Heath, 1354 Herschel Ave., Cincinnati 8, Ohio 1941
- * Miller, Douglas Scott, 122 Lawrence Ave., E., Toronto, Ontario, Canada 1939
- Miller, Jerome Stapleton, 1338 Washtenaw, Ann Arbor, Michigan 1949
- * Miller, Loye H[olmes], Museum of Vertebrate Zoology, University of California
Berkeley 4, California 1937
- Miller, Lyle [DeVerne], 650 Almyra Ave., Youngstown, Ohio 1947
- Miller, Richard F[ields], 2627 N. Second St., Philadelphia 33, Pennsylvania 1952
- Miller, William R[osswarnel], Fish & Game Service, Rural Route 1, Milton,
Vermont 1946
- * Mills, Herbert H., Arrowhead Farms, Rural Route 3, Bridgton, New Jersey 1951
- Minard, Elbridge Alden, 25 Maple St., Auburndale 66, Massachusetts 1950
- Minich, Edward C., 1047 Fairview Ave., Youngstown 2, Ohio 1923
- Miskimen, Miss Mildred, Department of Physiology, Miami University, Oxford,
Ohio 1950
- * Mitchell, Harold Dies, 378 Crescent Ave., Buffalo 14, New York 1936
- * Mitchell, Mrs. Osborne, Cobast, Caixa Postal 4965, Rio de Janeiro, Brazil 1933
- * Mitchell, Mrs. R. V., East Dr., Congress Lake, Hartsville, Ohio 1943
- Mitchell, Miss Verna E., 1900 "F" St., N. W., Apt. 623, Washington 6, D. C. 1949
- * Mitchell, Walton I[ungerich], 398 Vassar Ave., Berkeley 8, California 1893
- Mockford, Edward [Lee] Biology Dept., Box 221, University of Florida,
Gainesville, Florida 1946
- Moe, Owen A[rnold], 3651 Glenhurst Ave., Minneapolis 16, Minnesota 1951
- Mohler, Levi L[appl], 1000 S. 35th St., Lincoln, Nebraska 1942
- Mohr, Charles E[ldward], Audubon Nature Center, Greenwich, Connecticut 1947
- Monk, Harry C[rawford], 406 Avoca St., Nashville 5, Tennessee 1920
- Monroe, Burt L[eavelle], Jr., Ridge Road, Anchorage, Kentucky 1946
- * Monroe, Burt L[eavelle], Sr., Ridge Road, Anchorage, Kentucky 1935
- Monroe, Mrs. Robert A[nsley], 1424 Tugaloo Dr., Knoxville, Tennessee 1952
- Monson, Gale, P. O. Box 1717, Parker Arizona 1933
- Moore, Miss Dora, French Creek, West Virginia 1934
- Moore, Mrs. [Margaret Rodes] McBrayer, 335 W. Lexington St., Danville,
Kentucky 1950
- Moore, Robert B[lyron], 1332 Alfred St., Baton Rouge 6, Louisiana 1947
- * Moore, Robert Thomas, Meadow Grove Place, Flintridge, Pasadena 2, California 1939
- Moran, James Vincent, H M 2, Hdq. Support Act., Navy 510, Box 19, FPO,
New York, New York 1943
- Moreno, Abelardo, Museo Poey, Catedra "U", Escuela de Ciencias, University
of Havana, Havana, Cuba 1949
- Morony, John J., Jr., Box 1114, Alamo, Texas 1951
- Morrell, Charles K., 119 E. Maxwell St., Lexington, Kentucky 1943
- Morrison, Kenneth Douglas, c/o National Audubon Society, 1130 Fifth Ave.
New York, New York 1937
- Morrissey, Thomas J[ustin], 325 McClellan Blvd., Davenport, Iowa 1946
- * Morrow, Mrs. Dessie Powers (Mrs. John, Jr.), 1320 N. State St., Chicago 10,
Illinois 1949
- * Morse, Margarette Elthea, 122 W. South St., Viroqua, Wisconsin 1921

Mosby, Henry Sackett, Box 838, Blacksburg, Virginia	1951
Moser, Jane Myers (Mrs. R. Allyn), 90th & Farnam, Omaha 6, Nebraska	1946
* Moser, Dr. R[euben] Allyn, 90th & Farnam, Omaha 6, Nebraska	1940
Moser, Randolph, Apt. D, 470 E. Washington St., Pasadena 6, California	1944
Mossman, H[arland] W[infield], 2902 Columbia Road, Madison 5, Wisconsin	1948
Moule, John W[illiam], 68 North Oval St., Hamilton, Ontario, Canada	1948
* Muckley, Mrs. R. L. (Marion), 1335 Astor St., Chicago 10, Illinois	1950
* Mudge, Edmund W., Jr., 5926 Averill Way, Dallas Texas	1939
* Mueller, Mrs. Florence N., 4408 Pine St., Omaha 5, Nebraska	1951
Mueller, Helmut Charles, 2756 N. Palmer St., Milwaukee 12, Wisconsin	1949
Muhlbach, W[alt] L[auritz], Department of Zoology & Entomology, Ohio State University, Columbus 10, Ohio	1951
Mumford, Russell E[lugene], Rural Route 1, Cortland, Indiana	1949
Munter, Rear Admiral W[illiam] H[enry] (Retired), 4518 52nd Ave., N.E., Seattle, Washington	1933
Murie, Adolph, Moose, Wyoming	1932
Murie, O[lans] J[ohan], Moose, Wyoming	1934
* Murphy, Paul C[hables], 935 Goodrich Ave., Apt. 10, St. Paul 5, Minnesota	1944
Murray, Rev. J[oseph] J[ames], 6 White St., Lexington, Virginia	1931
Musgrove, Jack W[arren], 2414 Adams Ave., Des Moines 10, Iowa	1947
Musselman, T[homas] E[dgar], 124 So. 24th St., Quincy, Illinois	1940
Myers, Buford M[acMartin], Jr., 65 Oakland St., New Orleans 21, Louisiana	1948
Nathan, Bernard, 224 Elmwood Ave., Buffalo 22, New York	1952
Neal, Mrs. Charles (Dorothy Phillips), Box 133, Demorest, Georgia	1946
Neff, Johnson Andrew, Bldg. 45, Denver Federal Center, Denver 2, Colorado	1920
Nelson, Arnold Lars, 3256 Van Hazen, N.W., Washington 15, D.C.	1932
Nelson, Charles E[llsworth], Jr., 124 Oxford Road, Waukesha, Wisconsin	1937
* Nelson, Miss Theodora, 315 E. 68th St., New York 21, New York	1928
Nelson, T. W., 432 Jewell Ave., Topeka, Kansas	1949
Nelson, Urban C., Box 1887, Juneau, Alaska	1939
Nero, Robert William, Department of Zoology, University of Wisconsin, Mad- ison 5, Wisconsin	1947
Ness, Robert D., 1177 Winton Road, S., Rochester 18, New York	1951
Nessle, James P., 1823 Barrows St., Toledo 13, Ohio	1936
* Netting, M[orris] Graham, Carnegie Museum, Pittsburgh 13, Pennsylvania	1941
Nevius, Mrs. Richard, Rural Route 1, Greenville, Tennessee	1940
New, John G., Rural Route 5, Scranton Rd., Hamburg, New York	1946
Newberry, A[ndrew] Todd, 70 Rock Spring Rd., West Orange, New Jersey	1952
Newman, Robert J[ames], Museum of Zoology, Louisiana State University, Baton Rouge, Louisiana	1950
Nice, L[eonard] B., 5725 Harper Ave., Chicago 37, Illinois	1932
* Nice, Mrs. Margaret Morse, 5725 Harper Ave., Chicago 37, Illinois	1921
* Nichols, Charles K[etcham], 212 Hamilton Rd., Ridgewood, New Jersey	1933
Nichols, John Treadwell, American Museum of Natural History, 79th St. and Central Park, W.. New York 24, New York	1941
Nichols, L[eon] Nelson, 331 E. 71st St., New York, New York	1937
Nicholson, Donald John, 1224 Palmer St., Orlando, Florida	1945
Nickell, Walter Prine, Cranbrook Institute of Science, Bloomfield Hills, Michigan	1943
Nields, James F[ulton], Jr., Hardwick, Massachusetts	1949
* Nielsen, Mrs. B[atrice] W[isc], Rural Route 1, Box 808, Kauffman Ave., Niel- sen Reservation, Red Bluff, California	1945
Niess, William Victor, 2343 Hickory St., St. Louis 4, Missouri	1950
Nighswonger, Paul F., Rural Route 9, Alva, Oklahoma	1950
Nordgren, Robert, 79 Seymour Ave., S. E., Minneapolis 14, Minnesota	1951
Nordquist, Theodore C., 2701 York Ave., N., Robbinsdale 22, Minnesota	1941
Nork, Theodore J., 451 Wrightwood Ave., Chicago 14, Illinois	1947
Norman, Edward d'Aubigny, Box 221, Deerfield, Massachusetts	1951
Norman, James L[ee], 424 N. 12th, c/o Bebb Floral Co., Muskogee, Oklahoma	1948

