Dues for 1928

ANNUAL DUES FOR 1927 NOW PAYABLE

This is the Treasurer's first notice to all members that dues for 1928 are now payable to the Treasurer,

Mr. J. W. Stack,
Michigan Agricultural College,
East Lansing, Michigan.

You are earnestly requested to remit at your earliest convenience, thus saving postage expense to the Club, and much time and effort to the Treasurer. A receipt will be returned only if requested.

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The Club values the continued support of every member, and every resignation is received with much regret. It is a very unpleasant duty to discontinue the BULLETIN to members in arrears for dues.

The WILSON BULLETIN again extends the season's greetings to its readers. As the years slip by for us they also make history for our institutions. This has been a reasonably prosperous year for the BULLETIN. Financially, we should come out about even; we anticipate no deficit. We have probably received a few more members than we have lost. We have a loyal membership. If a larger number of our members would become active in increasing our membership, it would mean much to the organization.

THE
WILSON BULLETIN

A Quarterly Magazine Devoted to the Study
of Birds in the Field
and the Official Organ of the

WILSON ORNITHOLOGICAL CLUB

Edited by
T. C. Stephens, *Editor-in-Chief*
Myron H. Swenk William I. Lyon

Volume XL
1928

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at
Sioux City, Iowa

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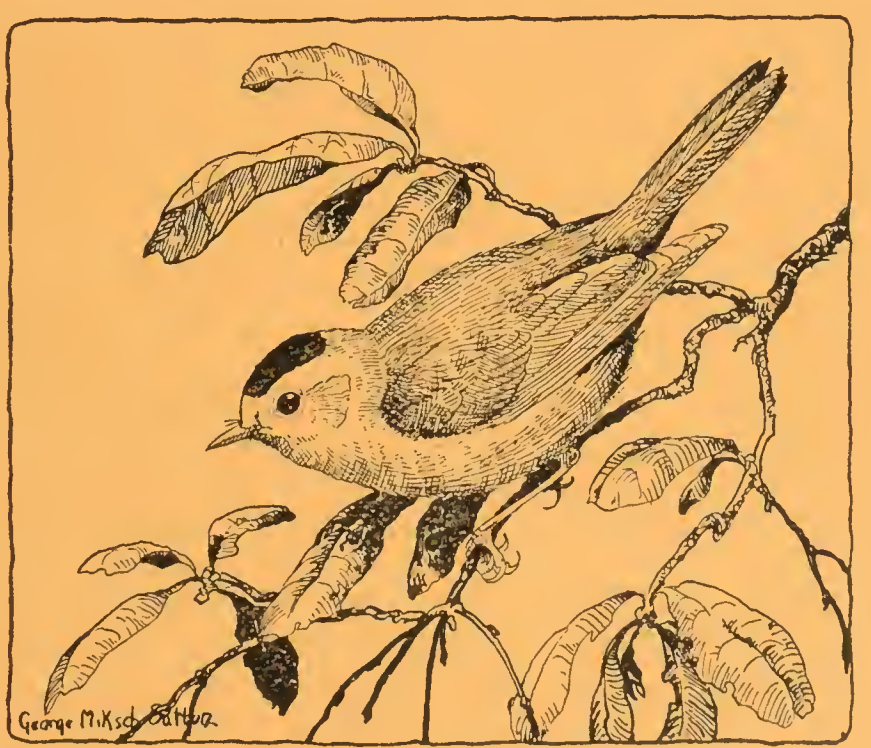
THE WILSON BULLETIN



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New subscriptions, changes of address, and applications for membership should be addressed to the Secretary. Personal items, news of events in the scientific world, and other notes suitable for our "Notes Here and There" department may also be addressed to the Secretary.

Claims for lost and undelivered copies of the magazine may be addressed to the Editor.

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The Nebraska Ornithologists' Union.
The Iowa Ornithologists' Union.
The Kentucky Ornithological Society.
The Tennessee Ornithological Society.

BARROW'S GOLDEN-EYE

Male, lower. Female, upper.

THE WILSON BULLETIN

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Vol. XL. (Old Series) No. 1 March, 1928

Vol. XXXV (New Series) Whole Number 142

THE COURTSHIP BEHAVIOR OF BARROW'S GOLDEN-EYE
(Glaucionetta islandica)

BY EDMUND JOSEPH SAWYER

Probably for most readers of the WILSON BULLETIN a species like Barrow's Golden-eye has a certain plus-attraction. Comparatively few "arctic" species are found as nesting birds within the United States, south of Alaska. Among the ducks only the Pacific Harlequin seems to share a status closely similar to that of the Barrow's Golden-eye. There is an element of peculiar, human appeal in the mere idea of a bird that savors of the ice-fields and the midnight sun choosing, in considerable numbers and as if against the pull of instinct, to renounce the land of its primitive origin and adopt a homestead within our own boundaries. Yet that appeal is a mere hint of the real thrill that comes to one who first looks on a flock of these usually rare ducks competing for nuptial favors on some secluded little lake in a favored locality of our Rockies. "Barrow's Golden-eyes," you exclaim to your inner self — your bird-loving self, that is to say — and something (a kind of ornithological patriotism) insists that those resplendent drakes and coquettish hens are most ardently approving of these United States as a place altogether good enough to be used as a setting for their amours; nor is the thrill lessened when you reflect, as you do, that these amours will find their full fruition within short walking distance of the "Holy Ground" whereon you stand.

PLACE AND PERIOD OF THESE STUDIES

This species is a permanent resident in Yellowstone Park. Before, during, and after the following observations I saw it in various waters —in the Gardiner River, particularly. For the most part, however, Ice Lake was the concentration point in the Mammoth region and I shall confine my remarks mainly to observations there made, especially because nothing new was seen elsewhere of their courtship behavior. Ice Lake (so-called from having at one time furnished ice for cold storage at Mammoth Hot Springs) is situated two and a half

miles south of the park's northern entrance. Only half a mile north of the Wyoming boundary it lies within that narrow strip of southern Montana which is embraced by the park. Its elevation is approximately 6,000 feet. It is really a pond of only some four to six acres' extent; of irregular egg-shape, its extreme length may be four hundred yards, greatest width (near northern end) rather less than two hundred yards; it comes to an irregular blunt point at its southern end. It lies in a hidden pocket of sage-covered hills, but a thicket of aspens and alders extends down to the northwest shore. The eastern shore is low and marshy, affording nesting to a small colony of Thick-billed Redwings; while on the western side the land rises steeply and almost steadily to the very base of Mount Sepulcher's eliff-like eastern side, distant about a mile and a half. I visited this lake daily for

nearly a month in 1924 alone, spending from one to eight or more hours on eaeh visit, probably averaging four or five hours; this ineluded every hour of daylight. It was not found that time of day or state of weather had mueh to do with the actions of the birds.

Daily observations on Ice Lake began April 17 when, passing on horseback, I saw, as my notes reeord, "about one hundred and fifty Barrow's Golden-eyes, ten to thirty Mallards, probably also a few teal." It should be noted that those figures were the merest estimates from some distance on horseback. At that time the lake was frozen over except for a rim some twenty-five fect in width marking its shoreline. Most of the ducks were swimming in this open margin, but several were standing on the iee, a few Mallards walking on it. On the following day an observation blind was in operation and nearly all subscquent notes and sketches were made from this blind. The latter, a small tent, designed and made by myself for the purpose, was erected close to the water's edge and near an alder thicket on the west

shore and close to the mouth of one of the two small creeks which feed the lake on that side. Within fifteen minutes after I entered the blind on April 17 at six P. M., a pair had alighted almost directly in front and had very obligingly allowed me to witness the consummation of their marriage. But this soon proved no case of exceptional fortune. other pairs were equally obliging and, before many days, the affair, rather elaborate though it is, became an old story and my detailed notes were indeed profusely illustrated.

A Surprising Spectacle

It was astonishing to me to see all this wholesale mating going on long before nesting sites would be selected. A nesting box which I early erected in what seemed a suitable location beside one of the tributary creeks and in clear view from the lake, a hundred feet distant, was apparently never even inspected by the birds; before the next spring beavers had felled the aspen tree to which the box had been attached. One hundred and fifteen individuals were counted on April 24; there had been no distinct lessening in the number since systematic observations had begun on the 17th. Winter conditions still held in the nearest nesting haunts — small lakes less than a mile away; these lakes were still locked fast in thick ice and surrounded by deep snow. Yet, on that April 17, and perhaps much earlier, complete mating was already occurring on a broad scale, virtually every member of the flock seeming to indulge; this state of affairs continued daily for weeks. It was not until May 13 that I found a nest of fresh eggs; these I collected for the Yellowstone Park Museum, where they are now exhibited. About that date I abandoned my daily visits, although the visits continued to be frequent; there were still about seventeen birds on the lake.

My studies were continued each spring until 1927, inclusive; but practically no new data were secured after the first year; corroboration of former observations and additional sketches of attitudes previously noted were practically the only things gained. Hence, nothing of material importance will be lost, while confusion may be avoided, by confining my account, as I shall, rather strictly to the year 1924. Perhaps the advantageous position of my blind can be more clearly realized when I add that the golden-eyes often swam within a dozen feet of me and sometimes one could be seen diving and then busily feeding on the bottom in less than two feet of water close to shore.

Rivalry

The nuptial behavior as I observed it may be divided in a natural, if general, way into two main periods. These are, first, rivalry; sec-

ond, aetual mating of a given pair. Rivalry is a varied and rather eomplieated process and, when the entire flock or most of it is involved, as frequently occurs, the seene is one of great animation and exeitement. It is then to all intents and appearanees a busy marriage mart, eomplete with audible and frenzied bidding and the wild gestieulations of those fearful of being raised. Though each drake obviously has only his own poor self to offer one will nevertheless look in vain for the individual who makes this offer in any self-effaeing manner. Competitors are many, time flies, supply is limited, females are most ravishing and in no proerastinating mood; every drake seems obsessed with all this.

On the drake's part, head bobbing and elaborate neck pumping and stretehing are the most outstanding actions; these motions are grotesque and spectaeular, as, for example, in the sudden upward thrust of the head. (See Figures 10-1, Plate 2). In many of his gestures the neck is extended to a surprising length. With neck stretehed upward (as in Figures 6-9 of Plate 1) the bill may be opened and shut at one to three second intervals in repeated low quacks. I think this is more common during rivalry, but I have noted it when the drake seemed to be courting a certain female. A frequent act of the drake is the backward kick which sends a spurt of water backward and upward in the wake of the swimming bird (Fig. 2 on Plate 2). There is mueh quarreling among the drakes; hot pursuits on, above, and under water (see Figures 12-18, Plate 2).

The actions of the female during rivalry are chiefly various grotesque movements of the head and neck as she swims about. The extreme example is a snaky movement of the neck as the head is swept forwards and baekwards, from extreme side to side of the bird, in a generally horizontal plane. (See Figures 19, 21-23, on Plate 2). What is properly a mating pose is illustrated in Figure 20, Plate 2. It is ineluded here to indicate the fact that the females thus often manifest desire without relation to the mood or proximity of any male.

Rivalry, particularly in this flock aspect, does not seem to follow a regular and progressive plan as does the actual mating and its eonsummation. There may, however, be a standardized method of proeedure throughout; but at least this could not be noted where so many competing birds were concerned and moving swiftly to and fro in a mixed floek. One of my field notes says (April 19): "Though a few birds can be seen courting at almost any time, a sort of courting bee seems to seize the flock at intervals averaging about one hour; then a dozen or more males will be seen throwing their heads high, kicking

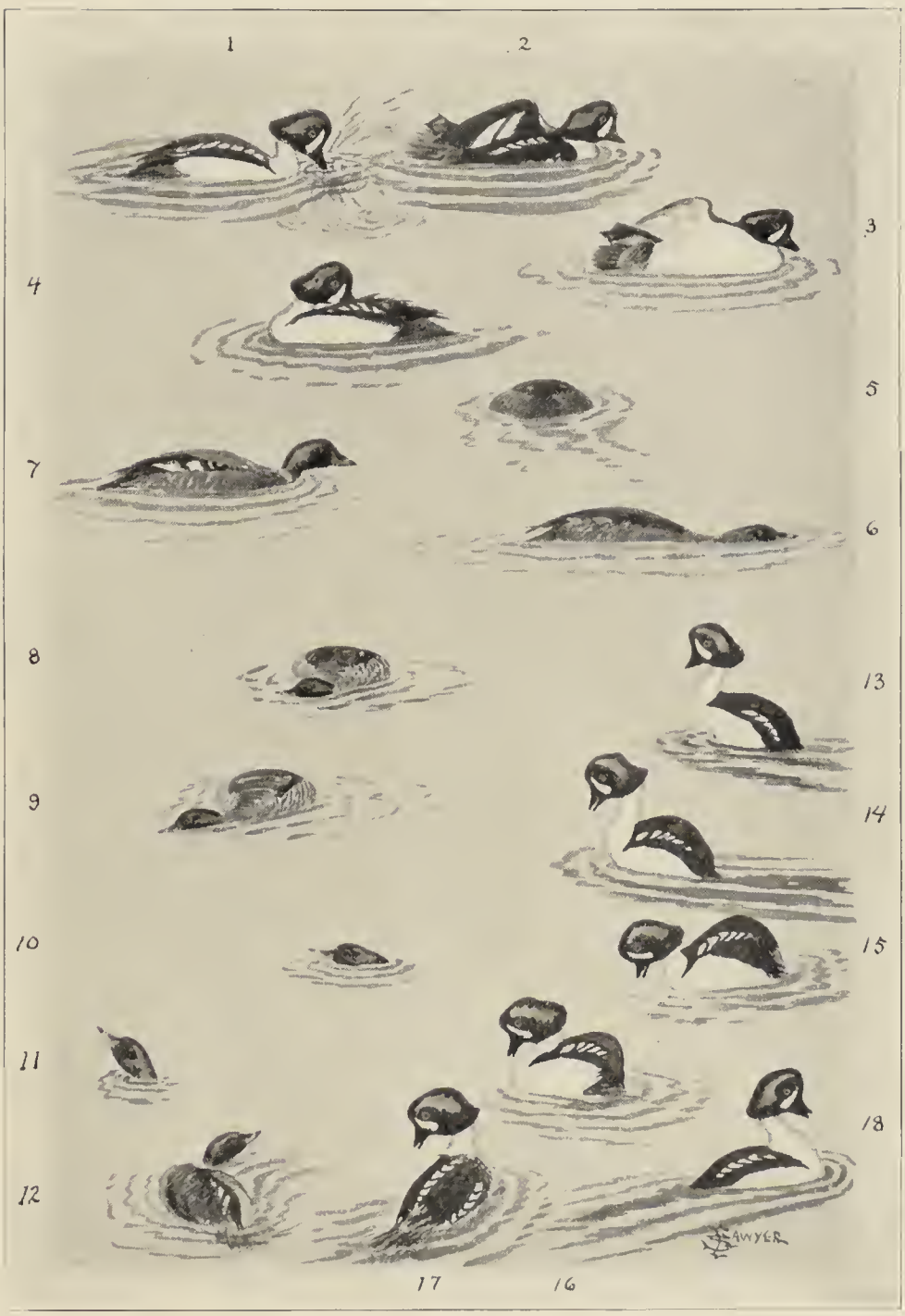


PLATE 2. BARROW'S GOLDEN-EYE. Attitudes during rivalry. The actions and attitudes do not appear to occur in any regular order or sequence, thus differing from those of final mating.

up the water, while many females are twisting their necks from side to side. But, at these times the sexes form a helter-skelter mixed flock, and no system or particular purpose is apparent. A female sometimes drives away another rival female, males drive away rival males." Yet there is some positive evidence that the rivalry and competitive courtship is in fact a rather general scramble in which the actions and postures do not occur in any given order, but, hit or miss, according to the chance impulse of the moment; though these impulses are doubtless to attract or impress and win favor, no given act — as, say, a bob of the head — can be predicted. Yet it is true that many times several males will perform the same act at once or nearly so; that looks like jealous competition in the case of that particular time and act. Similarly, the notes of the drakes tend to occur in chorus or nearly so, following intervals of comparative silence, as if in competition.

The strange thing to observe is that, after an hour or so of this frenzied rivalry and showing off, the game always appears to end about where it began, with quite negative results. If any successful wooing has been done, certainly one can not distinguish the proud and happy groom from the possible dejected swain who loved and lost; nor can the blushing bride be told from the despairing spinster. A pair might, it is true, separate from the main flock and consummate their mating during the general conference; or, again, here and there a couple may be seen *in coitu* when most of the flock is busily feeding immediately following their dispersal. Still it was never apparent that any of these "understandings" were definitely traceable to anything which could be seen accomplished at the flock gatherings. Nevertheless, I do not doubt that some extent or kind of selection occurs during the gatherings. I am probably merely pointing out the difficulty of actually noting the steps and manner of the process from beginning of competition to final mating act.

When the flock had, for the time being, more or less broken up one could often see the working of individual jealousies and rivalries and might note appearances of fidelity or inconstancy. The males seemed the more fickle, while for the most part they showed great respect for the females' privilege of choice. Males chase away males and females. Females chase away both sexes also. Just after the bathing which follows a mating completely enacted the female is especially given to repulsing intrusive males and females alike. One of my field notes reads, "Watched what appeared a pitched battle, breast to breast (two males); very loud splashing the only demonstra-

PLATE 3. BARROW'S GOLDEN-EYE. Attitudes during mating. From the top of the plate the attitudes are shown in general order of sequence, except that figures 8-12 and 13-18 are according to definite natural order.

tion apparent, the water flying and both birds rising about clear of the surface two or three times; it (the contest) lasted about twenty seconds, then each (contestant) joined a waiting female (some yards away) and all four indulged in much head bobbing." The males do a lot of twitching in the water with their bills — a general courting practice — but particularly for a minute or so before conclusively mating as described elsewhere.

Mating

There were usually a number of "inviting" females to be seen floating like half submerged logs on the pond, especially after the dispersed flock had had some little time for feeding. The appearance of the female in this position is remarkable and thoroughly characteristic of her mood. For many minutes at a time the bird looks like a rounded piece of driftwood as she lies half submerged for her entire length, including head, neck and bill. She sometimes emits a low clucking call in this attitude. Here may be mentioned a very striking thing which obtained among the birds in general; that is, the females, so far as one might judge by behavior, were decidedly more precocious than the males in their desire. With a given pair the female's period begins long in advance of the male's and continues unabated until the male's period, only two or three minutes in duration, is over. It was a common thing to see a half sunken duck float and drift invitingly about a drake for a quarter of an hour or more, while he showed not the slightest knowledge of her existence. Occasionally the immediate sequel was a sudden and furious transformation—from the ignored spouse spoiling for attention to the very personification of "a woman scorned;" she would dart with apparently murderous intent at the unresponsive drake, putting him to flight that looked not to the order of his going; yet, no sooner would he come to rest than she would be again at hand, floating invitingly — the all-loving spouse again — outdoing if possible her former abject appeal. Sooner or later — usually sooner than in instances like that above described — the drake complies.

The male sometimes assumes a pose similar to that of the half submerged female. This *may* be, in his case also, a specific advertisement of desire; but it seemed random, was not one of the definite series of mating acts. There is no attitude or act of the drake coinciding with that prolonged period of the female. Any interest he may feel at that time is certainly well disguised. It is only fair justice to the spectacle itself to record the strangeness of seeing him drifting or slowly swimming in the most every-day posture and manner imag-

inable while the female drifts, with the fine art of apparent chance, within near contact; often he swims slowly away to avoid her.

The first positive indication of his desire is apt to be a peculiar and animated twitching of the water with his bill (Fig. 1, Plate 3); then he is apt to stretch, turning on his side and extending the upper wing and leg — in this he is quite deliberate; pluming of the back feathers follows and looks like a gesture of ostentation. All this has taken but a minute or so (unless the water twitching has been more prolonged than usual); then the upright position (Fig. 13 in Plate 3) is assumed, which marks the beginning of the spurt to the female; the birds are usually within a yard of each other when the spurt begins. The next steps are illustrated in sequence (Plate 3, Figs. 14-17 for the male, 9-12 the correlated attitudes of the female). It should be understood that the plate shows an entirely arbitrary and unreal separation of the pair in the latter's three last stages of action.

Scarcely a minute is consumed in the entire specific act. While finally, *in coitu*, they begin to swim in a very small circle a note is repeated at regular intervals of about a second; I wrote it, "Gr-err'-er" or "cr-err'-er," and it seemed to come from the female, yet the latter point is in doubt. The middle syllable, high and accented, seems jerked forth, Another note (I thought from the drake) is a low cluck; these two notes were timed with each other so that one appeared an echo. As I reflect about it now, there seems a possibility that both calls came from the same individual. Having circled, as mentioned, two or three times around, the pair separates, each bird swimming away instantly from the spot; dabbling and vigorous bathing begins at a distance of some forty feet on the part of the female, rather farther in the case of the male. The male's appearance in this swimming away is noteworthy (Fig. 18 in Plate 3). He has an extremely self-conscious bearing; in the live bird the effect is enhanced to a ludicrous extent by the regular ticktock movement of the bill from side to side. The set pose, the straight course with uniform speed, the mechanical movement of the head — all give every appearance of an automaton, personifying egotism and wound up to run a set course.

In the matter of these mating operations I wish to emphasize their uniformity as regards sequence, time consumed, and the manner in which each step itself is performed. To me it was surprising that so many little mannerisms and actions apparently unessential and with no survival value had yet become thoroughly standardized and correlated with their respective stages in the performance. How, for example, can we explain the remarkable "proud" swim, so uniform in

every remarkable detail, of the male; this especially, since it follows complete consummation of the mating? May it indicate a period of distinctly significant breath-regaining or strength-regaining?

Notes and Calls

A nasal twanging note or quack by the male accompanies attitudinizing during rivalry. It is that note which, possibly with others in the same category, often becomes a small babel as other drakes compete with it. There is also a low quack by the drake as he swims with head high and slightly forward (Fig. 8, Plate 2).

The female's "desire" note is a low cluck, fast and regularly repeated while with lowered head she drifts about the male(as in Plate 2, Fig. 20). The female's "gr-err'-er" or "cr-err'-er" call, more fully described under mating, is also uttered when she is simply *near* the drake; the last stage of mating is always accompanied by this note.

From a male and female together in flight above me I heard a repeated low short quack, slightly suggesting a Black Duck or a Mallard.

The drake often or usually gives a continued short quack in throwing the head back and while in the attitude which ensues (see Plate 2, Fig. 11). Quoting my field notes, "The usual note (apparently male, but possibly female or both) is a sort of quack with a decided nasal, metallic twang; sounds exactly like an amateur first trying a patent duck-call."

Both males and females did a good deal of what appeared to be, and may have been, sneezing.

If I may extend the period in question, I can add that a female, disturbed in her incubating, began a quacking when she had gotten clear of the nesting stub and was in flight to a nearby pond.

An Exceptional Case

To the rivalry and mating actions as described above there remains to be added a unique and notable case. Obviously this is not to be considered as qualifying the standardized behavior of mature and normal birds; rather, it is an aside from the latter subject. On May 1 I noticed an individual that was strikingly "off color." As to explanation of the plumage, I will leave the point for others to determine who have access to the proper series of skins. Under other circumstances of time and place one's first thought would be of simply a seasonal or developmental phase of color; but, with every other member of the flock (as well as all individuals seen elsewhere at this time) in full breeding plumage, it struck me that this odd garb might indicate a case of sexual abnormality. That the bird shared the mat-

ing impulse was beyond question; it was equally evident from his technique that this impulse was not typical and normal — his action was always premature and invariably abortive. Many times I saw the bird attempt to consummate a mating, but in every instance the female spurned him and avoided contact, sometimes also chasing him in resentment of his ill-timed advances. There was a striking contrast between the orderly and standardized procedure of all the other drakes, with relation to their mates, and the unco-ordinated rushes of the off color individual; for the latter's charges would always begin at a distance of some dozen to twenty-five or thirty feet from the intended mate, instead of the customary yard or less; nor were they preceded by the dabbling, stretching and preening so characteristic in other drakes. On May 13 this bird was still on Ice Lake.

Ice Lake. Looking north from the blind with several Barrow's Golden-eyes in the water.

My field notes describing the individual in question are as follows: "Head somewhat less crested than typical male, more crested than typical female; white on lores somewhat restricted, rest of head dark sepia with violet-purple gloss; sides and flanks like female, dark; breast, violet-gray; belly, white; upper parts, wings, tail, dark grayish or grayish-brown; feet dull flesh or dull orange, clouded with grayish; ring around neck white. Altogether, coloring and marking intermediate between typical male and female." Bear in mind that the description just given may be inexact in many details; but, for each part described, the *effect* produced by the live bird (for the specimen was not taken) was as stated, seen at close range.

Wild Life Associations

The golden-eye was merely one of the various wild life attractions on and about Ice Lake. Mallards were always present (usually several pairs), Green-winged Teals were usually represented by a few pairs or a small flock, now and then there were a few Widgeons and Shovellers; Pintails, in small numbers, were frequent visitors; occasionally there was a small flock of Ruddy Ducks. American Mergansers, never more than a very few at a time, would come in to try the fishing — successfully, too. A pair of Canada Geese occasionally would rise honking as I came close to the lake, to return and alight out near the middle soon after I had disappeared in the blind; they might then slowly swim ashore where the gander (presumably) would stand guard with watchful head raised high while the mate walked about, feeding. An Osprey, probably from the nest on famous misnamed "Eagle Nest Rock" a mile away, was a very frequent caller. A Kingfisher used one of my bough tent-supports for his lookout.

A few beavers, from a lodge two hundred feet from the blind, were in the daily habit of passing to and fro fifteen or twenty feet from me. Deer passed within sight of my peep-hole and once a lank coyote snooped by, skirting the opposite shore. Muskrats were abundant, instructive and entertaining. That is to list only some of the notables among those present.

Mountain Song Sparrows, Yellow Warblers, Western Robins and Mountain Bluebirds were nesting in the shore thickets or nearby pines. Within one hundred feet of the lake I collected for the Yellowstone Park Museum in due time one set each of eggs of Mallard, Thick-billed Red-winged Blackbird, and Mountain Song Sparrow. Cassin's Purple Finches were nesting a hundred yards from the east shore. Hence it will be understood that even an eight-hour day in the blind seemed all too short even though during the hasty lunch one's eyes could still look continuously from the peep-hole. There was never a dull or idle moment. If a lull occurred in the golden-eyes' affairs, there was always something, if no more than a muskrat or two, to be picked up by sweeping the shoreline with the glass; very often it was not necessary to look so far for the rats; they were fond of landing right in front of the blind and nosing about in the scant leavings from my lunch.

I think no allowance whatsoever need be made for any influence on the golden-eyes' behavior, as recorded in these notes, by the other more or less associated forms of wild life. The only species calling for remark in this connection are the various other ducks, the beavers

and the muskrats. As for the ducks, the other species simply did not mingle with the golden-eyes; each species kept by itself or, at times, mingled more or less casually with its more closely related species, as Mallards with the Teal and Shovellers. When the golden-eyes were spread about the lake all species were of course rather generally intermingled; still, in the matter of any inter-relations, the golden-eyes were simply "out of it"—a species apart; where the flock had drawn together in any of its "courting bees" other species never mingled or interfered. Beavers and muskrats were in a single category; either species could pass as if unnoticed unless the distance were less than fifteen or twenty feet; otherwise, the duck would swim rather deliberately out of the way a couple of yards or so. Even when the beaver or rat was coming swiftly and directly toward the duck, the latter seemed to regard the oncoming animal as little more than simply a small moving object with which impact was to be avoided.

Yellowstone Park, Wyoming.

SOME IMPRESSIONS OF THE COMMONER WINTER BIRDS OF SOUTHERN ARIZONA

BY MYRON H. AND JANE BISHOP SWENK

Southern Arizona has much to offer to the ornithologist and bird lover of the northern United States by way of a decided contrast in the character of its bird life. It was our privilege to spend the winter of 1926-27 (October 19 to April 27) in this interesting region; and we have since thought it might be interesting to others if we briefly described how two Nebraskans, familiar enough with the birds of the North, but making their initial acquaintance with the commoner winter birds of this Lower Sonoran or semi-tropical country, were impressed by them.