Norris, Robert Allen, Museum of Vertebrate Zoology, University of California, Berkeley 4, California.....	1941
Norris, Russell T[aplin], 50 Milk St., Newburyport, Massachusetts.....	1939
Norse, William J[ohn], 531 W. 211th St., New York 34, New York.....	1939
North, George W[ebster], 33 Bold St., Hamilton, Ontario, Canada.....	1941
Northrop, Mrs. Horson A., 358 E. Main St., Owatonna, Minnesota.....	1952
Northrop, Myron, 7934 Delmar St., St. Louis 24, Missouri.....	1945
*Nowland, Paul J., 700 Equitable Bldg., Wilmington, Delaware.....	1950
Nyc, Fred F., Jr., P. O. Box 869, Brownsville, Texas.....	1943
Oberholser, Harry Church, 2933 Berkshire Road, Cleveland Heights, Cleveland, 18, Ohio.....	1894
O'Conner, Miss Esther [Laura], 4344 Locust Ave., Kansas City 4, Missouri.....	1940
Odum, Eugene P[leasants], Department of Zoology, University of Georgia, Athens, Georgia.....	1930
Odum, Howard Thomas, c/o Biology Department, University of Florida, Gainesville, Florida.....	1946
Oliver, Miss Mary C[lara], 411 W. Broadway, Silver City, New Mexico.....	1934
*Olsen, Dr. Richard E., 3325 Franklin Road, Rural Route 3, Pontiac, Michigan.....	1938
*Olson, Mrs. Gladys Elizabeth (Mrs. Simon), 33 Harvard Drive, Lake Worth, Florida.....	1942
Olson, Miss Hazel [Elizabeth], 832 E. State St., Jacksonville, Illinois.....	1951
Olson, Mrs. Monrad J., Box 145, Sanish, North Dakota.....	1946
Ommanney, G. G., c/o P. O. Box 14, Hudson Heights, Quebec, Canada.....	1944
O'Neil, Norah Selby (Mrs. Mike), 1311 Bonham St., Commerce, Texas.....	1949
*O'Reilly, Ralph A., Jr., Davisburg, Michigan.....	1936
Orians, Rev. Howard Lester, 1611 16th Ave., Monroe, Wisconsin.....	1947
*Ott, Frederick Louis, 2527 No. Wahl Ave., Milwaukee 11, Wisconsin.....	1941
Overing, Robert, Rural Route 4, Raleigh, North Carolina.....	1930
Owrc, Oscar T., 2625 Newton Ave., So., Minneapolis 8, Minnesota.....	1935
Packard, Christopher M., 14 Belmont St., Brunswick, Maine.....	1951
Packard, Fred Mallory, 1840 Mintwood Pl., N. W., Washington 9, D. C.....	1949
Paine, Robert T[reat], III, 2 Nubbard Park, Cambridge 38, Massachusetts.....	1951
Palmer, Ralph S[imon], New York State Museum, State Education Building, Albany 1, New York.....	1934
Palmer, T[hodore] S[herman], 1939 Biltmore St., N. W., Washington, D. C.....	1914
*Palmquist, Clarence O[scar], 834 Windsor Road, Glenview, Illinois.....	1945
Pangborn, Mark W[hitel], 25 E. 56th St., Indianapolis, Indiana.....	1948
Parker, Henry M[elville], Cochituate Road, Wahland, Massachusetts.....	1941
*Parkes, Kenneth Carroll, Lab. of Ornithology, Fernow Hall, Cornell University, Ithaca, New York.....	1946
Parks, G. Hapgood, 99 Warrenton Ave., Hartford 5, Connecticut.....	1950
Parks, Richard Anthony, 2303 Pembroke Pl., N. E., Atlanta, Georgia.....	1942
Parmelee, David F[reeland], 1465 University Terrace, Apt. 1326, Ann Arbor, Michigan.....	1949
Partch, Max L[orenzo], State Teachers College, St. Cloud, Minnesota.....	1940
Paul, Mrs. Harold Gilmore, Rural Route 1, Pickerington, Ohio.....	1948
Paulson, Clarence, Seneca, Wisconsin.....	1949
Paynter, R[aymond] A[ndrew], Jr., Kent Drive, Hamden, Connecticut.....	1946
Peelle, Miles L. 1039 College St., Adrian, Michigan.....	1940
Penner, Lawrence R., Department of Zoology & Entomology, University of Con- necticut, Storrs, Connecticut.....	1940
Perkins, Mrs. Mary Loomis, 1305 S. 52nd St., Omaha 6, Nebraska.....	1946
*Perner, Miss Margaret E., 2487 Noble Road, Apt. 30-D, Cleveland Heights 21, Ohio.....	1943
Perry, William L[ouis], Falmouth Foreside, Portland, Maine.....	1949
Peterle, Tony J., Cusino Wildlife Research Station, Michigan Department of Conservation, Shingleton, Michigan.....	1951
Peters, Harold S[eymour], 968 Cumberland Road, N. E., Atlanta 6, Georgia.....	1924
Peters, Stuart S., 94 Carruthers Ave., Kingston, Ontario, Canada.....	1952
Petersen, Peter C., Jr., 620 E. 30th St., Davenport, Iowa.....	1952

Petersen, (Mrs.) Paula R., 620 E. 30th St., Davenport, Iowa	1951
Peterson, Alfred, Box 201, Brandt, South Dakota	1931
Peterson, Arnold J[erome], Biology Dept., Concordia College, Moorhead, Minnesota	1949
Peterson, Mrs. C[harles] E[mil], Madison, Minnesota	1936
Peterson, Randolph L., Div. of Mammals, Royal Ont. Museum of Zoology, Toronto, Ontario, Canada	1946
*Peterson, Roger Tory, P.O. Box 7, Glen Echo, Maryland	1942
Petrides, George A., Division of Conservation, Michigan State College, East Lansing, Michigan	1942
*Petroskey, Miss Helen Martha, Box 91, Hiram, Ohio	1949
*Pettingill, Olin Sewell, Jr., Dept. of Zoology, Carleton College, Northfield, Minnesota	1930
Pettit, Lincoln C[oles], Hiram, Ohio	1948
Peugh, Miss Marguerite M[ary], Apartado 16, Mantemorelos, N.L., Mexico	1951
*Phelps, William H[enry], Apartado 2009, Caracas, Venezuela, South America	1940
*Phillips, Allan Robert, 113 Olive Road, Tucson, Arizona	1934
*Phillips, Cyrus Eastman, II, 255 Polk St., Warsaw, Illinois	1944
*Phillips, Homer Wayne, Route 1, Box 81, Austin, Texas	1947
Phillips, Richard Stuart, 834 Liberty St., Findlay, Ohio	1944
Phillips, William B[utterworth], 137 W. 31st St., New York 24, New York	1951
Pierce, Fred J[ohn], Winthrop, Iowa	1947
Pierce, Robert Allen, Nashua, Iowa	1941
Pirnie, Miles David, Conservation Bldg., Michigan State College, East Lansing, Michigan	1928
*Pittman, James Allen, Jr., 1138 Overbrook Dr., Orlando, Florida	1945
Plaisted, Walter William, 95 Newcomb Road, Tenafly, New Jersey	1949
Plath, Karl, 305 S. Cuyler Ave., Oak Park, Illinois	1942
Pomeroy, Lawrence R., New Jersey Oyster Research Lab., Bivalve, New Jersey	1948
*Poole, Cecil A[very], 1764 Topeka Ave., San Jose 26, California	1942
Poor, Hustace Hubbard, 230 E. 71st St., New York 21, New York	1935
*Porter, Dr. Eliot F[urness], Route 1, Box 33, Sante Fe, New Mexico	1947
Porter, Richard Dee, 3130 Ogden Ave., Ogden, Utah	1950
Porter, T[homas] Wayne, Dept. of Zoology, Michigan State College, East Lansing, Michigan	1938
Potter, David M., 1557 Timothy Dwight College, Yale Univ., New Haven 11, Connecticut	1946
*Potter, Mrs. George C. (Beatrice B[rown]), 2111 Malvern Road, Charlotte 7, North Carolina	1948
Potter, Julian K[ent], 437 Park Ave., Collingswood 7, New Jersey	1915
Potter, Louis Henry, Route 1, West Rutland, Vermont	1941
*Pough, Richard H[oopner], 33 Highbrook Ave., Pelham 65, New York	1938
Prather, Millard F[illmore], 1129 Brown-Marx Building, Birmingham 3, Alabama	1940
Prescott, Kenneth Wade, U.S. Naval Prep. School, U.S.N.T.C., Bainbridge, Maryland	1946
Preston, Miss Elsie M[ary], 624 Brickell Ave., Miami, Florida	1952
Preston, Frank W[illiam], Box 149, Butler, Pennsylvania	1948
Prucha, Miss Alma H., 1716 N. Prospect Ave., Milwaukee 2, Wisconsin	1942
Pruitt, Ben H., Route 2, Box 33, Springfield, Oregon	1951
Pruitt, Mrs. William O., Jr. (Erna Nauert), Museum of Zoology, Ann Arbor, Michigan	1948
Puett, Miss May Wilson, P.O. Box 2183, Greenville, South Carolina	1950
Purvis, Miss Betty, Route 1, Renfrew (Butler County), Pennsylvania	1952
Putman, William L[loyd], Dominion Entomological Lab., Vineland Sta., Ontario, Canada	1945
Putnam, Mrs. Edward K., 2123 W. Pleasant St., Davenport, Iowa	1951
Putnam, Mrs. Evelyn J., 1531 Jefferson St., Duluth, Minnesota	1951
Putnam, Loren Smith, Dept. of Zoology, Ohio State Univ., Columbus 10, Ohio	1942
Quam, Mrs. Mary Battell, Box 716, Paoli, Pennsylvania	1944

Quay, Thomas L., Zoology Dept., North Carolina State College, Raleigh, North Carolina.....	1939
Quay, W[lilbur] B[rooks], Museum of Zoology, Univ. of Michigan, Ann Arbor, Michigan.....	1949
Quimby, Don C., Dept. of Zoology & Entomology, Montana State College, Bozeman, Montana.....	1942
Racey, Kenneth, 6542 Lime St., Vancouver, British Columbia, Canada.....	1951
Ragusin, Anthony V[incent], P.O. Box 496, Biloxi, Mississippi.....	1937
Rahe, Carl W., 9005 Tioga Ave., Cleveland 5, Ohio.....	1931
Ramisch, Miss Marjorie [Viola], 1835 Noble Rd., East Cleveland 12, Ohio.....	1943
Ramey, Ralph E[merson], Jr., 1140 W. Ashby Pl., San Antonio, Texas.....	1948
Ramsay, A[lfred] Ogden, McDonogh School, McDonogh, Maryland.....	1949
Rand, Austin L., Chicago Natural History Museum, Roosevelt Rd. & Lake Shore Dr., Chicago 5, Illinois.....	1950
*Randall, Clarence B[elden], 38 S. Dearborn St., Chicago, Illinois.....	1949
Randall, Robert Neal, 928 16th St., Bismarck, North Dakota.....	1939
Randle, Worth S., 3622 Zumstein Ave., Cincinnati 8, Ohio.....	1949
Rapp, William F[rederick], Jr., 2759 "F" St., Lincoln, Nebraska.....	1941
*Rausch, Dr. Robert [Lloyd], U.S. Public Health Service, Box 960, Anchorage, Alaska.....	1947
Rawlings, William Herbert, 341 Graham Blvd., Apt. 1, Mt. Royal, Montreal 16, Quebec, Canada.....	1952
Rawson, George William, Ciba Pharmaceutical Products, Inc., Lafayette Park, Summit, New Jersey.....	1947
Rea, Gene, 251 Leland Ave., Columbus 2, Ohio.....	1948
Read, Bayard W[hitney], Upper Dogwood Lane, Rye, New York.....	1949
*Rebmann, G. Ruhland, Jr., 729 Millbrook Lane, Haverford, Pennsylvania.....	1941
Reed, Parker Crosby, 27 Hayes Ave., Lexington, Massachusetts.....	1949
Reeder, Miss Clara Maude, 1608 College Ave., Houghton, Michigan.....	1938
Rees, Earl Douglas, 1504 No. Main St., Findlay, Ohio.....	1946
Reese, C[arl] R[ichard], 266 E. Dunedin Rd., Columbus 14, Ohio.....	1948
*Reese, Mrs. Hans H. (Tercsa S.), 3421 Circle Close, Shorewood Hills, Madison 5, Wisconsin.....	1941
Reeve, Alexander Jardine, 276 Renfrew St., Winnipeg, Manitoba, Canada.....	1950
Regan, Mrs. Frances M[aass], 113-19 Colfax St., Queen Village, New York.....	1948
*Rehfish, Miss Carol, 335 Delgado, Santa Fe, New Mexico.....	1949
*Reichert, Miss Elsa, c/o Mirakel Repair Co., 14 W. 1st St., Mt. Vernon, New York.....	1950
Reilly, E[dgar] M[ilton], Jr., P.O. Box 34, Old Chatham, New York.....	1946
Renn, Miss Elmira Virginia, 3949 "R" St., S.E., Washington 20, D.C.....	1949
Rett, Egmont Z[achary], Museum of Natural History, Santa Barbara, California.....	1940
Reuss, Alfred Henry, 2908 Edison St., Blue Island, Illinois.....	1936
Reynard, George B., 728 Parry Ave., Palmyra, New Jersey.....	1950
Reynolds, Mrs. Perry J., 5293 Bedford St., Detroit 24, Michigan.....	1948
Reynolds, William Pius, 1330 Foulkrod St., Philadelphia 24, Pennsylvania.....	1948
Rice, Dale [Warren], 432 W. 42nd St., Indianapolis 8, Indiana.....	1946
Rich, Mrs. Eva, 150 W. 80th St., New York 24, New York.....	1952
Richards, Tudor, St. Paul's School, Concord, New Hampshire.....	1951
Richdale, Lancelot Eric, 23 Skibo St., Kew, Dunedin, S.W. 1, New Zealand.....	1945
Richter, Carl H., 703 Main St., Oconto, Wisconsin.....	1947
Ricker, W[illiam] E[ldwin], Pacific Biological Sta., Nanaimo, British Columbia, Canada.....	1943
Riggs, Carl D[aniell], Dept. of Zoology, Univ. of Oklahoma. Norman. Oklahoma.....	1943
Riggs, Miss Jennic, 3313 Fairmont Dr., Nashville 5, Tennessee.....	1952
Rimsky-Korsakoff, V[ladimir] N[icholas], Box 735, Center Moriches, Long Island, New York.....	1951
Ripley, S[idney] Dillon, II, Peabody Museum, New Haven 2, Connecticut.....	1946
Risebrough, Robert W., 1732 Kline Rd., Ithaca, New York.....	1952
*Ritchie, Dr. Robert C., 165 Alexandra Blvd., Toronto 12, Ontario, Canada.....	1942
Ritzer, Henry John, 148 Kensington Ave., Jersey City 4, New Jersey.....	1951