Our stay was at the historic and flourishing city of Tucson, which lies picturesquely in the approximate center of Pima County, on a level plateau of about 2,400 feet elevation that is thinly clothed with vegetation of the verdant desert type—i. e., various cacti, scrubby mesquite, creosote bushes, etc.—and is practically surrounded by imposing and eternally varyingly hued mountain ranges, some of which attain an elevation of 10,000 feet and support a Transition fauna. We found the weather during our stay to be generally very pleasantly bright and dry, except for a period of about three weeks in December when there seemed to us to be a good deal of cloudy and showery weather for a desert country. The days were nearly all warm, but the night

temperatures from early November to March not infrequently dropped to freezing or a little below. No effort whatever was made by us to search out the rarer winter birds of the region; in fact, practically all of our observations were made incidentally right in the city of Tucson or on short hikes in its immediate environs, including, however, longer trips to Sabino Canyon at the base of the Santa Catalina Mountains to the north, to the base of the Tucson Mountains to the west, and to the Mexican boundary to the south. The birds here mentioned were all seen by both of us, but the records of bird songs have been excerpted wholly from the note book of the junior author.

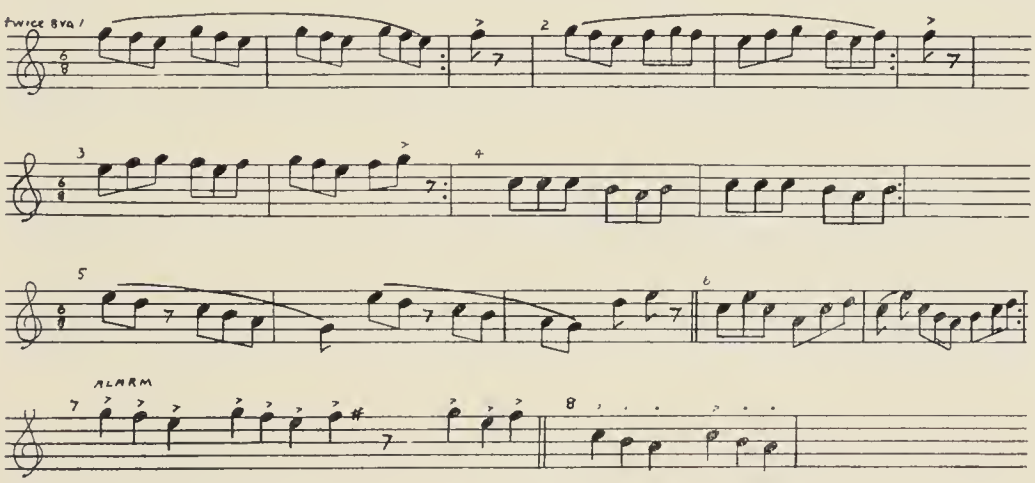
Without a doubt the most abundant bird in Tucson and its environs was the handsomely reddish-purple-splashed male House Finch (*Carpodacus mexicanus frontalis*) and his grayish, brown-streaked mate. These birds were as common there as the English Sparrow is with us in Nebraska; and that gamin itself was of course not absent in Arizona either, but it seemed to us less prosperous in the face of real competition put up by the House Finch. We were not, of course, wholly unacquainted with the House Finch, having previously met with it in Colorado and southern California, but we had never before been privileged to enjoy an intimate association with it for months.

When we arrived at our home for the winter, on October 20, these finches were plentiful and conspicuous everywhere about the house. About 6:20 each morning they began to twitter in their sleeping places in the woodbine vines just outside of our east window. By 7 o'clock they were in full song, and from then on they continued singing lustily all the morning, especially around 10:00 A. M. when their songs were at the loudest. Early in November we noticed that they were gradually singing less frequently and less loudly; in fact, it seemed that their numbers about the house were becoming fewer. This period of diminished vocal effort extended from about November 5 to Christmas time. Toward the end of December the desultory songs became more frequent, and continued gradually to increase in frequency during January, so that by early February the birds were again singing as lustily as they were when we arrived in the preceding October. By the time nest building was started, early in March (we saw the first birds carrying nesting material on March 7), the singing of the males was at its height, and continued so through the remainder of our stay.

The House Finch is a joyous bird, and it expresses its joy in its rollicking, warbling song. The song itself is not long, but it is rapidly repeated many times, producing a long-continued flow of singing. The

song has many variations; in fact, but rarely do you hear two songs that are exactly alike. Different individuals will sing slightly differently, and the same bird will vary his song from time to time, but the song always has the same basic structure, is rather consistently given in 6/8 time, and all of the songs share the same general quality.

The first four of the following are typical or usual songs, as given when the finches resumed vigorous singing in February. The four sets of triplets would be repeated many times, sometimes very fast, usually finally ending in a single interrogatory note one or two tones higher than the last note of the final triplet, or else on the lowest tone of the triplets, as if to finish the song completely. The fifth song was that of a highly-colored old male heard on February 26, and presented



a somewhat unusual form. The sixth song was that of a male that frequented our front porch at nesting time (March 7 on), and is rather more varied than the first four songs here given, expressing the over-jubilant mood the singer was in. No. 7 represents notes of alarm given by this bird on February 4 when a dog was prowling about in the yard close by. It was a series of strongly accented quarter notes. When we disturbed him he would sometimes give the call numbered 8 as he flew away. Often during March and April the birds sang while on the wing.

In town, about the houses, during April we found several House Finch nests in the trees and hedges, but out in the open desert all of the nests that we found were concealed in the protecting arms of the cholla cactus. We found the first completed sets of eggs (two sets) on April 2, and young were commonly out of the nest by the end of that month.

Next to the House Finch, the most abundant winter sojourner about our place was the dainty Gambel's Sparrow (*Zonotrichia gam-*

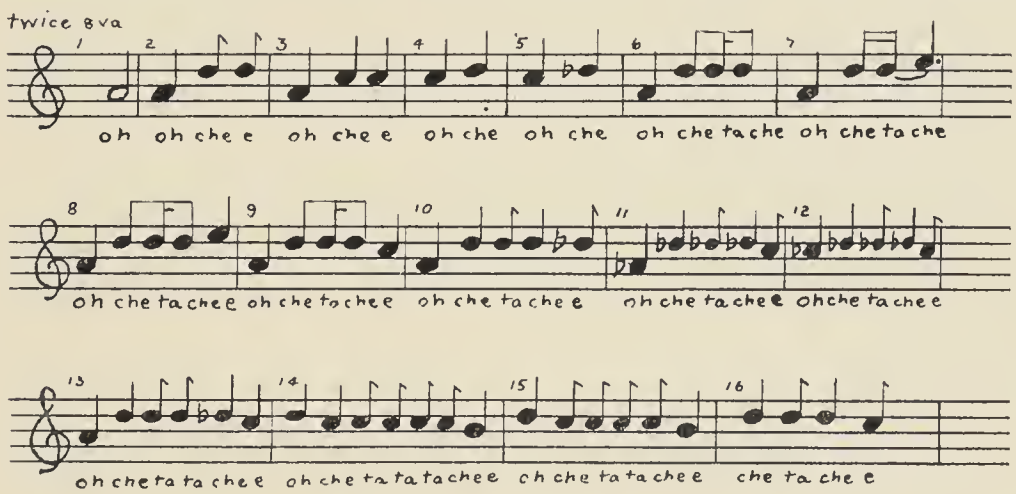
beli), which occurred in small troops everywhere about town from early December until the end of April. We first noted two of these handsome birds in some low trees in one of the several city parks on the afternoon of November 6; and the first thing we heard, early the next morning, was the characteristic song of this species in our own back yard. There were four of them — three adults and one immature bird, the latter easily distinguishable by its chestnut and white instead of black and white crown — feeding on the ground. A feeding board, amply provisioned with rolled oats, was at once put up, and the birds quickly responded to this hospitality. Two adults came on November 11, and from then on more or less regularly through the remainder of the month, others joining the party from time to time until by December 1 several of them were visiting the feeding board regularly and enlivening the day for us with their pleasing singing. Several of our visitors by this time were immature birds. This troop remained at about constant numbers up to December 14, when further additions became noticeable, and Gambel's Sparrows were abundant everywhere. The maximum numbers were reached about the end of December, and remained unchanged through January, February and March. Then during April there was a gradual falling off, so that by the end of that month there were very few of the birds remaining anywhere in town.

Out of many individual crown sparrows closely examined through the glass, all that were seen clearly enough to definitely establish the point had the characteristic pale lores, with the superciliary stripe attaining the bill, of the Gambel's Sparrow; and not one had the black lores and interrupted superciliary of the White-crowned Sparrow (*Zonotrichia leucophrys*). This latter species, according to Swarth (A Distributional List of the Birds of Arizona, Pacific Coast Avifauna No. 10, p. 53), migrates commonly through Arizona, usually in company with the Gambel's Sparrow, but evidently winters farther south at this longitude, since there seems to be no authentic record of its wintering in Arizona, even in the southern part; while the Gambel's Sparrow is not only an abundant migrant throughout Arizona but winters commonly in the southern part of the state. Our winter singers among the crown sparrows were, therefore, undoubtedly all *Z. gambeli*.

The song of the Gambel's Sparrow, as heard during the winter period in Arizona, consisted typically of a long, clear, sweet, whistled, introductory note, usually on A but sometimes on C or D, usually followed by from one to six shorter, dreamy, plaintive notes, usually on D but sometimes on C, all at the same pitch and equally emphasized

except the terminal note, which was commonly rather blurred or double-toned in quality and a tone or a half tone higher or lower than the rest of the series of shorter notes. The variations were, of course, many, but the following sixteen excerpts from the singing of different birds that were heard from early January to early April are representative.

In January we frequently heard the single, whistled half note (1), or a quarter note followed by two eighth notes (2) or two quarter notes (3), while the longest songs consisted of only three (6 and 7) or four (8) notes following the initial quarter note. By March, while the songs of the shorter type (5 and 5) were still to be heard occasionally, most of the singing represented variations of the typical

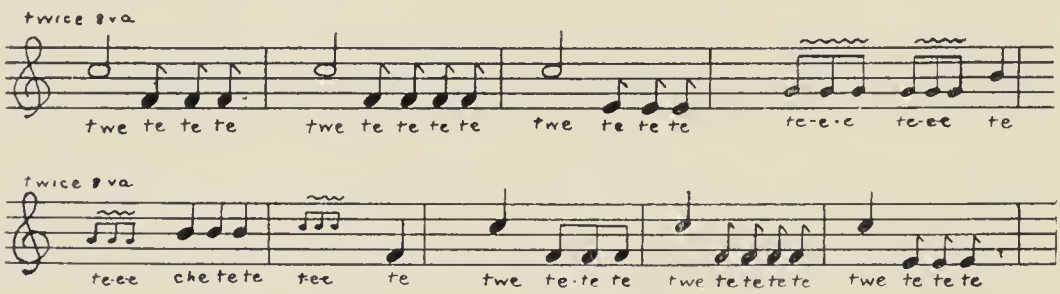


whole song "*oh, chee-ta che-e*" (8, 9, 10, 11 and 12). By the end of March (28th) or early in April (1st) songs with five or six shorter notes following the opening quarter note were dominant (13, 14, 15).

The singing of *Z. gambeli* is either different from that of the closely related *Z. leucophrys*, or else the songs of these birds are subject to considerable geographic variation. Though closely listened for, at no time did we hear the Sierra song of the White-crowned Sparrow, as described by Mrs. Florence Merriam Bailey (Handbook of Birds of the Western United States, p. 339), consisting of "two long whistled notes of rich and plaintive tone, the first sliding up to the second with grace notes, the second followed by a lower note repeated rapidly three times," viz., "*oh, oh, chee-chee-chee;*" nor (Wild Animals of Glacier National Park, p. 177) the Montana song of the same bird consisting of "four slow, clear notes followed by grace notes," viz., "*oh see the firs, see-see-see-see.*" This latter song we have heard approximated by migrating White-crowns in Nebraska in

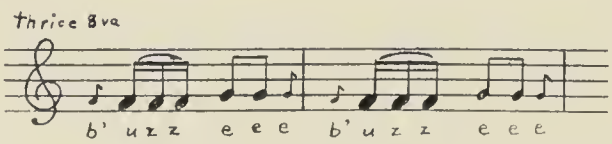
May—a clear, plaintive, whistled "*oh, che, che, che, che-witty-witty*" consisting of a low, softly upwardly slurred introductory note, followed by three distinct, clear, highly pitched, whistled notes, the first of which is emphasized, and ending hurriedly with three burred descending notes, sometimes shortened to "*oh, che, che, wit-chee,*" in which the distinct, high, whistled notes are reduced to two, and the ending is abruptly descending, two-syllabled and rather harsh.

A bird that winters more or less commonly in the valleys of southern Arizona (Swarth, p. 56) is the attractively colored Desert Black-throated Sparrow (*Amphispiza bilineata deserticola*). We first noted this species in the desert on December 3, but at that time it was silent. On April 2, however, as soon as we entered the edge of the



desert north of Tucson we heard a new bird voice in the tinkling, canary-like song of this bird. Soon we saw several of them in the creosote bushes (*Covillea*), and had the opportunity of listening to several males in full, ecstatic song. The song was rapidly given and sustained, and frequently included triplets of what sounded like double-toned notes. The following is an effort to record the song of one of these birds. This sparrow was common in the desert about Tucson, but of course was never seen in the city itself.

Although the Green-backed Goldfinch (*Astragalinus psaltria hesperophilus*) is supposed to be a resident bird in the valleys of southern Arizona (Swarth, p. 51), we did not encounter it until in April. On April 8, while we were passing through the little city park in which



we had first noted the Gambel's Sparrow, we heard several repetitions of the following little song, that from its pronounced buzzing quality we thought must be that of the Pine Siskin, but that was yet not exactly the same.

We soon located the birds—a flock of about a dozen feeding on the ground under some trees in a perfectly typical Goldfinch manner. The

song was very high pitched, and entirely different from anything we have ever heard our common *A. tristis* utter in Nebraska, but very like the song of the Pine Siskin. After this first meeting with the Green-backed Goldfinch we frequently saw and heard them in little groups in different parts of town; they became, in fact, quite common before the close of April.