**Robbins, Chandler S[eymour], Patuxent Research Refuge, Laurel, Maryland.....	1941
**Robbins, Eleanor C[oolcy] (Mrs. Chandler S.), Patuxent Research Refuge, Laurel, Maryland.....	1936
Roberts, Harold D., 610 Harrison St., Black River Falls, Wisconsin.....	1946
Robins, C[harles] Richard, Dept. of Conservation, Fernow Hall, Cornell Univ., Ithaca, New York.....	1949
Robinson, Thane S., Museum of Natural History, Univ. of Kansas, Lawrence, Kansas.....	1952
Roesler, Mrs. Carol S. (Mrs. M. Stuart), June Road, Cos Cob, Connecticut.....	1949
Roesler, M. Stuart, June Road, Cos Cob, Connecticut.....	1949
**Rogers, C[harles] H[enry], East Guyot Hall, Princeton, New Jersey.....	1903
Rogers, K[ay] T[rowbridge], Dept. of Anatomy, E. Med. Bldg., Univ. of Michigan, Ann Arbor, Michigan.....	1952
**Rogers, Miss Mabel T., 436 No. Beach St., W., Daytona Beach, Florida.....	1947
Rogers, Mrs. Walter E., 911 E. North St., Appleton, Wisconsin.....	1931
Rooney, James P., 1514 So. 12th Ave., Yakima, Washington.....	1947
**Root, Oscar M[itche]ll, Brooks School, North Andover, Massachusetts.....	1940
Roppel, Otto, (16) Marburg-Lahn Wettergasse 39, Western Germany, U.S. Zone	1952
Rorimer, Mrs. J. M. (Irene Tuck), 3624 Prospect Ave., N.W., Washington 7, D.C.....	1938
*Rose, W[illiam] C[umming], 710 W. Florida Ave., Urbana, Illinois.....	1949
Rosene, Walter, Jr., P. O. Box 665, Gadsden, Alabama.....	1942
Rosewall, O[scar] W[aldemar], Dept. of Zoology, Louisiana State Univ., Baton Rouge 3, Louisiana.....	1931
*Ross, C[harles] Chandler, 7924 Lincoln Dr., Chestnut Hills, Philadelphia 18, Pennsylvania.....	1937
Ross, James B., 225 Oldfield Road, Decatur, Georgia.....	1949
*Routa, Albert, 331½ E. Main St., Clarksburg, West Virginia.....	1950
**Rudd, Dr. Clayton G[lass], 315 Medical Arts Bldg., Minneapolis 2, Minnesota.....	1944
Rudolph, Mrs. Ross, Route 1, Downsview, Ontario, Canada.....	1952
Ruhr, C[lifford] E[ugene], 1007 Laurel St., Atlantic, Iowa.....	1947
Russak, Marshall L., 1675 Metropolitan Ave., New York 62, New York.....	1952
Russell, Stephen M[ims], Box 5456, Virginia Tech. Sta., Blacksburg, Virginia.....	1952
Rustad, Orwin A., Dept. of Biology, St. Olaf College, Northfield, Minnesota.....	1951
Rutter, Russell James, Huntsville, Ontario, Canada.....	1950
Ryan, Richard, 5009 Broadway, New York 34, New York.....	1949
Rycraft, Thomas M[atten], 427 E. Third St., Watsonville, California.....	1952
Ryder, Ronald A. (Ensign USNR), USS ALGOL (AKA 54), FPO San Fran- cisco, California.....	1952
Ryel, Lawrence [Atwell], 3401 Benstein Road, Milford, Michigan.....	1951
Sabin, Walton B., Route 2, Altamont, New York.....	1945
Sait, Carroll C[harles], 4134 Old Orchard Ave., Montreal 28, Quebec, Canada.....	1949
Samson, Dale D[umont], 613 Carrolton Blvd., West Lafayette, Indiana.....	1951
Sanborn, Alvah W., Pleasant Valley Sanctuary, Lenox, Massachusetts.....	1951
Sandy, Miss Tirzah M., University Hospital, Redwood & Greene Sts., Balti- more 1, Maryland.....	1950
Satterly, J[ack], 100 Castlewood Road, Toronto 12, Ontario, Canada.....	1947
Satterthwait, Mrs. Elizabeth Allen (Mrs. A. F.), 775 19th Ave., So., St. Petersburg, Florida.....	1925
Sauer, Dr. Gordon C[henoweth], 2620 Francis St., St. Joseph, Missouri.....	1949
Saugstad, N[els] Stanley, Route 4, Minot, North Dakota.....	1939
Saunders, Aretas A[ndrews], Box 141, Canaan, Connecticut.....	1934
Saunders, George B[radford], Patuxent Research Refuge, Laurel, Maryland.....	1926
**Savage, James Buffalo Athletic Club, Buffalo, New York.....	1939
Sawyer, Miss Dorothy, 323 Division St., Schenectady 4, New York.....	1937
Schaeffer, Ens. David A[lan], U.S.N., U.S.S. LSM 268, c/o Fleet P.O., San Francisco, California.....	1949
Schaich, Charles A., 1301 Walnut St., Reading, Pennsylvania.....	1951
Scharff, Abe, 196 E. Parkway, S., Memphis 4, Tennessee.....	1952
Schley, Mrs. Sue S. (Mrs. F. B.), 1352 Peacock Ave., Columbus, Georgia.....	1952
Schlonga, A[ndrew] M[atthews], 511 Thornton St., Leavenworth, Kansas.....	1952

- Schneider, Miss Evelyn J., 2207 Alta Ave., Louisville 5, Kentucky..... 1935
- Schoenbauer, Miss Clara K., 5319 Greenway Drive, Hyattsville, Maryland..... 1952
- Scholes, Mrs. Doris Kathryn, 385 E. Hall St., Bushnell, Illinois..... 1947
- *Schorger, A[rnie] W[illiam], 168 N. Prospect Ave., Madison, Wisconsin..... 1927
- *Schramm, Wilson [Cresap], 321 Kensington Road, Syracuse 10, New York..... 1944
- Schreiner, Keith M., Capital Bldg., State Game & Fish Dept., Bismarck, North
Dakota..... 1949
- Schultz, Mrs. Robert (Zella McMannama), 22809 W. 53rd Ave., Edmonds,
Washington..... 1950
- Schumm, William George, 302 "C" St., LaPorte, Indiana..... 1944
- Schwartz, Charles Walsh, 131 Forest Hill, Jefferson City, Missouri..... 1950
- Schwartz, Paul, Apartado 1766, Caracas, Venezuela..... 1952
- Schwendener, Mrs. Carl M., 1722 N. 48th St., Milwaukee 8, Wisconsin..... 1949
- Schwilling, Marvin D., Box 864, Garden City, Kansas..... 1951
- Sciple, George W., Wildlife Research Lab., Bldg. 45, Denver Federal Center,
Denver 2, Colorado..... 1951
- Scotland, Miss Minnie B[rink], 42 Continental Ave., Cohoes, New York..... 1938
- Scott, D. M., Dept. of Zoology, Univ. College, Univ. of Western Ontario,
London, Ontario, Canada..... 1950
- *Scott, Frederic R[obert], 2700 Malvern Ave., Apt. 2, Richmond 21, Virginia..... 1947
- Scott, Fred T., Pittsburg, New Hampshire..... 1948
- Scott, Peter, The New Grounds, Slimbridge, Gloucestershire, England..... 1947
- Scott, Robert R., III, 4253 Kingston Pike, Knoxville, Tennessee..... 1952
- Scott, Thomas G[eorge], Section of Game Research & Mgmt., Illinois Natural
History Survey, Urbana, Illinois..... 1936
- Scott, W[alter] E[dwin], 1721 Hickory Drive, Madison 5, Wisconsin..... 1938
- Sealander, John A[rthur], Jr., Dept. of Zoology, Univ. of Arkansas, Fayetteville,
Arkansas..... 1947
- Seaman, George Albert, P.O. Box 344, St. Thomas, Virgin Islands..... 1950
- Searles, Scott, Dept. of Chemistry, Kansas State College, Manhattan, Kansas..... 1951
- Seeber, Edward L[incoln], 1654 Fifth Ave., Huntington 3, West Virginia..... 1944
- Seibert, Henri C., Ohio University, Athens, Ohio..... 1941
- Seiple, Stanley, Grove City College, Grove City, Pennsylvania..... 1951
- Serbousek, Miss Lillian, 1226 Second St., S.W., Cedar Rapids, Iowa..... 1935
- *Shackleton, Mrs. Elizabeth C[atterall] (Mrs. Walter H.), Route 1, Box 76-A,
Prospect, Kentucky..... 1947
- *Shackleton, Walter H., Route 1, Box 76-A, Prospect, Kentucky..... 1947
- Shaftesbury, Archib D., Women's College, Univ. of North Carolina, Greens-
boro, North Carolina..... 1930
- Shannon, Bernice [Irene] Bl[eladeau] (Mrs. Francis P.), 3021 Eagle Pass,
Louisville 13, Kentucky..... 1949
- Sharp, Henry S[taats], 180 Ames Ave., Leonia, New Jersey..... 1951
- Sharp, Ward M., 206 Forestry Bldg., Pennsylvania State College, State
College, Pennsylvania..... 1936
- Sharpless, Mrs. Isaac, 1235 Wendover Road, Rosemont, Pennsylvania..... 1952
- Shaub, Benjamin Martin, 159 Elm St., Northampton, Massachusetts..... 1948
- Shaver, Jesse M[ilton], George Peabody College for Teachers, Nashville,
Tennessee..... 1922
- Shaw, Dr. Charles H[icks], Bremen, Ohio..... 1941
- *Shearer, A[mon] R[obert], Box 428, Mont Belvieu, Chambers County, Texas..... 1893
- Sheehan, Robert R[aymond], Navy 3080 Box 20, FPO San Francisco, California..... 1952
- Shelford, Victor E[rnest], Vivarium Bldg., Univ. of Illinois, Champaign, Illinois..... 1931
- Shetler, Stanwyn G[erald], Route 2, Hollsopple, Pennsylvania..... 1949
- *Shires, James E., AF 35741450, 67th Recon. Tech. Sq., APO 970, PM San
Francisco, California..... 1951
- Short, Wayne, 1030 Fifth Ave., New York 28, New York..... 1941
- Sibley, Charles G[ald], Dept. of Natural Sciences, San Jose State College,
San Jose 14, California..... 1942
- Sick, Helmut, Av. Nilo Pecanha 23, III, Rio de Janeiro, D.F., Brazil..... 1951
- Sieh, James G[erald], Biology Bldg., Okoboji, Iowa..... 1948

* Simmons, Mrs. Amelia C., 2742 N. Maryland Ave., Milwaukee 11, Wisconsin	1943
** Simmons, Edward McIlhenny, Avery Island, Louisiana	1942
** Simmons, Grant Gilbert, Jr., Lake Ave., Greenwich, Connecticut	1949
Simon, James R., Jackson Hole Wildlife Park, Moran, Wyoming	1947
Simon, Stephen Wistar, 7727 York Road, Towson, Baltimore 4, Maryland	1947
Simpson, Mrs. Roxie Collie, 6624 First St., N.W., Washington 12, D.C.	1949
Sims, Harold L[ee], 714 St. Philip St., Thibodaux, Louisiana	1942
Singleton, Albert Roland, 3968 Marburg Ave., Cincinnati 9, Ohio	1948
Siverling, (Mrs.) Signa J., Bowbells, North Dakota	1952
Sjodahl, Sven Erik, 7013 Noble Ave., Cincinnati 24, Ohio	1949
Skaggs, Merit B[ryan], Eagle & Dodd Roads, Route 1, Willoughby, Ohio	1934
Skelton, Mrs. Kathleen, 353 W. 57th St., New York, New York	1949
Skutch, Alexander F[rank], San Isidro del General, Costa Rica, Central America	1944
Slack, Miss Mabel, 1004 Everett Ave., Louisville 4, Kentucky	1934
Smalley, Alfred E[ans], 1117 E. Cumberland Ave., Middlesboro, Kentucky	1946
Smart, Robert W[illiam], Dunbar Hall, Exeter, New Hampshire	1951
* Smith, Allen G[ordon], Box 603, Brigham City, Utah	1949
* Smith, Dr. A[rthur] F[rancois], Manning, Iowa	1934
Smith, Carl E[arne]st], Halsey, Nebraska	1947
Smith, Earl E[mmett], Atkins Garden & Research Lab., Apartado 414, Saledad, Cienfuegas, Cuba	1947
* Smith, Miss Emily, Route 1, Box 387, Los Gatos, California	1948
Smith, Frank R[ush], Route 2, Box 93, Laurel, Maryland	1910
Smith, Harry M[adison], Dept. of Zoology & Physiology, Univ. of Wyoming, Laramie, Wyoming	1936
Smith, Miss Marion L[ucille], 429 S. Willard St., Burlington, Vermont	1949
Smith, Orion O., Box 150-A, Spring Creek Road, Rockford, Illinois	1936
Smith, R[obert] D[emet]t], 1141 Minna Place, Memphis 5, Tennessee	1951
Smith, Robert L[eo], Route 1, Reynoldsville, Pennsylvania	1945
Smith, Robert Skalak, 12904 Melgrove Ave., Garfield Heights, Ohio	1950
* Smith, Roy Harmon, 183 No. Prospect St., Kent, Ohio	1936
Smith, Thomas Price, W-5 Green Tree Manor, Louisville 7, Kentucky	1951
Smith, Wendell Phillips, Wells River, Vermont	1921
Smith, Mrs. Winnifred Wahls (Mrs. E. R.), Wingham, Route 1, Two Rivers, Wisconsin	1946
Snapp, Mrs. R. R., 310 W. Michigan, Urbana, Illinois	1940
Snow, Mrs. C. S. (Mabelle), 2211 Chester Blvd., Richmond, Indiana	1950
Snyder, Dana Paul, Section of Mammals, Carnegie Museum, Pittsburgh 13, Pennsylvania	1949
* Snyder, Dorothy E[astman], 452 Lafayette St., Salem, Massachusetts	1951
Snyder, L[ester] L[ynne], Royal Ontario Museum of Zoology, Queen's Park at Bloor, Toronto, Ontario, Canada	1929
Sooter, Clarence Andrew, U.S. Public Health Service, P.O. Box 1132, Greeley, Colorado	1940
** Sorrill, Mrs. Anna Marie (Mrs. Tom), Tom Sorrill Farm, Ursa, Illinois	1950
Sowls, Lyle K[enneth], Arizona Coop. Wildlife Research Unit, Univ. of Arizona, Tucson, Arizona	1949
Spangler, Miss Iva M., 128 E. Foster Pkwy., Fort Wayne, Indiana	1939
Sparkes, Miss Vera E., 2417 Lyndale Ave., No., Minneapolis 11, Minnesota	1951
Speirs, Mrs. Doris Huestis, "Cobble Hill", Route 2, Pickering, Ontario, Canada	1936
Speirs, J[ohn] Murray, "Cobble Hill", Route 2, Pickering, Ontario, Canada	1931
** Spencer, Haven Hadley, 3412 Oakwood, Ann Arbor, Michigan	1946
** Spencer, Miss O[live] Ruth, 1030 25th Ave. Court, Moline, Illinois	1938
Sperry, Charles Carlisle, 1455 S. Franklin St., Denver 10, Colorado	1931
Spofford, Walter R[ichardson], II, Dept. of Anatomy, Syracuse Medical College, Syracuse 10, New York	1942
Springer, Paul F[rederick], Patuxent Research Refuge, Laurel, Maryland	1946
Sprunt, Alexander, Jr., The Crescent, Charleston 50, South Carolina	1951
Stabler, Mrs. Jeanne J[ohnson], c/o L. J. Stabler, Rogers Lane, Wallingford, Pennsylvania	1952

- Stabler, Robert M[iller], Colorado College, Colorado Springs, Colorado..... 1939
- Staebler, Arthur E[ugene], W. K. Kellogg Bird Sanctuary, Route 1, Augusta,
Michigan..... 1937
- *Stahl, Miss Marjoretta Jean, Kimberly, West Virginia..... 1942
- Stallcup, William B., Museum of Natural History, Univ. of Kansas, Lawrence,
Kansas..... 1951
- Stamm, Mrs. Frederick W. (Anne L.), 2118 Lakeside Dr., Louisville 5, Kentucky..... 1947
- Stark, Miss Wilma R[uth], 2108 16th St., N.W. 3, Washington, D.C..... 1939
- Starrett, William C[harles], Illinois State Natural History Survey, Route 2,
Havana, Illinois..... 1933
- Stauffer, James Milton, Haugen, Wisconsin..... 1949
- Stauffer, Ralph Stanley, 170 W. Washington St., Hagerstown, Maryland..... 1949
- Stavrum, Thomas J., 30 N. Spooner St., Madison 5, Wisconsin..... 1951
- Stearns, Edwin H[ra], Jr., 928 Grant Ave., Plainfield, New Jersey..... 1945
- Steel, William C., 551 Morningside Dr., Miami Springs, Florida..... 1952
- Steffen, Earnest William, 1000 Maplewood Drive, Cedar Rapids, Iowa..... 1944
- Steilberg, Robert H., 555 Sunset Rd., Louisville 6, Kentucky..... 1949
- Stein, Robert C., Lab. of Ornithology, Fernow Hall, Cornell University, Ithaca,
New York..... 1951
- Stettenheim, Peter, Reading, Vermont..... 1951
- Stevens, Charles Ellmo], Jr., 426 Second St., N.E., Charlottesville, Virginia..... 1947
- Stevens, O. A., State College Station, Fargo, North Dakota..... 1926
- Stevenson, Henry M[iller], Jr., Dept. of Zoology, Florida State Univ., Talla-
hassee, Florida..... 1943
- Stevenson, James O[sborne], Fish & Wildlife Service, Washington 25, D.C..... 1933
- Steward, Orville M[ilton], P.O. Box 19, Fordham Branch, Bronx 58, New York..... 1950
- *Stewart, Miss Mildred, 2219 Devonshire Dr., Cleveland 6, Ohio..... 1949
- Stewart, Paul A[iva], 8640 No. State St., Westerville, Ohio..... 1925
- *Stewart, Robert Earl, Patuxent Research Refuge, Laurel, Maryland..... 1939
- Stillwell, Jerry E., Route 2, Fayctteville, Arkansas..... 1935
- Stillwell, Wendell W[arden], 406 E. Vine St., Mt. Vernon, Ohio..... 1951
- *Stine, Miss Perna M., Route 5, Olncy, Illinois..... 1931
- Stitt, Merle E., Box 233, McCall, Idaho..... 1950
- **Stoddard, Herbert Lee, Sherwood Plantation, Route 5, Thomasville, Georgia..... 1916
- Stoerman, Frank A., 1721½ Westport Road, Kansas City 2, Missouri..... 1952
- Stokes, Allen W., Dept. of Wildlife Mgmt., U.S.A.C., Logan, Utah..... 1950
- Stoner, Emerson Austin, 285 E. "L" St., Box 444, Benicia, California..... 1947
- **Stoner, Mrs. Lillian C. (Mrs. Dayton), 399 State St., Albany 6, New York..... 1945
- Stophlet, John H[ermain], 2612 Maplewood Ave., Toledo 10, Ohio..... 1934
- Storer, Robert Winthrop, Museum of Zoology, Univ. of Michigan, Ann Arbor,
Michigan..... 1938
- *Storer, Dr. Tracy H[erwin], Div. of Zoology, Univ. of California, Davis, California..... 1928
- Stout, Paul, 2041 24th Ave., South, Nashville, Tennessee..... 1951
- Straw, Richard M[yron], 338 W. 6th St., Claremont, California..... 1947
- Strecker, Robert L[ouis], Zoology Dept., Miami Univ., Oxford, Ohio..... 1949
- Street, Phillips B[orden], Exton, Pennsylvania..... 1946
- Street, Thomas M., State Dept. of Health, Bureau of Vector Control, 2180
Milvia St., Berkeley 4, California..... 1940
- **Strehlow, Elmer William, 520 E. Montana St., Milwaukee 7, Wisconsin..... 1941
- Stringer, Kirby [Odell], P.O. Box 772, Memphis 1, Tennessee..... 1950
- Stringham, Emerson, Box 986, Kerrville, Texas..... 1940
- ***Strong, Dr. R[ubens] M[yron], 5716 Stony Island Ave., Chicago 37, Illinois..... Founder
- Struthers, Dana R., 4858 Fremont Ave., S., Minneapolis 9, Minnesota..... 1948
- Stull, W[illiam] D[eMott], Route 1, Delaware, Ohio..... 1952
- Stupart, Miss Barbara, 48 Russell Hill Road, Toronto, Ontario, Canada..... 1952
- Stupka, Arthur, Great Smoky Mts. Nat. Park, Gatlinburg, Tennessee..... 1935
- **Sturgeon, Myron T., Dept. of Geography & Geology, Ohio Univ., Athens, Ohio..... 1934
- Sturm, [William] Louis, S.O.M. Center Road, Solon, Ohio..... 1943
- Summerfield, Donald, Route 2, Box 4, Valley Station, Kentucky..... 1952
- Sundell, Robert A[rnold], 94 Main St., Frewsburg, New York..... 1951