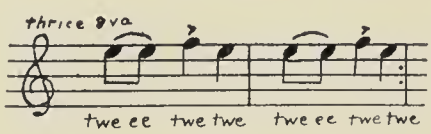
The Arizona Cardinal (*Cardinalis cardinalis superbus*) we found to be resident and common in the desert shrubbery environing Tucson, and we also occasionally glimpsed the related Arizona Pyrrhuloxia (*Pyrrhuloxia sinuata sinuata*). We first noted two individuals of this latter bird, a species new to us, in the desert north of Tucson on December 3, and last saw it twice between Tucson and Nogales on April 8. The Arizona Cardinal was more frequently noted, and on April 20 we had the pleasure of seeing a female sitting on its nest in a dense mesquite thicket southwest of town. Both of these birds seemed to us much shyer than our northern Cardinal is in Nebraska.

A familiar bird to us Nebraskans, albeit the males were in the unfamiliar streaky winter plumage, was the Lark Bunting (*Calamospiza melanocorys*). We saw a large flock of these birds on the desert north of Tucson on December 14. They were feeding in scattered longspur fashion on the ground and gave their characteristic call note as they flushed and flew away at our approach. Later in the day another smaller group was seen roosting in a clump of cholla cactus. From then on until early April they were present more or less commonly. The last two were seen on April 2.

Flocks of Red-winged Blackbirds (*Agelaius phoeniceus* subspp.?) were abundant in the city all winter. An especially large and noisy assemblage of them was discovered on November 14, roosting at night in the large palms on and near the University of Arizona campus, and from appearances they had been roosting there for some time before we found them. They foraged by day in the surrounding country. The flocks seemed to increase in size until about December 10, when they remained at about constant numbers until early in March. On February 27 we noted that a large number of Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*) had joined the flock, and were contributing their guttural calls to the confusedly liquid Red-wing chorus. A Dwarf Cowbird (*Molothrus ater obscurus*) found dead under a palm tree in the city on October 22 was the only contact we had with this bird, which apparently winters but rarely in the Tucson region (vide Swarth, p. 47). The only Western Meadowlark (*Sturnella neglecta*) that we saw all winter was a lone bird on December

19, near the eastern edge of town. We saw an oriole at a distance on April 8, south of Tucson, that we took to be the Bullock's Oriole (*Icterus bullocki*), but otherwise we did not encounter any orioles. Judging from the commonness of oriole nests in the tall cottonwoods and other trees in the city, however, this species must be common there, later in the season.

The only warbler that we saw all winter was the pretty little Audubon's Warbler (*Dendroica auduboni auduboni*), but that species was abundant everywhere, both in the trees of the city and in the shrubbery of the desert. Along in November we began to hear the very sharp and short "*twit*" calls of this species in the trees about us, and from early December on until mid-April when out-of-doors one was scarcely ever out of the hearing of it. On the morning of November 22 we picked up an immature female of this species in our yard, it evidently having been killed during the night by striking a wire.



Toward spring, and especially in April, the very high-pitched, thin, fine song of the species could be heard almost whenever listened for. The song has no carrying quality. It sounded to us much like "*twe-ee twe twe,*" repeated again and again with little variation.

The White-rumped Shrike (*Lanius ludovicianus excubitorides*) was a common bird, in and around Tucson, all winter. A pair of them made frequent visits to our back yard, of a morning in the early winter, where they were wont to perch, one on each radio pole, and call their "*kee-kee-e-e,*" shrilly to each other for minutes at a time. One or both of them were particularly noted doing this on November 4, 9, 19 and 21 and December 19; but after that they came no more. Along the valley roads in the spring this shrike was, next to the Desert Sparrow Hawk, the most abundant species of bird, exceeding slightly in numbers even the abundant and omnipresent Arkansas Kingbird.

We had hoped to see more of that odd bird, the Phainopepla (*Phainopepla nitens*), than we did. It apparently did not winter about Tucson, at least not commonly, and the first and only individual seen by us was one flying over the desert southwest of town on April 20. On March 6 we had the pleasure of renewing acquaintance, under strange surroundings, with our familiar friend the Cedar Waxwing (*Bombycilla cedrorum*). A flock of a dozen or more of them was seen right in town along an arbor vitae hedge and in the trees above.

This bird is recorded as of rare and irregular occurrence in Arizona (Swarth, p. 64), though it has previously repeatedly been observed at Tucson, from March to June. Another old friend, of more regular occurrence in winter in the Tucson region (Swarth, p. 81), that we encountered there, was the Mountain Bluebird (*Sialia currucoides*). On December 14 we saw an open flock of about a dozen of these beautiful birds on the desert north of town, and on December 31 we saw a lone individual in the same locality. On both December 3 and 14 we saw several Western Gnatcatchers (*Polioptila caerulea obscura*) in the creosote bushes on the desert north of Tucson, but we did not again encounter them later in the winter, though they are known to winter in the vicinity (Swarth, p. 78).

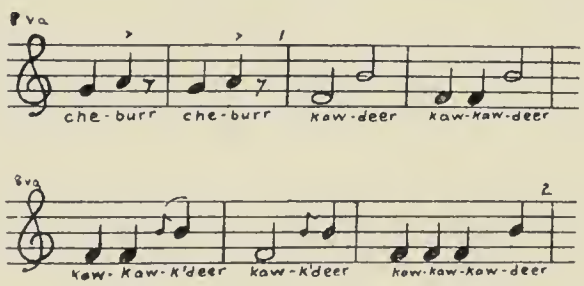
On our first trip into the open creosote bush and cholla cactus covered desert north of Tucson, on November 21, one of the first birds we encountered was a medium-sized, long-tailed, plain grayish brown bird, with a long, slightly curved bill, that flew up from the ground with the loud "*ter ter it*" *call*, and flew to a cholla cactus ahead. Immediately we knew we were having our first sight of the Palmer Thrasher (*Toxostoma curvirostre palmeri*). Soon another one was seen, and on every subsequent trip to the desert we encountered several of these birds; in fact, they proved to be one of the commonest species of the open desert. Early in March (5th) we noted that they were nesting, their bulky nests being conspicuous objects in the cholla cactus, upon the formidable spiny armature of which the birds evidently relied for the protection of their nests. At this time they had a loud, distinctly thrasheresque song. On April 2 fully fledged young were found, one unwary young individual nearly permitting itself to be picked up by hand.

The Western Mockingbird (*Mimus polyglottos leucopterus*) was not noted until early in April, and we believe it winters but sparsely in the Tucson region. On April 8, south of Tucson, it was very common, being outnumbered only by the Desert Sparrow Hawk, White-rumped Shrike, Arkansas Kingbird and Western Mourning Dove. By April 20 these birds were in full song everywhere.

Three wrens winter in the Tucson region — the Cactus Wren (*Heleodytes brunneicapillus couesi*), the Rock Wren (*Salpinctes obsoletus obsoletus*) and the Canyon Wren (*Catherpes mexicanus conspersus*) — in our experience decreasingly commonly in the order given. All are permanent residents there. We made our first acquaintance

with the big (for a wren), spotted-breasted, skulking Cactus Wren among the cholla cactus on the desert north of town on December 3, and thereafter at intervals met with it again in the same situations. Later we became acquainted with the bulky, globular nests of this species, protected, like those of the Palmer Thrasher, by the excessively spiny branches of the chollas, in which those nests that we saw were all placed. They had reared a brood of young by April 20. The Rock Wren we knew as an old friend, it being common in proper situations in extreme western Nebraska. We saw our first ones—a pair in a rocky gully—near Sabino Canyon on December 19, and later found them to be common in the rocky hills.

On the morning of October 24 we were attracted by a plaintive familiar call, and, stepping outside, we saw a pair of the Say's Phoebe (*Sayornis sayus*), one perched on the roof and the other on the telephone wire in front of the house. After a time they flew away. From this time on, one or both of what we assumed were the same birds appeared at irregular intervals around the house during the winter—on November 23 (two), December 3 (one), December 14 (two), December 19 (one), January 19 (one), January 23 (one) and February 4 (one)—thus indicating that the species remains through the winter in the vicinity of Tucson. Others were seen in the desert. During March and April these birds became much more common, and "our" pair settled down to build its home under the front porch of a house about a block away. By April 14 there were young in this nest.



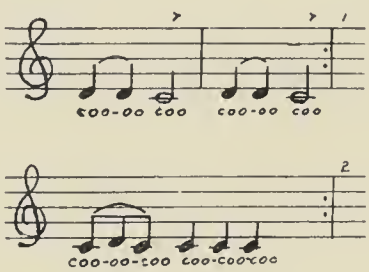
The Arkansas Kingbird (*Tyrannus verticalis*) was, of course, absent during the winter in the Tucson region, but it returned early in April. We saw the first ones on April 2, in our favorite little park, loudly calling "*che-burr, che-burr*" from the tree tops in decided Kingbird fashion. The call sounded as if the birds put so much emphasis on the "*burr*" that they had to stop abruptly to take in a breath after each call. Within a week the roadsides of the whole region roundabout were abundantly supplied with these birds, so that only the Desert Sparrow Hawks and White-rumped Shrikes could be counted as

more numerous in such situations, and from then on to the end of our stay their varied, chattering "*kaw-kaw-deer*" notes were to be heard everywhere, both in the town and in the open country. Aside from this and the preceding species, the only flycatcher that was seen by us was one we somewhat doubtfully identified as the Ash-throated Flycatcher (*Myiarchus cinerascens*), seen April 8 between Tucson and Nogales.

The Raven (*Corvus corax sinuatus*), though a resident bird (Swarth, p. 46) was seen by us only once—two of them along the road between Tucson and Nogales, opposite the Santa Rita Mountains. The Roadrunner (*Geococcyx californicus*), that odd ground-living cuckoo, is also resident, and was apparently more common, several of them being seen by us. Of hummingbirds we saw only one species—the Costa Hummingbird (*Calypte costae*)—but after the apricot trees in our yard came into bloom these were seen commonly about the blossoms, and on April 16 we had the pleasure of seeing a beautiful newly completed nest of this species in a vine growing over the doorway of an occupied house in the city. The Desert Quail (*Lophortyx gambeli*) we found to be common in the desert, and it furnished a good deal of sport to the local gunners in the fall. It was inclined in the spring to run ahead in the road, like our Bob-white used to do in eastern Nebraska twenty-five or thirty years ago, before it became virtually extirpated here, and its call was strongly suggestive of that of our northern bird.

There is one Arizona bird that is strictly a bird of the towns—the little Inca Dove (*Scardafella inca*). According to Swarth (p. 24) it is exceedingly local in its distribution. It was very common in Tucson, but we never saw it on the desert. On April 8, going from Tucson to Nogales and return, a distance of fifty-odd miles, we did not see a single Inca Dove between the two places, though they were common enough in each. On the other hand, the Western Mourning Dove (*Zenaidura macroura marginella*), so common in the towns of the North, was not seen by us in Tucson, but was common around the little outlying settlements. We encountered the Inca Dove almost at once on our arrival at Tucson, there being small flocks dispersed all over the city. Several of them habitually visited our back yard. Some were seen all through the winter, for the species is resident, though it seemed to us that there were more of them about in October and November, and again in March and April, than in December, January and February. This is a small, "scaly backed" species with a long, white-edged tail, and shows conspicuous reddish brown coloration in

the wings when it is in flight, suggestive of that shown in the Yellow-billed Cuckoo's wings. These little doves are very tame and can be approached to within a few feet. The call of the Inca Dove is a monotonous, unvaried, rather hard yet plaintive "*coo-oo-coo*" or "*who-oo-who*" (1), rapidly repeated over and over. There is a blowing quality in it. We heard this call all through the winter, but it became louder and more insistent as the nesting season approached in March and April. It is very different from the soft, drawled "*coo-oo-coo, coo, coo, coo*" (2) of the Mourning Dove. We noted the latter first near San Xavier Mission, south of Tucson, on December 26—a flock of twelve or fifteen—and again in greatly increased numbers on different occasions in April.



The commonest woodpecker seen during the early part of the winter in the cottonwood, poplar and other deciduous trees in the town was the Cactus Woodpecker (*Dryobates scalaris cactophilus*), a species of about the size of the Downy Woodpecker of the eastern United States, and of similar general habits and voice, but with the back crossbarred black and white. We saw and heard the first one on November 18, then another (a male) on the 24th, the next one on December 4 and again one on December 24 (a female). Although the species is recorded as resident, we did not see any after Christmas day. In the same tree with the male seen on November 24, and conversing spiritedly with it, was a male Red-naped Sapsucker (*Sphyrapicus varius nuchalis*), the only one seen during the entire winter. The commonest woodpeckers of the locality were the Gila Woodpecker (*Centurus uropygialis*) and the Mearns's Gilded Flicker (*Colaptes chrysoides mearnsi*), both of which are resident and were encountered from December to April whenever we entered areas in which the giant cactus or saguaro occurred numerously. They both nest in holes that they dig in this remarkable plant, which takes the place of trees in the desert, and we did not see them elsewhere. The Gila Woodpecker reminded us very much of our Red-bellied Woodpecker, but had less red on the crown in the male, and none in the female, and the wash on the under parts was yellowish rather than reddish. Its loud "*charr-r*" call notes and general behavior, however, reminded us more

of our Red-headed Woodpecker. The Mearns's Gilded Flicker looked and acted much like our common Northern Flicker, but that the red nuchal crescent was lacking and the malar stripe of the male was red, as in the Red-shafted Flicker, instead of black. Both of these woodpeckers were especially common about the Carnegie Desert Laboratory in April.

Two small birds of prey profit by the numerous woodpecker excavations in the giant cactus, in that these supply them with nesting sites. These are the Elf Owl (*Micropallas whitneyi*) and the Desert Sparrow Hawk (*Cerchneis sparverius phalaena*). We have no real idea how common this tiny owl may be in the saguaros, but on one occasion we found one sitting in the opening of its burrow, calmly blinking down at us, and allowing itself not only to be photographed at very short range with a small pocket camera, but afterward to be dragged out of its retreat. The Desert Sparow Hawk, is certainly *very* abundant everywhere. A pair of them visited the radio poles on our house on three occasions during November (18th, 21st and 25th), thus emulating the White-rumped Shrikes. In the spring, during April, they were easily the most numerous bird along the roadsides and among the giant cacti, where they nested. Aside from the Desert Sparrow Hawk, the bird of prey most in evidence was the Turkey Vulture (*Cathartes aura septentrionalis*), which during the late winter and spring was quite plentiful. On one day we saw over a dozen of them. The Marsh Hawk (*Circus hudsonius*) was also seen in small numbers in April.

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ARE BIRDS DECREASING IN NUMBERS?

BY ALTHEA R. SHERMAN

In replying to a query regarding the decrease of birds in recent years a careful observer would be quite apt to say that many species are decreasing in numbers, while a few are increasing. Such would be my answer, based on memory impressions, as well as on daily written records. Within the past three years friends have signified their recognition of a keenly felt loss of certain birds, formerly common or abundant, speaking somewhat in this wise: "We seem to have lost our Bobolinks. In this entire summer I have seen a Bobolink only two or three times." While another asks, "Tell us what has become of the Bobolinks, Kingbirds, and Bluebirds? We used to see many of them by the roadside, but now they are seldom met." Such

remarks have been made by elderly men, living in the counties of Winneshiek, Allamakee, and Clayton, which occupy the northeastern corner of Iowa. They are men who have known the fields and highways of the region for seventy years or thereabout. One object of this paper is to substantiate these impressions with figures taken from written records, kept daily, based on intensive observations, covering a score of years, and made on the same acres, whose natural conditions have changed very little in that period.

During the twenty years under consideration the changes in natural conditions, which have materially affected our bird population, pale before the magnitude of the changes that preceded them. Of these it may be permitted to speak briefly. To Farmersburg Township, Clayton County, Iowa, my parents came upward of eighty-two years ago, in May of 1845. Three, possibly four, homes preceded theirs, but these were built in the shelter of the woods, whereas they located on the treeless, trackless prairie wilderness, whose wide expanse of wild grass was unbroken by any object. The memories of their older children reach back seventy-five years, but mine for only seventy years or a trifle less, when many changes already had occurred. The Wild Turkey, so abundant on the wooded banks of rivers, had been exterminated before that day. Prairie Chickens were still numerous, as were some other ground nesting species. The hosts of Passenger Pigeons still passed in migration, while as late as 1865 the honking of wild geese, flying northward, caused sleepless nights for a young man, recently arrived from the East. To have kept for sixty years a record of the coming and rate of increase of bird species would have been a most desirable achievement. Instead of that I was sent from home to school in 1869, and for the next twenty-six years was absent except for brief intervals. For a few years after residence in the family home was resumed other duties claimed my attention.

The spot where my bird studies have been conducted became the family home in 1866. It was situated on the southern edge of a small, frontier village, that the coming railroads did not approach, consequently it shared the fate of many another hamlet similarly situated. Our home dooryard contains about an acre of land. The changes it has undergone in sixty-one years are characteristic of many prairie localities and have close connection with the bird species displaced and those attracted to it. The first change on grass covered prairie soil, which held no attraction except for ground nesting birds, was the building of house and barn. The barn has provided nest

sites for seven species of birds. The next change came with the growth of trees, shrubbery, and berry bushes; the last, important change has been due to lack of pruning and to riotous thickets for the planting of which the birds brought the seeds. The elderberry is the most attractive of these and its bushels of berries find favor in the sight of fall migrants. Drawn by bird planted bushes there have come within the past half dozen years to nest the Traill's Flycatcher, Indigo Bunting, Cedar Waxwing and Yellow Warbler. Of the forty species of birds, known to have nested on our premises within twenty-two years, thirty-six of them have nested within the limits of the dooryard. Probably thirteen instead of forty would have numbered the breeding species had the land remained in its original wild state.

The duration of the period whose figures are here discussed is from 1907 to 1927, inclusive, which makes twenty-one years, but I was absent the whole of 1914 to the middle of September, therefore no account is made of that year. There have been other long absences, but these occurred late in the fall months, mainly after migration had ended, or in the winter. There have been short breaks in the summer records, which have not seriously affected the general averages.

A daily record of the birds seen or heard has been kept throughout the year. From about November 12 to nearly the same date in March rarely are other than resident birds to be seen. These are seen from the windows. For the remaining 245 days of the year to window observations is added the list of birds found on a walk over our own acres and along the highway for a distance of a half mile or more, occasionally less. On this walk approximately a hundred acres can be viewed with binoculars for the identification of the larger species and the smaller ones near at hand. The time given to this counting of species would average two hours a day for the greater part of eight months. Shorter hours are offset by the time given on days, when nearly the entire time is devoted to watching the migrating hosts. Since 1905 there have been identified on or from our land 162 species of birds. The largest number in one day was 52. Out of this total of 162 species the annual lists show that from 92 to 109 species are recognized yearly. The records for thirteen years of nearly unbroken observations give an annual average of 103 species, while the average for the past three years is 94 species only.

Even more deplorable than this decrease of species shown by the annual totals are the showings made by the median number of bird species daily present in the three months of June, July, and August.

when the lists consist chiefly of breeding birds. The daily average for these three months in the four year periods 1909 to 1912, and 1917 to 1920 was 21 for each, but for the four years 1924 to 1927 inclusive, it was 17. In 1921 for June and July only it was 25 species; for the same months in 1927 the daily average shrank to 16 species. It should be noted here that the decrease of nine species in the breeding months names the same number shown in annual totals, when 94 species instead of 103 is the average. Any bird student, keeping records of this sort, ought to be able to answer, "It is death," to the question, "What has happened to our Kingbirds, Bobolinks, and Bluebirds?" and confidently add that equally with these have the Chipping Sparrows suffered; that beyond our ken have passed a large proportion of the Bob-whites, Prairie Horned Larks, Baltimore Orioles, Vesper Sparrows, Cliff Swallows, Barn Swallows, Warbling Vireos, Maryland Yellow-throats, and Short-billed Marsh Wrens, which until very recent years helped to make longer these daily lists. All are not yet extinct. To restore *some of them* to their former numbers is still possible, if mankind is willing and will act.

The next step will be to outline the status of certain species of the listed birds. In the fall of 1907 I built a rude blind for shelter, while observing rails and other marsh birds in a wet ravine about a hundred yards from our house. For a few years there had been a radical change in the occupant uses to which this bit of marshy land was put, also there had been a succession of wet seasons. Due to these two causes the rails flourished in that spot. King Rails were seen on a few days, Virginia Rails were listed on fifty days of 1907 and the following year, and the Sora Rail on ninety-five days. In the spring of 1909 the King and the Virginia Rails were seen only a few times, but the Sora stayed and nested. It is believed that at least two pairs had nests. Our state geologists tell us that the water level in Iowa has fallen fifteen feet in the past fifty years. Springs have dried up that formerly had fine flows of water. This happened to the marshy ravine that was the haunts of the rails. In succeeding years a few of them were seen, but in the past six years only the Sora has been listed, and it on only two occasions.

Numerically the Solitary Sandpiper does not seem to have suffered. Far different has been the fate of Wilson's Snipe. Formerly in migration it was seen in flocks, numbering from six to fifteen birds, on a dozen to twenty days of the year. Gradually its numbers fell to one or two individuals, until in the last two years not one was seen. The Upland Plover, formerly an abundant breeding species, is with

us no more. A pair here in the summer of 1917 probably was nesting. Owing to crop rotations the Killdeer must change its location yearly, making it difficult to estimate its numbers, however, they do not seem to be greatly reduced in twenty years. In this neighborhood a few Prairie Chickens still survive, but now so far from our home that no longer can their booming be heard in spring. It is three years since the last one was listed.

Fortunately, most fortunately, our county's population is largely rural. Its villages are few and small; its largest one numbering less than 1700 inhabitants. This means that the county is quite free from that urban creature, who calls himself "a sportsman," whose pleasure it is to go forth with a gun and shoot such beautiful, beneficient creatures as the Bob-white. Twenty years ago it was a common bird, heard calling daily in summer, sometimes three or four cocks calling at once. For ten years its numbers held fairly well, then came winters of severe cold and drifting snow, after which Bob-white became very scarce. In the summer of 1918 it was heard only twice. Since then a slight increase in its numbers has been detected.

The so-called sportsman is absent, and I have yet to hear of farmers in this neighborhood shooting Bob-whites, but I have seen some of them show deep concern over injuries done to nesting birds by their plows and mowing machines. It is these implements that have worked destruction; these and the life-sustaining cow. If long ago everyone had become a vegetarian, leaving no one to demand veal, beef, pork, and mutton; if chemists had placed on the market synthetic butter, milk, cheese, and ice cream the ground nesting birds would not have fared so badly.

The pasturing herds have been inimical to our wild flowers as well as to our birds. Long, long ago there perished a flower of transcendent loveliness; it was gone before we learned so much as its name. But the beauty of other flowers still glowed on all the hilltops. These in turn vanished. In the tame grass now covering the hillsides may be seen numerous flowering plants, but the plants are ragweed, thistles, and dock. Last year the man, employed to cut roadside weeds, slashed down every evening primrose, jewel-weed, and aster, and left standing every burdock, thistle, and nettle, that I passed on my daily walk.

The early settlers of this region planted deciduous trees about their homes. About forty years ago the general practice of planting evergreen trees for wind-breaks began. Their growth has marked a great increase among the Bronzed Grackles. Before that the King-

birds were numerous. They seem to hold well their own against all birds except the grackle. It and the rare activities of some keeper of bees are the only known causes for the great decrease of the Kingbirds.

Along with the Kingbirds some years ago the Bobolinks held a constant place on the daily bird lists. Both species were marked present for seven days in the week and thirty days in the month until their summer season was over. Fifteen years ago while visiting a cousin on his ranch in California he remarked to me, "I don't know what I'd give to hear again the Bobolinks singing on the old farm in Iowa." Some of his friends have said that his income is a million dollars a year. This he declares is exaggeration. Whatever the figure may be, it has not been lack of the price of railroad fare that hindered his return in the months when the Bobolinks sing. Unless he comes quickly all the millions of the entire globe can not procure for him in this locality one hour of the music of the Bobolink. Even now the absence of its song makes the world seem dreary and when a song is heard the occasion is marked for special recognition. In contrast with former summers, when a grand chorus of song was heard each day, in 1927 I heard a Bobolink sing on four days only. In August the count of individuals in flocks, moving southward, proved that some other localities are more fortunate. To the rice growers on the Atlantic sea-board must be referred those people asking, "What has become of our Bobolinks?"

In 1907 the Red-winged Blackbird was the most abundant breeding species in our neighborhood. Seven of its nests were located on our premises with many more nearby. In the summer just past not seven pairs of these birds were seen on all the acres under my observations. Many dry summers in which farmers could mow the grass on low ground seem to explain the loss among redwings. A similar decline has attended the Meadowlarks. Here both the eastern form and its western cousin are breeding species. Formerly both the Red-winged Blackbird and the Meadowlark could be listed daily, now there is many a break in their records.

For the marked falling off in the numbers of the Baltimore Oriole thanks are due to the Screech Owl. In 1924 a pair nested in one of our maple trees and came daily to the feeding-stick for food. A most enjoyable sight and a brilliant combination of colors were afforded by a Red-headed Woodpecker together with both of the Orioles feeding on the stick at the same time. Later, after the mother Oriole was taken the father strove bravely to feed the three nestlings, but all fell victims to the foe.

Twenty-two of our native sparrow species have visited our home place. While speaking of sparrows let it be said that the English Sparrow has never been listed here, never counted among the birds, it is accounted a pest only, and is with us always. The numbers of our native sparrows *seen* in each migration season depends very much on whether the brook beds are dry or hold water and on what crops the three years crop rotation, practiced by my farmer neighbors, has brought to the brooksides. Enough of these cycles have passed to confirm the opinion that the hosts of visiting sparrows are less than formerly. Among the breeding Fringillidae the status of the Goldfinch alone remains unchanged. The Vesper Sparrow has appreciably decreased. The Dickcissel is always a variable summer resident, sometimes here, sometimes absent. Year after year the spacing of nesting Song Sparrows was the same; six or seven locations were claimed. In 1927 only three of these were occupied. Formerly the Chipping Sparrow was one of the birds to be found constantly on the daily lists. It has not been learned if a foot disease, afflicting the species elsewhere, does so here. But it is known that the increase of its destructive arch-enemies, the Bronzed Grackle and the House Wren, is sufficient to explain its present scarcity.

Any one who has been called upon to write the obituary of a dear, young friend, a friend beautiful and graceful of form, whose coming was like the breath of spring, whose beneficent life blessed mankind and harmed him not, then that person knows full well the emotions felt by any of us when speaking of the swallows — the swallows that were the chief bird joys of our childhood, the Cliff Swallows that built their homes three deep under the eaves of the barns, and the Barn Swallows that built numerous nests within. Hundreds of swallows skimmed the air, where scarcely one can now be found. Last spring, like a token out of the blue, came a flock of Cliff Swallows to the home of a near neighbor. They built twenty-seven nests, almost all of which English Sparrows occupied at once.

In connection with other bird losses it seems fitting to recall the great catastrophe that befell the warblers in May of 1907. Not only warblers, but also vireos, and some of the flycatchers died from lack of food, accompanied by freezing weather. A large portion of our warblers' range was not affected. The area on which warblers suffered death is estimated as upward of one hundred million of acres. In our dooryard of an acre sixteen dead warblers were found. Using this as a basis for computation it has been said that millions of them perished. In the *Auk* for January, 1908, are two articles descriptive

of the calamity, and a short account of it appeared in *Bird-Lore* (September-Oetober, 1915).

It was a bereavement for bird students to have the beautiful family of warblers eome so near extinetion. If one bewailed the loss, he was sure to be told, "Mourn not! Comfort yourself with the thought of the short time taken by the Bluebirds to replenish their numbers, when nearly annihilated!" Naturally one would deem twenty years suffieient for warbler restoration. In spring migrations before 1907 no attempts were made to eount the individuals of the great swarms of warblers that halted in search for food. For sake of later eomparisons this was most unfortunate. However, it was estimated that fully one hundred warblers have visited our trees on some days. Over against this reasonable estimate are placed the reeorded figures for twenty years, taken on the very same grounds, whieh were fully as attraetive for warblers as they were prior to 1907. It was believed that warblers were not inereasing, when a ehart of the figures was made it showed that the family was deereasing. Both spring and fall migrations are eounted. Only in 1915 did the warbler numbers exceed the beggarly few which eame in 1908, direetly following the year of the great death. In the entire spring of 1918 the total of eight species, eontaining twenty-three individuals, was no more than could have been found in one hour of the old days.