Suthard, James G[regory], 1881 Raymond Ave., Long Beach 6, California.....	1936
Sutherland, Mrs. Robert L., 1513 Gaston Ave., Austin 21, Texas.....	1950
Suttkus, Royal Dallas, Zoology Dept., Dinwiddie Hall, Tulane Univ., New Orleans 18, Louisiana.....	1947
*Sutton, George Miksch, Dept. of Zoology, Univ. of Okla., Norman, Oklahoma.....	1920
Svärdson, Doc. Gunnar, Odmärdsvägen 17, Traneberg, Sweden.....	1949
Swanson, Gustav A., Fernow Hall, Cornell Univ., Ithaca, New York.....	1927
Swedenborg, Ernie D[avid], 4905 Vincent Ave., S., Minneapolis 10, Minnesota.....	1929
Sweet, William O., 175 Park St., Attleboro, Massachusetts.....	1949
Switzer, Mrs. Ann Harney, 1620 Fairidge Place, Kingsport, Tennessee.....	1952
*Taber, Wendell, 3 Mercer Circle, Cambridge, Massachusetts.....	1936
Tabler, Mrs. William B. (Fan Boswell), 2923 Riedling Dr., Louisville 6, Kentucky.....	1947
Tabor, Miss Ava Rogers, 305 Canal Blvd., Thibodaux, Louisiana.....	1940
Taintor, Mrs. Elizabeth Tabor, 11 Story St., Cambridge 38, Massachusetts.....	1945
Tallman, William S[weet], Jr., No. 4 Linden Pl., Sewickley, Pennsylvania.....	1940
Tanghe, Leo J[oseph], 852 Stone Rd., Rochester 16, New York.....	1943
Tanner, James Taylor, Dept. of Zoology, University of Tennessee, Knoxville 16, Tennessee.....	1937
*Tashian, Richard E[arl], Biology Dept., Long Island Univ., 380 Pearl St., Brooklyn 1, New York.....	1949
**Taylor, Arthur Chandler, 309 N. Drew St., Appleton, Wisconsin.....	1929
Taylor, H[erbert] S[tanton], 1369 Fair Ave., Columbus 5, Ohio.....	1948
Taylor, Nelson, May's Lake, Route 4, Stillwater, Minnesota.....	1951
Taylor, Dr. R[obert] L[incolin], 810 Highland Dr., Flintridge, Pasadena 3, California.....	1947
Taylor, Mrs. Walker L[ewis], c/o Mrs. G. D. Phelps, Towner Park Road, Sidney, Vancouver Island, British Columbia.....	1952
Teachenor, Dix, 1020 W. 61st St., Kansas City, Missouri.....	1923
Teale, Edwin Way, 93 Park Ave., Baldwin, Long Island, New York.....	1948
Tenney, Albert R., Route 1, Box 101, Toronto, Ohio.....	1949
Terrill, Lewis McIver, 216 Redfern Ave., Westmount, Montreal 6, Quebec, Canada.....	1948
Thacher, S. Charles, 2918 Brownsboro Road, Louisville 6, Kentucky.....	1942
Thomas, Edward S[inclair], Ohio State Museum, Columbus 10, Ohio.....	1921
Thomas, Landon B[aiillie], P.O. Box 141, Edgerton, Wisconsin.....	1947
Thomas, Brother Leo, F.S.C., Christian Brothers College, 650 E. Parkway, South Memphis 4, Tennessee.....	1952
Thomas, Mrs. Rowland (Ruth H.), 410 E. Green St., Morrilton, Arkansas.....	1937
Thompson, Daniel Q., Wildlife Research Unit, Univ. of Missouri, Columbia, Missouri.....	1945
Thompson, Donald R[uff], 4313 Shore Acres Rd., Madison 4, Wisconsin.....	1947
Thompson, Milton D., 1317 W. Glenn St., Springfield, Illinois.....	1952
Thompson, William Lay, 2204 Bowman Ave., Austin, Texas.....	1952
*Thorley, Robert F., 3 Midland Gardens, Bronxville 8, New York.....	1946
Thornburg, Ashley Alvin, 306 Hot Wells Blvd., San Antonio 10, Texas.....	1950
**Thorne, Oakleigh, II, Box 347, Islip, Long Island, New York.....	1947
*Thornton, Wilmot A[rnold], Dept. of Zoology, Univ. of Texas, Austin, Texas.....	1948
**Thorp, George B[oulton], 556 Abbott Ave., Ridgefield, New Jersey.....	1935
Thorsell, Richard S., 7 House Road, Morristown, New Jersey.....	1951
Thorson, Thomas B[ertell], Div. of Natural Sciences, San Francisco State College, San Francisco 2, California.....	1949
Throne, Alvin L., Wisconsin State College, Milwaukee 11, Wisconsin.....	1949
Tinbergen, N[ikolass], Dept. of Zoology, University Museum, Oxford, England.....	1947
Tipton, Dr. Samuel R[idley], 1415 W. Adair Dr., Fountain City, Knoxville 18, Tennessee.....	1941
*Todd, Mrs. Elizabeth D. (Mrs. Paul H.), 918 W. Main St., Kalamazoo 48, Michigan.....	1939
Todd, George K[endall], 809 W. 25th St., Cheyenne, Wyoming.....	1943
*Todd, Henry O[liver], Jr., Woodberry Road, Murfreesboro, Tennessee.....	1938
Todd, Mrs. Mabel Sellers (Mrs. A. P.), 1622 Cherryhurst Ave., Houston 6, Texas.....	1940

Todd, W[alter] E[dmond] Clyde, Carnegie Museum, Pittsburgh 13, Pennsylvania	1911
Tomich, P[rospcr] Quentin, 204 Dororo Drive, Salinas, California	1948
*Tomkins, Ivan Rexford, 1231 E. 50th St., Savannah, Georgia	1931
Tordoff, Harrison B[ruce], Museum of Natural History, Univ. of Kansas, Lawrence, Kansas	1947
*Townsend, Miss Elsie White, Dept. of Biology, Wayne Univ., 4841 Cass Ave., Detroit 1, Michigan	1938
Trainer, John Elzra], Dept. of Biol., Muhlenberg College, Allentown, Pennsylvania	1952
**Trautman, Milton B[ernhard], Stone Laboratory, Put-in-Bay, Ohio	1932
*Traylor, Melvin Alval, Jr., 759 Burr Ave., Winnetka, Illinois	1947
Trimm, H. Wayne, 165 Strong Ave., Syracuse 10, New York	1943
Trowern, Robert Wilson, 42 Van Dusen Blvd., The Kingsway, Toronto, Ontario, Canada	1948
Trussell, Miss Malvina, 2011 Lee Ave., Tallahassee, Florida	1946
Tryon, C[larrence] A[rcher], Jr., Dept. of Biological Sciences, Univ. of Pitts- burgh, Pittsburgh 13, Pennsylvania	1942
**Tucker, Mrs. Carll, Penwood, Mount Kisco, New York	1928
Tucker, Donald [Julius], 103 N. Ballston Ave., Scotia, New York	1952
Tucker, Robert Edward, 245 N. Auburndale, Memphis, Tennessee	1942
Tuttrup, Miss Janc, Bowie's Mill Road, Route 1, Derwood, Maryland	1949
Tvedt, Harold B[loom], 650 Jessamine St., San Antonio, Texas	1941
*Twomey, Arthur C[ornelius], Carnegie Museum, Pittsburgh 13, Pennsylvania	1936
Tyler, Dr. Winsor M[arrett], 1482 Commonwealth Ave., Brighton 35, Massachusetts	1914
Tyrrell, W. Bryant, 246 Park Ave., Takoma Park 12, Maryland	1947
Uhler, Francis Morey, Patuxent Research Refuge, Laurel, Maryland	1931
*Uhrig, Mrs. Alex B. (Mrs. Corrinne), Box 28, Oconomowoc, Wisconsin	1926
Ulrich, Mrs. Alice E., 193 LaSalle Ave., Buffalo 14, New York	1952
Ulrich, Edward C., 193 LaSalle Ave., Buffalo 14, New York	1952
Umbach, Miss Margaret, 2526 East Drive, Fort Wayne 3, Indiana	1941
Underdown, Henry T., 8216 Manor Road, Elkins Park, Philadelphia 17, Pennsylvania	1952
Underhill, Slayton, 68 Rockledge Road, Hartsdale, New York	1950
Ussher, Richard Davy, 101 Grandview Ave., Newtonbrook P.O., Ontario, Canada	1947
Vaiden, M[eredith] G[ordon], Rosedale, Mississippi	1937
Van Arsdell, Dr. C[harles] A[lexander], 1024 Beaumont Ave. Harrodsburg, Kentucky	1946
Van Coevering, Jack, 6170 Commerce Road, Route 5, Pontiac, Michigan	1939
Van Deusen, Hobart M[erritt], 12 Highland Ave., Montclair, New Jersey	1951
Vane, Dr. Robert F[rank], 600 Dows Bldg., Cedar Rapids, Iowa	1946
Vanek, Mrs. Charles W., 7441 Reuter Ave., Dearborn 1, Michigan	1952
**Van Tyne, Josselyn, Museum of Zoology, Univ. of Mich., Ann Arbor, Michigan	1922
Vasconcelos, Lic José, Plaza de la Ciudadela 6, Mexico City, D.F., Mexico	1952
**Vaughan, William C[oleman], Locust Grove Farm, River Road, Youngstown, New York	1941
Vaurie, Charles, American Museum of Natural History, 79th & Central Park, West, New York, New York	1946
Vincent, Brother Ignatius, F.S.C., St. Mary's College, Winona, Minnesota	1949
Vogelsang, Gerald A[llen], Route 4, Little Cedar Lake, West Bend, Wisconsin	1952
Vollmar, Mrs. R[heal] Lewis, 6138 Simpson Ave., St. Louis 10, Missouri	1941
von der Heydt, James A[rnold], Box 156, Nome, Alaska	1947
Vore, Marvin E[limer], 1128 No. 8th Ave., West Bend, Wisconsin	1947
Wade, Douglas E., Department of Entomology & Zoology, Clemson Agricul- tural College, Clemson, South Carolina	1936
Wade, Mrs. Sydney J. (Mrs. Katherine White), Rural Route 5, Box 229-A, Jefferson City, Missouri	1940
Wagner, Mrs. C. R. (Nancy Elizabeth), South Lane Farm, Utica, Ohio	1947
Wagner, Esther E., 22 Golden Hill, Bethel, Connecticut	1937
Wagner, Helmuth O., Bremer Ubersee Museum, Bremen, Germany	1945

Walker, Charles F[rederic], Museum of Zoology, University of Michigan, Ann Arbor, Michigan.....	1939
Walker, David W[illiam], ETSN 3039438 — USS Roanoke — T Division, c/o Flcet P.O., New York, New York.....	1952
*Walker, Jason A[lison], 89 Church St., Box 295, Waterloo, New York.....	1949
Walker, M[yr]l V[incent], Zion National Park, Springdale, Utah.....	1943
*Walkinshaw, Dr. Lawrence Harvey, 1703 Central Tower, Battle Creek, Michigan.....	1928
Wallace, Miss Edith Adell, 617 Buchanan St., Gary, Indiana.....	1945
Wallace, George J[ohn], Department of Zoology, Michigan State College, East Lansing, Michigan.....	1937
Wallace, Roy, 63 DuPont St., Toronto 5, Ontario, Canada.....	1952
Wallner, Dr. Alfred, Box 120, Bakersfield, California.....	1941
Walters, Miss Kathleen, 312 Crane St., Royal Oak, Michigan.....	1944
Wandell, Willet N[orbert], Natural History Survey, Urbana, Illinois.....	1944
Wanless, Harold R[ollin], 704 S. McCullough St., Urbana, Illinois.....	1940
Ward, Loren D., 29 Maple St., Geneva, New York.....	1952
Warner, Dwain Willard, Museum of Natural History, University of Minnesota, Minneapolis 14, Minnesota.....	1946
Warters, Miss Mary Ellen, 5115 Woodland Ave., Des Moines 12, Iowa.....	1950
Wasson, Mrs. Theron, 606 Thatcher Ave., River Forest, Illinois.....	1951
Waterman, Ralph T[en Eyck], 13 Meadow Road, Poughkeepsie, New York.....	1947
*Watkins, Dr. John O[verby], 359 Pine St., Spartanburg, South Carolina.....	1952
Watson, Frank Graham, 4110 Drummond St., Houston 25, Texas.....	1937
Watson, James Dewey, Jr., Rural Route 2, Box 258, Chesterton, Indiana.....	1945
Watson, Robert J[ames], Box 75, Blacksburg, Virginia.....	1943
Watt, Mrs. Leafie Baldwin, Route 2, Rowe Place, Franklin, New Jersey.....	1952
Wayland-Smith, Robert, 137 Kenwood Ave., Oncida, New York.....	1952
Weaver, Mrs. Alice Helen Brown, 1434 Crain St., Evanston, Illinois.....	1948
Webster, Clark G[ibbons], Patuxent Research Refuge, Laurel, Maryland.....	1948
*Webster, J[ackson] Dan, Hanover College, Hanover, Indiana.....	1939
Weise, Charles M[artin], Vivarium Bldg., Univ. of Illinois, Urbana, Illinois.....	1949
Weiser, Virgil Leonard, 538 W. Villard, Dickinson, North Dakota.....	1946
Weller, Milton Webster, Wildlife Conservation Building, University of Missouri, Columbia, Missouri.....	1950
Welles, Mrs. George M. (Mary Pike), Rural Route 1, Elmira, New York.....	1938
Wellman, Mrs. Cora B[lyard], Lincoln, Massachusetts.....	1951
Welty, Carl, Rural Route 1, Beloit, Wisconsin.....	1948
*Wernicke, Mrs. J[ulius] F. (Maleta Moore), Gull Point, Escambia County, Florida.....	1944
West, Mrs. E. M. (Adele H.), 803 Clayton Ave., Chattanooga 4, Tennessee.....	1950
Weston, Henry G[riggs], Jr., Grinnell College, Grinnell, Iowa.....	1947
Westphol, Mrs. Barbara O., Apartado 25510, Mexico City 12, Mexico.....	1950
Wetherbee, David K[enneth], 11 Dallas St., Worcester, Massachusetts.....	1947
**Wetmore, Alexander, U. S. National Museum, Washington 25, D. C.....	1903
Weydemeyer, Winton, Fortine, Montana.....	1930
Weyer, Albert E., Depto. Medico, Cia Bananera de Costa Rica, Golfito, Costa Rica.....	1949
Weyl, Edward Stern, 3827 The Oak Road, Philadelphia 29, Pennsylvania.....	1927
Wheatland, Miss Sarah B[igelow], 85 Sachem St., New Haven, Connecticut.....	1942
Whelan, Miss Mary Elizabeth, 215 Catherine St., Muskegon, Michigan.....	1951
Whipple, Dr. V[ernon] L., 1606 Bruce St., St. Paul, Minnesota.....	1951
Whitaker, Mrs. Lovie M., c/o Dr. John R. Whitaker, School of Journalism, University of Oklahoma, Norman, Oklahoma.....	1947
Whiteomb, Pemberton, 130 Cedar St., New York 6, New York.....	1949
Whiting, Robert A[relic], 2521 Cobb Road, Jackson, Michigan.....	1947
Whitney, 1st Lt. Nathaniel R[uggles], Jr., M.D., AO2239356, Quarters 1505, Apt. A, Robins Air Forec Base, Georgia.....	1942
Wiekstrom, George M[artin], 2293 Harding Ave., Muskegon, Michigan.....	1951
Wiggin, Henry T[aylor], 151 Tappan St., Brookline 46, Massachusetts.....	1941