Facts so astonishing, so eontrary to expeetations and experience, must have an explanation. Beyond doubt the faets known to be true on one acre are true of the millions of acres north of it. After the House Wrens became established here Maryland Yellow-throats were driven off. Not a warbler's nest had suecessful outeome until last summer, when the wrens having been redueed to a minimum and all Cowbird eggs having been removed from the nest a Yellow Warbler brought off a brood.

The Bluebird is one of the greatest sufferers from the evil nature of the House Wren. Not until about ten years ago were the effeets from the intensive breeding of these wrens felt here. Once more the proof-telling figures show mueh. My daily records show that in eertain past years I enjoyed the presenee of this beautiful bird for sueh annual totals as 126 days, 132 days, 136 days, and 149 days. During all of last year (1926) I saw the Bluebird on four days only, and this ycar on eleven days. What does this mean? Nothing less than that I am being wronged, defrauded, cheated out of my rights to the pursuit of happiness by the maintainers of wren boxes to the north of me.

Among the birds here whose numbers have not changed appreciably of late may be named the Chimney Swift, Phoebe, Blue Jay, Crow, Cowbird, Brown Thrasher, Robin and five species of woodpeckers. I know of no family of birds capable of affording spectators so much entertainment as can the woodpeckers. The Flicker especially deserves a volume for his history. Although a model of fatherhood he is mated to a fickle female, far too often ready to desert him, leaving her nestlings to starve, while she goes off with another male. His trials are enough without the addition of a foreign foe.

The latter part of 1913 and until mid-August of the next year I spent in the Old World, seeing a little of twenty countries. From the first of June onward my itinerary was planned for seeing birds.- The sight of a woodpecker was very rare, marking a red letter day on the bird lists, and there were but three of them. The first was in January, when a Golden-backed Woodpecker was seen in Delhi, India; the other two were in July in which a Lesser Spotted Woodpecker was seen in the environs of Honefos, Norway, and later a Green Woodpecker was seen in a public park of Stockholm, Sweden. This serious dearth of Old World woodpeckers lacked explanation until a few American ornithologists reported instances of Starlings driving Flickers from their holes and usurping the same. The unchecked spread of the Starling seems to repeat a tragedy, similar to the spreading of the English Sparrow with almost nothing being done to save our valuable native birds. Therefore it is gratifying to hear from one man in North America who is doing some of this protection. Mr. John B. Lewis of Lawrenceville, Virginia, has related his difficulties in protecting one Flicker's home. "In the last two years the Starlings have given me no little trouble. Last spring they would have taken possession of all the nest boxes and holes on the place, had I not made free use of a shot gun. More than twenty were killed in about two weeks, before they gave up and quit the premises. Seven were shot off one flicker house in three days."

In my restricted field of observation five bird species have been increasing. Three of them are among the most destructive and undesirable of our bird citizens. Favoring the increase of Screech Owls has been the advantages offered by many woodpecker holes and untenanted buildings, together with immunity from the shot gun. A close study of their habits brings the conclusion that the farther away are all Screech Owls the better it is for all desirable birds.

The coming in abundance of the Bronzed Grackle has been mentioned and the part it plays in the reduction of Kingbirds and Chipping Sparrows. The farmers like to see the grackle following the

plow, picking up the larvae of the May beetle, known as the white grub worm, which destroys their corn. But its good deeds do not seem to counter-balance its harm to other birds.

Among the many melancholy events in a bird history covering a score of years one delightful occurrence stands in bright relief. It was the coming of the Cardinal on its northward advance. Its first appearance in this area was in 1909, and its second visit came six years later. Since 1918 it has been a regular winter boarder, showing in spring a desire to stay for nesting, but is driven off by the Brown Thrashers.

Not so welcome has been the increase of Catbirds. They were plentiful enough before their ranks were augmented. Desirable bushes in which to build nests and an abundant food supply have attracted them. Their gluttony for berries surpasses that of other birds. However great the supply of berries, none is left for us except those under covers, protecting them from Catbirds, Brown Thrashers and Robins.

Here House Wrens have increased immensely in twenty years. Nothing less could be expected, when across the entire continent school children are urged to build and put in place boxes for wrens. A fad or fashion has been started more deadly to many birds than the fashion of wearing bird feathers on women's hats. The disaster following that fashion was not so much the fault of ignorant women as it was of market hunters who killed birds for gain. The disaster following the wren house craze is not the fault of innocent children, but is the criminal fault of those fostering for gain the business of wren house making. They include various classes of teachers and leaders who are selling the birthright lives of many kinds of birds for their own mess of pottage. They have heard the truthful warnings of many who *know* that in summer the House Wren is a constant menace to several species of birds — a menace that is spelling destruction to vanishing birds, greatly needing protection.

Some of us in a few short years have seen great changes in natural surroundings. Having seen the vanishing of some birds from a locality, and other birds take their places; having seen how easily the English Sparrow displaced the beautiful swallows, we can believe that quite as readily the Starling can displace the woodpeckers; moreover, on a small area we have seen the House Wren completely displace warblers and the Bluebird. Those who can lift their eyes to hills once beautiful with wild flowers and now see there naught but ugly weeds realize how easily in nature work the laws of displacement, and how easily good birds are displaced by bad ones.

National, via McGregor, Iowa.

BIRDS OF EASTERN McKENZIE COUNTY, NORTH DAKOTA

BY ADRIAN LARSON

The area covered by this paper lies in the western part of North Dakota. McKenzie County is bounded on the west by Montana, on the north and east by the Missouri River, and on the south, so far as this paper is concerned, by the Little Missouri River. This county, called the "Inland Empire," has about the same area as some of the eastern states; only the northeastern portion of it, about twenty townships (some seven hundred square miles), is covered by this paper.

The region treated is known as the Missouri Plateau, and has an elevation of about 2,300 feet—a little higher on the buttes, and a little lower along the Missouri River. It lies in the Transition Zone. and becomes hot enough at times to be properly classed as the arid Upper Sonoran Zone. Maximum summer temperature has reached 106°F., and in the winter season it has gone as low as 48° below zero. The prevailing winds are southeast and northwest, and the average rainfall is around 14 inches.

There is a great variation in the topography of this region. The most conspicuous topographic feature is the so-called "badlands." Along the Missouri River, and extending for two or three miles inland, the surface is cut up into innumerable gullies, canyons, coulees, washouts, and steep cliffs that beggar description; words can not describe these badlands adequately. Lignite coal seams that have burned, and are still burning, have caused much of the bizarre appearance of this country. Loose, easily eroded soil and torrential rains during the summer have also been factors in the making of the badlands.

When one is in the heart of the badlands, and looking north, the hills and valleys have a cheerless, treeless, and barren appearance. On the other hand, by looking in the opposite direction one will find that the badlands are very well covered with vegetation. Burr oak, gray and black birch, aspens, green ash, elm, juneberry, wild plum, choke cherry, pin cherry, silver berry, buffalo berry, black and red haw, various willows, red cedar, creeping juniper, and bearberry are found in profusion. Along the larger washes will be found cottonwoods, sage brush, buck brush, prickly pear and other forms of cactus. Spanish bayonet, rose bushes, gumbo lilies, climbing bittersweet, wild hops, gooseberry, currant, wild red raspberry, hazel brush—all of these and others will be found in the shadier portions of the badlands.

There may also be found rattlesnakes, bull snakes, blue racers, chipmunks, porcupines, bobcats, white-tailed deer, and formerly the

mountain lion, buffalo, and elk. One of the most conspicuous of the animals is the coyote. Timber wolves used to be found, but they have all been exterminated. The last wild buffalo was shot in 1901, and the elk some years earlier. It is reported that a few antelope are still in this country, but I have seen none myself. The mountain lion is extinct; the beaver was nearly extinct, but is again becoming numerous owing to a closed season.

The eastern bird student will probably be astonished at the number of western birds to be found here. The Rock Wren will be seen bobbing in and out of the crevices and among the rocks. The all-blue Mountain Bluebird is conspicuous. The Say's Phoebe, the Black-headed Grosbeak, and the Prairie Falcon will also be found.

The badlands are found along the Missouri River, but the big badlands are those of the Little Missouri River. These badlands begin near the northern boundary of South Dakota and follow the course of the Little Missouri northward to its junction with the Missouri, in some places reaching a considerable width. For some years a movement has been growing to have a large area of these badlands converted into a national park, to be known as Roosevelt National Park, because Roosevelt spent his cowboy life here.

Another ecological area is the timber growth along the flood plain of the Missouri River, which reaches a width of half a mile in places. The timber is chiefly cottonwood, with a mixture of ash and elm at higher elevations, and various small shrubbery. The fauna which occurs here is closely similar to that of the badlands; but in places where the trees have been cleared away the fauna will be more like that of the plains.

The plains form a distinct life area characterized chiefly by the grasses, such as the buffalo, grama, and blue-joint grasses. The wild rose, buck brush, and silverberry are to be found in the coulees and depressions. This area includes, of course, all of the farm lands. This country has been homesteaded and farmed more or less since 1903, and, as it is a land of fair crops, many of the first homesteaders are still living on their original filings. Many artificial groves of trees are scattered over the prairies, and on the whole it is more than likely that there are more birds here now than there were prior to 1903.

There remains for mention the lake and slough area. The region contains one large slough known as Dimick Lake, which is a great resort for waterfowl. There are also a few smaller sloughs scattered about, which play a part in the ecology of the region. Since this

region was on the edge of the Kansas ice sheet, it is well drained with the exception of the few sloughs mentioned.

My studies in this region began in September, 1912, and continued until April, 1914; then I was away until August, 1916, with the exception of a week in May, 1915. Then I resumed my studies in 1916, and continued them until April, 1926. I have had, therefore, twelve years in this region, including eleven summers and thirteen winters. J. J. Audubon traversed part of this region in 1844, and, doubtless some of the other early ornithologists touched the edge of it in passing up or down the Missouri River. We may believe that there has not been much change in the species of birds since those early years, even though certain species may have changed in status. As remarked above some birds, especially the woodland birds, have probably increased in abundance. It may be a possibility that the Passenger Pigeon, the Whooping Crane, the Trumpeter Swan, or the Wild Turkey have lived here in the past, but I have never heard any of the old settlers speak of them, and I can only leave them out of consideration.

[The following list contains 184 named forms.—Ed.]

Eared Grebe. *Colymbus nigricollis californicus.* A common summer resident and breeder in the sloughs. Average spring arrival May 14 (six years). Earliest spring arrival, May 6, 1923. Average fall departure, September 18 (two years).

Pied-billed Grebe. *Podilymbus podiceps.* A common summer resident and breeder. Earliest date of spring arrival, April 30, 1919. Average fall departure, September 19 (three years).

Pacific Loon. *Gavia pacifica.* On October 19, 1924, a bird was shot on the Missouri River which I considered was of this species. Color pattern, measurements, etc., tallied exactly with the description given in Bailey's "Handbook of Birds of Western United States." The skin was sent to the U. S. Biological Survey for determination, but I never again heard of it.

Ring-billed Gull. *Larus delawarensis.* Rare. Two were seen on November 8, 1925.

Franklin's Gull. *Larus franklini.* A common transient visitant. Average spring arrival, May 1 (five years). Earliest spring arrival, April 29, 1924. Latest spring departure, June 8, 1924. During the spring migration huge flocks will often settle on newly ploughed fields and feed.

Forster's Tern. *Sterna forsteri.* Not common. Two were seen along the Missouri River, June 12, 1925.

Black Tern. *Clidonias nigra surinamensis.* A common summer resident. Average spring arrival, May 20 (eight years). Earliest spring arrival, May 11, 1921. Average fall departure, July 30 (two years). The data on the departure of this species are unsatisfactory.

Double-crested Cormorant. *Phalacrocorax auritus.* Rare. A cripple of this species was caught at Watford City sometime during 1915. In 1920 I saw a mounted cormorant there which may have been the same individual.

White Pelican. *Pelecanus erythrorhynchos.* Not very common. Twenty-eight in a flock were observed on September 26, 1925.

Hooded Merganser. *Lophodytes cucullatus.* Rare. One was shot on October 29, 1916. The lack of fish-inhabited lakes probably accounts for the scarcity of diving birds and mergansers.

Mallard. *Anas platyrhynchos.* A very common transient; a few remain to breed. Both the Mallard and the Pintail lay their eggs in a grassy field or meadow often a mile or more from the nearest water. I have twice found nests of the Mallard at the base of a diamond willow tree in a deep oak and aspen covered coulee. One nest contained twelve eggs, which were later destroyed by crows; the same duck built another nest, which contained eggs when found. Average spring arrival, March 28 (nine years). Earliest spring arrival, March 17, 1926. Average fall departure, November 11 (six years). Latest fall departure, December 10, 1923. In some years of light snowfall a few Mallards have lingered throughout the winter at the air-holes in the Missouri River, feeding in nearby corn and stubble fields.

Gadwall. *Chaulelasmus streperus.* A common transient, a few remaining to nest. Earliest spring arrival, April 21, 1921. Average fall departure, November 9 (three years). Latest date of fall departure, November 19, 1923.

Baldpate. *Mareca americana.* A common transient, a few remaining to nest. Both the Gadwall and the Baldpate linger in the fall until the last pond hole is frozen. Average spring arrival, April 6 (five years). Earliest spring arrival, March 17, 1926. Average fall departure, November 3 (two years). Latest fall departure, November 5, 1924.

Green-winged Teal. *Nettion carolinense.* A common transient, a few remaining to nest. Average spring arrival, April 12 (four years). Earliest spring arrival, April 5, 1921. Average fall departure, October 31 (four years). Latest fall departure, November 9, 1924.

Blue-winged Teal. *Querquedula discors.* A common summer resident, nesting abundantly. Average spring arrival, April 29 (six

years). Earliest spring arrival, April 25, 1925. Average fall departure, October 15 (five years). Latest fall departure, November 9, 1924 (probably a cripple).

Shoveller. *Spatula clypeata.* A common summer resident and breeder. Average spring arrival, April 14 (seven years). Earliest spring arrival, March 24, 1918. Average fall departure, October 31 (four years). Latest fall departure, November 14, 1923.

Redhead. *Marila americana.* A tolerably common transient. average spring arrival, April 17 (three years). Earliest spring arrival, April 12, 1924. Average fall departure, October 27 (three years). Latest fall departure. November 9, 1924.

Canvas-back. *Marila valisineria.* A rare transient. Latest fall departure, November 9, 1924, a red-letter day for ducks.

Scaup Duck. *Marila marila.* A tolerably common transient. Latest fall departure, November 9, 1924.

Lesser Scaup Duck. *Marila affinis.* A common transient, a few remaining on the large sloughs throughout the summer. Average spring arrival, April 17 (six years). Earliest spring arrival, March 31, 1925. Average fall departure, November 9 (three years). Latest fall departure, November 19, 1923.

Ring-necked Duck. *Marila collaris.* The status is about the same as the Scaup. Latest fall departure, October 26, 1924.

Buffle-head. *Charitonetta albeola.* A tolerably common transient. Earliest spring arrival, April 29, 1923. Average fall departure. November 6 (three years). Latest fall departure, November 14, 1923.

Ruddy Duck. *Erismatura jamaicensis.* A common transient; a few may nest. Average spring arrival, May 20 (two years). Average fall departure, October 23 (two years).

Lesser Snow Goose. *Chen hyperboreus.* Rare. April 23, 1918, only record.

White-fronted Goose. *Anser albifrons gambeli.* Rare. June 1, 1925, only record.

Canada Goose. *Branta canadensis.* A regular, but not common, transient. Average spring arrival, March 24 (ten years). Earliest spring arrival, March 9, 1926. Average spring departure, April 5 (six years). Latest spring departure, April 8, 1920. Average fall arrival, October 26 (three years). Earliest fall arrival, October 18, 1924. Average fall departure, November 15 (five years). Latest fall departure, November 17, 1918.

Whistling Swan. *Cygnus columbianus.* Rare. The species was seen on the following dates: April 6, 1921; April 22-27, 1923; November 14, 1923; on this last date five were seen.

Bittern. *Botaurus lentiginosus.* A common summer resident in the marshes and meadows, breeding. Average spring arrival, May 22 (four years). Earliest spring arrival, May 14, 1920. Average fall departure, October 7 (six years). Latest fall departure, October 21, 1924.

Great Blue Heron. *Ardea herodias.* A common summer resident along the Missouri River, breeding. Average spring arrival, April 16 (three years).

Sandhill Crane. *Grus mexicana.* A common transient in both spring and fall. Average spring arrival, April 9 (eight years). Earliest spring arrival, April 3, 1921. Average spring departure, April 17 (three years). Latest spring departure, April 30, 1920. Average fall arrival, September 28 (eight years). Earliest fall arrival, September 14, 1919. Average fall departure, October 10 (seven years). Latest fall departure, November 5, 1924.

Sora. *Porzana carolina.* A common summer resident in the marshes, breeding. Average spring arrival, May 27 (three years). Average fall departure, September 30 (four years). Latest fall departure, October 18, 1925. An imitation of their call will often cause a racket of answering rail calls throughout the marsh.

Coot. *Fulica americana.* A common summer resident of the marshes, breeding. Average spring arrival, May 8 (four years). Earliest spring arrival, May 4, 1924. Average fall departure, October 28 (four years). Latest fall departure, November 9, 1924 (a cripple).

Northern Phalarope. *Lobipes lobatus.* Transient, not quite as common as Wilson's Phalarope. May 20-25, 1924.

Wilson's Phalarope. *Steganopus tricolor.* A tolerably common summer resident, breeding. Average spring arrival, May 11 (eight years). Earliest spring arrival, May 4, 1918. I have no fall records.

Avocet. *Recurvirostra americana.* Rare. I have seen it here only once, June 7, 1925. The scarcity of this species is probably explained by the absence of alkaline lakes and ponds.

Wilson's Snipe. *Gallinago delicata.* A common transient. Average spring arrival, May 2 (three years). Earliest spring arrival, April 27, 1921. Average fall departure, October 18 (nine years). Latest fall departure, November 14, 1923.

Long-billed Dowitcher. *Lymnodromus griseus griseus.* An uncommon transient. September 16-21, 1924.

Pectoral Sandpiper. *Pisobia maculata.* A common transient. Average spring arrival, April 28 (three years). Latest spring departure, May 6, 1923. Earliest fall arrival, July 20, 1924. Latest fall departure, September 24, 1912.

White-rumped Sandpiper. *Pisobia fusciollis.* An uncommon transient. May 20 to June 1, 1924.

Baird's Sandpiper. *Pisobia bairdi.* An uncommon transient. May 4, 1921. September 21, 1924.

Least Sandpiper. *Pisobia minutilla.* A common transient. Average spring arrival, May 18 (three years). Latest spring departure, June 1, 1924.

Semipalmated Sandpiper. *Ereunetes pusillus.* A common transient, which is easily confused with the preceding. Average spring arrival, May 18.

Marbled Godwit. *Limosa fedoa.* Rare. A flock of eight was seen May 27, 1925.

Hudsonian Godwit. *Limosa haemastica.* Rare. One was recorded on May 22, 1924.

Greater Yellow-legs. *Totanus melanoleucus.* An uncommon transient. Latest spring departure, May 22, 1924.

Yellow-legs. *Totanus flavipes.* A common transient. Average spring arrival, April 24 (six years). Earliest spring arrival, April 17, 1925. Average spring departure, May 10 (two years). Latest fall departure, October 15, 1925.

Western Solitary Sandpiper. *Tringa solitaria cinnamomea.* A tolerably common transient. Average spring arrival, May 3 (three years). Earliest spring arrival, April 27, 1924. Latest spring departure, May 31, 1925. Earliest fall arrival, July 17 (two years). Latest fall departure, September 18, 1920.

Western Willett. *Catoptrophorus semipalmatus inornatus.* An uncommon summer resident, possiblly breeding. Average spring arrival, May 13 (four years). Earliest spring arrival, May 1, 1924.

Upland Plover. *Bartramia longicauda.* A tolerably common summer resident, breeding. Average spring arrival, May 10 (eight years). Earliest spring arrival, May 6, 1921. Latest spring arrival, May 15, 1917. Only fall date, August 24, 1924.

Spotted Sandpiper. *Actitis macularia.* A common summer resident, breeding; especially along the Missouri River. Average spring arrival arrival, May 21 (four years). Earliest spring arrival, May 15, 1917. Latest fall date, September 7, 1919.

Long-billed Curlew. *Numenius americanus.* An uncommon transient. Average spring arrival, April 24 (six years). Average spring departure, May 15 (two years).

American Black-bellied Plover. *Squatarolla s. cynosurae.* A rare transient. May 18-22, 1924.

Golden Plover. *Pluvialis d. dominica.* A rare transient. May 27, 1925; also seen in September, 1925.

Killdeer. *Oxyechus vociferus.* A common summer resident, breeding. Average spring arrival, April 5 (ten years). Earliest spring arrival, March 28, 1918. Average fall departure, October 11 (four years). Latest fall departure, October 18, 1925.

Semipalmated Plover. *Charadrius semipalmatus.* Uncommon. A small flock was seen on Dimick Lake on August 20, 1925.

Belted Piping Plover. *Charadrius melodus.* Uncommon. A straggler may be seen now and then on the sandbars in the Missouri River. June 12 and August 28, 1925, are my only dates.

Ring-necked Pheasant. *Phasianus torquatus.* The introduction is apparently successful, as they are becoming common along the Missouri River, where they frequent the timber and brush.

Hungarian Partridge. *Perdix perdix.* I found two in an arroyo near the Missouri River on May 31, 1925. Several pairs have been liberated a year or two previously.

Pinnated Grouse. Prairie Chicken. *Tympanuchus americanus.* A resident, though not very common in winter; it breeds more or less commonly in the neighborhood of the prairie marshes.

Prairie Sharp-tailed Grouse. *Pedioecetes phasianellus campestris.* A common resident, which nests abundantly. This is our common prairie chicken.

Western Mourning Dove. *Zenaidura macroura marginella.* A common summer resident, breeding. Average spring arrival, April 23 (six years). Earliest spring arrival, April 18, 1920. Average fall departure, September 28 (six years). Latest fall departure, October 15, 1923.

[Turkey Vulture. *Cathartes aura.* This species has been reported along the Missouri River; a friend has told that he has seen a half dozen of these birds roosting in the tall cottonwoods along that stream. I have never seen them there].

Marsh Hawk. *Circus hudsonius.* A common summer resident, breeding. Average spring arrival, March 21 (eleven years). Earliest spring arrival, March 12, 1913. Average fall departure, October 18 (six years). Latest fall departure, October 30, 1925.

Sharp-shinned Hawk. *Accipiter velox.* A tolerably common summer resident, breeding. Earliest spring arrival, May 6, 1925. Average fall departure, October 11 (two years).

Cooper's Hawk. *Accipiter cooperi.* Uncommon. Breeds (?). Earliest spring arrival, May 8, 1925. Only fall record, September 25, 1924.

Goshawk. *Astur atricapillus.* A more or less common winter visitor. During October and November, 1916, it was very abundant and destructive to game birds and poultry. Average spring departure, March 15 (four years). Latest spring departure, April 2, 1917.

Western Red-tail. *Buteo borealis calurus.* Not common; may breed. Average spring arrival, March 29 (three years). Average fall departure, October 19 (two years).

Swainson's Hawk. *Buteo swainsoni.* A common summer resident, nesting in the cottonwoods or other tall trees, or on the cliffs in the badlands. Average spring arrival, April 24 (three years). Latest fall departure, October 19, 1924.

Rough-legged Hawk. *Archibuteo lagopus sancti-johannis.* An uncommon winter visitor. Average fall arrival, October 31 (three years). Earliest fall arrival, October 23, 1924. Average spring departure, March 19 (five years). Latest spring departure, April 1, 1913. I had one of these birds in captivity for a week, and it would eat anything offered it. One day it pounced on a stuffed grouse, and hung on for dear life.

Ferruginous Rough-leg. *Archibuteo ferrugineus.* Not common; nests on the cliffs in the badlands. Earliest spring arrival, March 25, 1920. Latest fall departure, October 19, 1924.

Golden Eagle. *Aquila chrysaetos.* Rare; though in the vicinity of the badlands it may be found at any season of the year.

Bald Eagle. *Haliaetus leucocephalus.* Rare; usually to be found during the fall and winter. Formerly both eagles nested commonly.

Prairie Falcon. *Falco mexicanus.* A common summer resident in the badlands.

Duck Hawk. *Falco peregrinus anatum.* Rare. One was caught in a trap on December 2, 1925.

Richardson's Merlin. *Falco columbarius richardsoni.* Rare. Only record, September 5, 1924.

Sparrow Hawk. *Cerchneis sparveria sparveria.* A common summer resident, breeding. Average spring arrival, March 31 (nine years). Earliest spring arrival, March 14, 1918. Average fall departure, October 20 (two years).

Long-eared Owl. *Asio wilsonianus.* Tolerably common, breeding.

Short-eared Owl. *Asio flammeus.* Tolerably common, breeding. Apparently more common in winter.

Western Horned Owl. *Bubo virginianus occidentalis.* A common resident, breeding.

Snowy Owl. *Nyctea nyctea.* An irregular winter visitor. Earliest fall arrival, November 19, 1918. Latest spring departure, March 29, 1925.

Burrowing Owl. *Speotyto cunicularia hypogaea.* More abundant in the prairie dog towns than anywhere else.

Black-billed Cuckoo. *Coccyzus erythrophthalmus.* A tolerably common summer resident, breeding. Average spring arrival, June 9 (three years). Latest fall date, August 8, 1920.

Belted Kingfisher. *Ceryle alcyon alcyon.* A common summer resident along the Missouri River, breeding. Average spring arrival, April 10 (two years).

Northern Hairy Woodpecker. *Dryobates villosus leucomelas.* A tolerably common resident, breeding. A specimen submitted to Dr. H. C. Oberholser January 30, 1921, was pronounced *septentrionalis* [=*leucomelas*].

Downy Woodpecker. *Dryobates pubescens medianus.* A common resident, breeding.

Yellow-bellied Sapsucker. *Sphyrapicus varius varius.* Rare. The only one I have ever seen here was found in an aspen grove on May 2, 1918.

Red-headed Woodpecker. *Melanerpes erythrocephalus.* Not at all common. I have seen it on two dates, viz., June 18, 1921, and June 10, 1924.

Northern Flicker. *Colaptes auratus luteus.*

Red-shafted Flicker. *Colaptes cafer collaris.* Flickers are very common summer residents, and breed. *Collaris* is occasionally seen, but many appear to be that are in reality hybrids. Average spring arrival, April 10 (ten years). Earliest spring arrival, March 31, 1925. Average fall departure, October 3 (three years). Latest fall departure, October 7, 1921.

Poor-will. *Phalaenoptilus nuttalli nuttalli.* Rare. One was seen on September 5, 1919, in the badlands of the big Missouri.

Sennett's Nighthawk. *Chordeiles virginianus sennetti.* A common summer resident. Average spring arrival, May 31 (four years). Earliest spring arrival, May 26, 1913. Average fall departure, September 9 (six years). Latest fall departure, September 22, 1918.

[*To be continued*].

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EDITORIAL

As a result of the attention given at the recent Nashville meeting to the history of Alexander Wilson it has been thought by some that the organization which bears his name might properly be more active in bringing to the attention of the rank and file of present-day ornithologists the work of this great pioneer in the field.

Aside from the thought of giving more attention to the subject at the various annual meetings, the possibility of preparing a commemorative issue of the Wilson Bulletin was suggested. It is, of course, very uncertain, and perhaps douhtful, whether any unpublished Wilsoniana would still be available for such a purpose. There is, however, an opportunity for the compilation of a source-hook.

Let it be granted that our purpose would be to make the life and work of Alexander Wilson known more widely than at present. Perhaps, then, the best way to do this is to make known the available sources of information. As a tentative plan we offer the following suggested sections or departments:

(a) Any original and unpublished material that may be found to be available; and any sketches that may he prepared especially.