Wilcox, Harry Hammond, Department of Anatomy, Medical School, Univ. of Pennsylvania, Philadelphia 4, Pennsylvania.....	1938
Wilcox, LeRoy, Speonk, Long Island, New York.....	1944
* Wilder, Theodore G[arfield], 125 Oxford Road, Waukesha, Wisconsin.....	1948
Wiles, Harold O[liver], 537 Campbell Ave., Kalamazoo, Michigan.....	1936
Wilkowski, William [Walter], 119 Bronson Ct., Kalamazoo, Michigan.....	1943
* Williams, George G., The Rice Institute, Houston, Texas.....	1945
Williams, Laidlaw O[nderdonk], Rural Route 1, Box 152, Carmel, California.....	1930
Williams, Raymond E., P. O. Box 193, Hawthorne, California.....	1950
Williamson, Mrs. John H., Cahaba Road, Rural Route 4, Box 900, Birmingham, Alabama.....	1952
Willis, Cornelius C[rinnell], 1 Carter Ave., Sierra Madre, California.....	1948
Willis, Miss Myra G., 1726 4th Ave., S.E., Apt. C, Cedar Rapids, Iowa.....	1944
Willms, A. George, Rural Route 2, Urbana, Illinois.....	1950
* Wilson, Archie F[ran cis], 1322 Braeburn Road, Flossmoor, Illinois.....	1937
Wilson, Mrs. Carl [Ruth], 11285 Lakepointe, Detroit 24, Michigan.....	1941
Wilson, Gordon, 1434 Chestnut St., Bowling Green, Kentucky.....	1920
Wilson, Harold Charles, Ephraim, Wisconsin.....	1938
Wilson, John Elder, 935 Academy St., Watertown, New York.....	1948
Wilson, Miss Rachel Esther, 621 First St., Huntington, West Virginia.....	1952
Wilson, Commander Rowland S[teele], Staff, Amphibious Group 3, FPO San Francisco, California.....	1941
* Wilson, Wynn Avis, 817 Greer St., Fort Worth 3, Texas.....	1950
** Wineman, Andrew, 150 Michigan Ave., Detroit, Michigan.....	1934
** Wing, Harold F[ran cis], Rural Route 3, Jackson, Michigan.....	1941
Wing, Leonard [William], Department of Wildlife Management, Texas A. & M. College, College Station, Texas.....	1924
Winn, Howard Elliott, 398 No. Elm St., West Bridgewater, Massachusetts.....	1947
Wistey, [Edna] Lorenc S. (Mrs. A. L.), South English, Iowa.....	1944
Witmer, S[amuel] W[enger], 1608 S. 8th St., Goshen, Indiana.....	1948
* Witte, Miss Agatha Wilhelmina, East Churchill St., Mt. Savage, Maryland.....	1949
Wolfarth, Floyd Parker, 133 High St., Nutley, New Jersey.....	1950
Wolfe, Col. L[loyd] R[aymond], Rural Route 1, Kerrville, Texas.....	1951
Wolfson, Albert, Department of Zoology, Northwestern University, Evanston, Illinois.....	1944
Wolk, Robert G[eorge], Lab. of Ornithology, Fernow Hall, Cornell University, Ithaca, New York.....	1952
Wolters, H. E., 28, Nikolaus-Becker-Strasse, (22c) Geilenkirchen bei Aachen, Nordrhein-Westfalen, Germany (British Zone).....	1952
Wonsild, Hans Christian, Helleruplunds Alle 8, Hellerup, Denmark.....	1951
Wood, Dr. Harold B[acon], 3016 No. Second St., Harrisburg, Pennsylvania.....	1932
Wood, Merrill, 811 N. Allen St., State College, Pennsylvania.....	1945
Woolfenden, Mrs. Harriet Bergtold, 4600 Fircrestone Ave., Terrace 6, Dearborn 2, Michigan.....	1951
* Worley, John G[ra ves], 237 Charleston St., Cadiz, Ohio.....	1936
Wright, Al[bert] J[ay], c/o Bache & Company, Ellicott Square, Buffalo 3, New York.....	1952
Wright, Audrey Adela, 1312 Hepburn Ave., Louisville 4, Kentucky.....	1941
Wright, Bruce S[tanley], Northeastern Wildlife Station, University of New Brunswick, Fredericton, New Brunswick, Canada.....	1948
Wright, Lt. Col. Dana [Monroe], Box 36, St. John, North Dakota.....	1943
Wright, Howard F[ord], 3604 N. Temple Ave., Indianapolis 18, Indiana.....	1948
Wright, Philip L[incoln], Montana State University, Missoula, Montana.....	1940
Wyatt, Miss Grace, College Station, Murray, Kentucky.....	1946
* Wyeth, William M[axwell], III, Wyeth Co., St. Joseph, Missouri.....	1951
Wylie, William L[ewis], 1310 National Road, Wheeling, West Virginia.....	1947
Yeager, Lee E[mmett], Colorado Wildlife Research Unit, Colorado A. & M. College, Fort Collins, Colorado.....	1939
* Yeaton, H[arold] B[allard], 12908 Riverside, Van Nuys, California.....	1951

*Yeatter, R[alph] E[merson], Illinois Natural History Survey Division, Urbana, Illinois.....	1932
Yolton, William Phillip, Paul Smiths College, Paul Smiths, New York.....	1952
Young, Howard [Frederick], Department of Zoology, University of Arkansas, Fayetteville, Arkansas.....	1947
Young, J. Addison, II, 60 Argyle Ave., New Rochelle, New York.....	1942
*Young, James B[oswell], 514 Dover Road, Louisville 6, Kentucky.....	1937
*Youse, James Richard, Box 751, Carlsbad, New Mexico.....	1949
Yurick, Harry, 948 W. 4th St., Hazleton, Pennsylvania.....	1952
Zaenglein, Ralph J., 402 Willard Ave., Maryville, Tennessee.....	1952
Zimmerman, Dale, 480 No. Almont St., Imlay City, Michigan.....	1943
Zimmerman, James H[all], 2114 Van Hise Ave., Madison 5, Wisconsin.....	1947
Zimmerman, John L[ester], 1515 Franklin St., Cincinnati 37, Ohio.....	1951
Zurcher, Miss Olga Celeste, 133 S. Richardson Ave., Columbus 4, Ohio.....	1948

LETTER TO THE EDITOR

In 1938 I accepted the Chairmanship of an informal committee which volunteered to gather facts about pronounced flights of Snowy Owls in North America. The purpose of the work was to provide an index to events in the Arctic rather than to contribute to an understanding of causes which is essentially an Arctic problem. It seemed feasible to gather data from over the whole of settled portions of the continent where Snowy Owls appeared on their regular flights. Three brief reports materialized and these were published in *The Wilson Bulletin* (55:8-10, 59:74-78 and 61:99-102).

In working as a volunteer committee, with round-robin procedure on a continental basis, delays are inevitable. Loss of data en route is also possible. Material on the flight in 1949-50 vanished completely and could not be traced. Since the Snowy Owl cycle is short and since we have found that major flights in the east and west do not necessarily synchronize, a transcontinental, volunteer committee has not been able to keep up with the owls.

The purpose of this communication is to allay any impressions readers of the *Bulletin* might have that Snowy Owls are permanently grounded. It also affords me opportunity to thank all the busy men who served on the now defunct committee, and to assure them that if the committee's difficulties are not attributable to its Chairman, then perhaps the undertaking was, simply, not feasible.

L. L. SNYDER

ROYAL ONTARIO MUSEUM OF ZOOLOGY AND PALAEOLOGY, TORONTO, AUGUST 25, 1952.

The *Proceedings of the Xth International Ornithological Congress*, held in Uppsala in June 1950, is now available for purchase from Professor Sven Hörstadius, Zoologiska Institutionen, Uppsala, Sweden. Book dealers may order it from Almqvist and Wiksell, Uppsala, Sweden. The price is 35 Swedish crowns (\$6.75 U.S.).

The volume covers the proceedings of the Congress, and some 83 papers presented before the meetings under four main headings, viz., Evolution and Systematics, Migration and Orientation, Behavior, and Regional Faunas. The book is paper bound, in attractive form, with 622 pages (531 in English, 28 in French, 93 in German), 1 color plate, 30 photographs, 125 maps and diagrams, and 46 tables. The edition includes only copies for the members of the Congress and a small number in addition for sale. Those interested in purchasing should order without delay as the number available is limited.

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BY JEAN AND RICHARD GRABER

In addition to names of species and of authors, this index includes references to the following topics: bibliography, call-notes, census, conservation, dichromatism, displays, ecology, eggs, flight, homing, hybridism, injury-feigning, localities by state, province, and country, migration, molt, mortality, nesting, new forms, parasitism, polygamy, song, weights. Names of new forms described in this volume are in **boldface** type.

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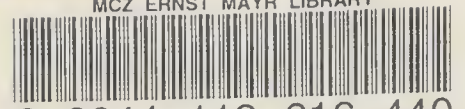
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