(b) Reproductions of all portraits of Wilson; perhaps also of the various printings of these, insofar as may be thought desirable.

(c) A list of all portraits with information as to the artist, the portrait, and the place of publication.

(d) A bibliography of Wilson's writings, including the various editions.

(e) A bibliography of biographies.

(f) Index of literary work other than ornithological.

(g) A key showing the whereabouts and possession of original Wilsoniana, insofar as the information is obtainable. Possibly this might also include original editions.

(h) An index showing possession and repository of much of the major and minor biographical material.

A very considerahle amount of research and compilatory work is implied in such a program. It is, however, not impossible if worth while. It would have to be a co-operative enterprise, doubtless. Whether it would be worth while and serve a useful purpose can be best decided by general consultation.

GENERAL NOTES

Conducted by M. H. Shwenk

Notes on Some Iowa and South Dakota Birds.—We found large numbers of Lark Buntings (*Calamospiza melanocorys*) in and near Gitchie Manito State Park, in the northwest corner of Iowa, this year, (1927), during the breeding season. We also had the pleasure of photographing another western bird, the Burrowing Owl (*Speotyto cunicularia hypogaea*), near Hartley. There is a large colony of the Cliff Swallow (*Petrochelidon lunifrons lunifrons*) near Dell Rapids, South Dakota. They are accessible for photographing.—F. L. R. and Mary Roberts, *Spirit Lake, Iowa.*

A Diving Spotted Sandpiper.—While collecting at Delevan Lake, Wisconsin, May 28, 1926, I was surprised to have a crippled Spotted Sandpiper (*Actitis macularia*) dive as I attempted to retrieve it. The water was very clear, and I could see the sandpiper swimming under the surface by the use of its wings only, is feet sticking straight out behind, and its neck fully extended. After swimming for about twenty feet, at a depth of from two to three feet, it then started to come to the surface, but saw me and started down again with renewed speed. The water became too deep for me to follow, so I returned to the bank to await developments. The bird finally came to he surface out of gun range and fully sixty feet from where it first dived. The wind then caught it, as it was beyond the shelter of the trees, and it took to wing, apparently none the worse for the experience.—Earl G. Wright, *Chicago Academy of Sciences. Chicago, Ill.*

The European Starling in Kentucky.—The European Starling (*Sturnus vulgaris*) has apparently become established in the Blue Grass Region of Kentucky. The first record for the region was obtained by Mr. Lucien Beckner at Winchester in 1920, but this must have been a solitary individual, since no others were seen for five years. In 1925 the bird was seen in Clark County by V. K. Dodge, and in 1926 it was observed in Versailles by Dr. A. S. Hendrick, in Nicholasville by P. T. Bronaugh, and in Lexington by H. M. Minor. Meanwhile it had appeared in the western part of the state and was reported in 1925 by Dr. M. Y. Marshall from Henderson County. In the fall of 1927 it was observed regularly in Lexington, where several small flocks are now spending the winter.—W. D. Funkhouser, *University of Kentucky, Lexington, Ky.*

A Bird "Life List."—The recent editorial suggestion (Wilson Bulletin, xxxix, p. 231) of a "life list" took my eye, so I ran through the check list (1910) and counted approximately 500 species and subspecies on my "life list." I then ran through to eliminate the subspecies, and found I had 432 species as follows: Pygopodes, 26; Longipennes, 32; Tubinares, 11; Steganopodes, 17; Anseres, 45; Herodiones, 14; Paludicolae, 10; Gallinae, 11; Columbae, 5; Raptores, 29; Coccyges, 5; Pici, 13; Macrochires, 8; Limicolae, 45; and Passeres, 163.

I find that I am especially low on Passeres, for there are many of the local warblers that I must have observed that I have forgotten about. I am sure I can get a dozen or more new to the above list, this spring. I have collected most of the large forms. I am just wondering how my "life list" would compare with that of other working ornithologists. I know that my small bird list does not come anywhere near par, but believe I have a good list of the water and shore birds.—Alfred M. Bailey, *Chicago Academy of Sciences, Chicago, Ill.*

The European Starling at Urbana, Illinois.— The introduction of any exotic species of animal affords the student of migration phenomena an interesting opportunity to study the subsequent dispersal of the speeies. Such a chance is afforded at the present time to bird students of the Middle West by the slow but persistent advanee westward of the European Starling (*Sturnus vulgaris*). The range and dispersal of the speeies, from the nueleus liberated in New York City in 1890-91, to and ineluding the year 1922, is summarized by Mary T. Cooke in Circular 336 of the U. S. Department of Agriculture. This summary ineludes one record only from Illinois, and even at the present time, Illinois still remains very close to the periphery of the range of the Starling. However, new reeords have steadily been aeeumulating recently, and it is with a view of keeping those interested in the movements of the Starling informed as to the activity of the birds that the following notes are published. In no ease is there any doubt as to the authenticity of the record, the observers in all cases being perfeetly familiar with the Starling from ornithologieal work done in the East.

1. Mareh 19, 1926. One lone Starling was seen in the eemetery south of the campus of the University of Illinois. The bird kept by itself, though floeks of Bronzed Grackles were near at hand. Reeord by A. S. Hyde.

2. April 3, 1926. A small floek of eight or nine Starlings, roosting in the University forestry preserve, in eompany with large floeks of Bronzed Grackles. Birds not segregated. Reeord by Dr. L. J. Thomas and A. R. Cahn.

3. April 5. 6, 7, and 8, 1926. During this time twenty-six Starlings were seen in the forestry preserve. Some of these may be duplieate records, or reeounts, but on the 7th seventeen birds were seen under conditions in whieh no duplieation was possible. The birds were associated with floeks of Bronzed Graekles, Red-winged Blackbirds and Cowbirds. Reeord by A. R. Cahn.

4. April 11, 1926. One lone Starling was seen along the Salt Fork River, south of the University woods. This bird was much interested in an old woodpecker's hole about eighty feet up in a dead eottonwood. It was first seen eoming out of the hole, but was never again seen in the vieinity, although the tree was carefully watehed. Reeord by A. S. Hyde.

5. April 16, 1926. Two Starlings were seen flying over a pasture about a quarter of a mile from the previously mentioned eottonwood tree. Reeord by A. S. Hyde.

6. April 18, 1926. Five Starlings, scattered in a floek of Red-winged Blaekbirds and Cowbirds, were seen near the eemetery. Reeord by A. R. Cahn.

7. April 21, 1926. Four Starlings were seen near strip mines, four miles south of Danville. The birds were entirely alone. Record by A. R. Cahn.

8. November 10, 1926. Five Starlings were seen in a floek of graekles in the forestry preserve. Record by A. R. Cahn.

9. November 14, 1926. Several Starlings were seen with a flock of grackles in the cemetery south of the University campus. Reeord by A. R. Cahn.

10. May 10, 1927. A flock of a dozen or more Starlings were seen in a wooded pasture north of Brownfield Woods. Reeord by A. S. Hyde.

11. May 12, 1927. A lone Starling was seen in a maple tree in front of the Natural History Building, on the campus of the University. Record by A. R. Cahn.

12. July 3, 1927. Lone Starling flying northeast across the residence district of Urbana. Record by A. S. Hyde.

13. November 14, 1927. A flock of eight or ten Starlings flew south, flying low over the fields west of Bondville, Champaign County. Record by A. S. Hyde.

14. November 16, 1927. Two Starlings in with a flock of about twenty Bronzed Grackles were seen in the residence district of Urbana. Record by A. R. Cahn.

15. November 19, 1927. Three Starlings were seen flying south over the Brownfield woods region. Record by A. S. Hyde.

16. December 3, 1927. Three Starlings were seen separately in the forestry preserve. The birds were very tame and were approached to within twenty feet and examined for over ten minutes with high power binoculars. Record by A. R. Cahn.

The only previously published records from the territory covered in this note are those of Prof. Frank Smith (*Illinois Audubon Bulletin*, Spring, 1922), who reported seven Starlings from Urbana on February 19, 1922. There were no Starlings seen by anyone connected with the University between this date and the first of the records offered herewith, in spite of the fact that bird students were constantly in the field. The note by Mr. Hunt (*Auk*, xliii, p. 239) reporting four Starlings from Oak Park, Illinois, for December, 1925, is the most recent record for the state which the writer has come across. It would seem, then, as if the Starlings were beginning a more determined effort to extend their range into Illinois, the results of which should be carefully watched by bird students.—A. R. Cahn, *University of Illinois, Urbana, Ill.*

The Fall Bird Migration in Ohio.—The high tide of the fall migration in Tuscarawas County, Ohio. is between September 15 and October 1. With a sparrow wave in October, any night between the above dates the call notes are to be heard, unless we have a night wind in the S. E. to S. The most favorable nights follow several warm days, with S. E. to S. S. W. winds changing to cooler N. W. to N. wind; and if cloudy the birds fly much lower and their call notes are more distinct. On some of the more favorable nights there are but few intervals in which call notes are not to be heard. The call notes of the birds, and the few occasions when we have seen them transit the moon, indicate their traveling in groups. Can we judge the numbers in these groups by the numbers we find in groups in the fields and woods, after an all night flight? The line of migration in Tuscarawas County, with some exceptions, is N. W. to S. E. for the fall migration, and from S. E. to N. W. in the spring migration for the ducks, geese, swans, herons and the shore birds. For the land birds we have not sufficient data to check their course. The well marked exceptions to the S. E. movement in the fall are the Nighthawks, Crows, Red-winged Blackbirds, Bronzed Grackles and Robins. Their line of migration is S. W. in the fall and N. E. in the spring. In Delaware County, one hundred miles west, they hold to the S. W. and N. E. line. The land, water, and shore birds hold to a North and South line, and seem to follow the Scioto Valley.—Charles R. Wallace, *Delaware, Ohio.*

A Durable Barn Swallow's Nest.—There is a nest of the Barn Swallow (*Hirundo erythrogastra*) in my barn. It is plastered onto a cross-beam two inches below the hay loft floor, just out of reach of my hand and entirely impossible for cats. It was built there in May, 1915, and has been occupied and a brood of swallows has been raised in it every year since then. In 1926 two broods were raised in it by the same pair of swallows. It has never been possible to

catch the birds on the nest, and so they have not been banded, therefore it is not possible to be certain that the nest has been occupied by the same birds each year, although the birds have seemed to be the same, judged by appearance and actions and habits. The only thing done to the nest each year is a renewal of some of the lining. No new mud has ever been put on it. When the Barn Swallows first come to this region this nest is visited and inspected, and two birds come and go occasionally until nesting time arrives, when they take possession and resent intrusion in the barn. Even though the barn is in constant use they never seem to become accustomed to the presence of people, stock, dogs or cats. After the young have left the nest the parents remain in the vicinity, and make frequent visits into the barn and to the nest; but by the middle of August they are gone from the immediate vicinity. During the past summer, 1927, four young were raised, and there was one infertile egg, or at least one did not hatch. Never before has there been an unhatched egg. It will be interesting to see how long this nest will last. It must have been fashioned by master builders. I would like to have the recipe for the glue that holds it to the beam.—Lynds Jones, *Oberlin, Ohio.*

Some Bird Notes from the Badlands of North Dakota.—During part of the summer of 1918 I was doing field work in North Dakota. I was much interested in the region north of Dickinson, in the badlands of the Little Missouri Valley.

The Ferruginous Rough-legged Hawks were quite common, and sat around on rocks and fence posts near a gopher burrow or a prairie dog town, waiting for an opportunity to catch one of the small animals. Marsh Hawks were also common, and behaved in the same way as they do in Iowa. Sparrow Hawks were the most common of the hawks, and fed almost exclusively upon grasshoppers, which were quite abundant. I saw only one Short-eared Owl, but hundreds of Burrowing Owls. The latter have the curious habit of sitting up on a mound in such a posture that they closely resemble the prairie dogs at a distance.

Among the smaller birds McCown's Longspur and Sprague's Pipit were very interesting to me. I saw an occasional Baird's Sparrow that I could identify, and probably dozens that I could not. The Lark Bunting was very common, and the flocks of young and old were a familiar sight. There were a good many Magpies along the rivers, and I shot at several, but seemed to be unable to get one without blowing all his tail feathers out. The Sharp-tailed Grouse was another interesting bird, and it was still quite common in the badlands. Coyotes were also common. The badlands country is most interesting, but is hard on the temper to try to drive a car through it. Roads are practically non-existent, and one wanders about jumping creeks and climbing hills at random. These badlands are quite heavily timbered, in places, with such trees as ash, elm, cottonwood, burr oak, birch and aspen; while the buffalo berry (*Shepherdia*) fills the river bottoms with a dense tangle of brush, or low trees. The only bush growing on the hill is the "buck bush" (*Symphoricarpos*). Some of the "coulees" are filled with the Red Cedar, but it seems to be rather local.—Ira N. Gabrielson, *Portland, Ore.*

The Last Days of a Certain Great Horned Owl. — Many great Horned Owls (*Bubo virginianus virginianus*) that have been shot or trapped near my home reach my hands. On October 22, 1925, a live female of this species was brought to me. The last days of this bird are interesting, as they show the fierce

eourage displayed by this species. A friend, living near Beulah, Iowa, keeps many ehiekens of the Leghorn breeds, and has a regular loss of the hens that persist in roosting in the trees. This owl entered a No. 1½ steel trap and sueceeded in earrying the same away on the night of Oetober 14. My friend informed me that the same owl eame on the nights of Oetober 16, 17 and 18, and eaeh time earried away a ehicken. Roused by the barking of his dog, he said that he heard the rattle of the trap ehain eaeh time. The owl was recaptured during the night of the 21st by getting the trap on the left foot into a larger one, sueh as is used for foxes. The owl was blind in the left eye. On disseetion I found a shot within the eye-eup, the pellet having entered from above. It is fair to assume that *Bubo* ean maintain itself, at least for a time, even with one foot out of eommission and only one head-light —Oscar P. Allert, *McGregor, Iowa.*

Notes on Birds of Pinellas and Pasco Counties, Florida.— These notes, aequired during the first half of 1927. are supplementary to the writer's paper bearing the above title in the Wilson Bulletin. XXXVIII, pp. 140-155. The following four speeies are added to the writer's list for these eounties:

Blue-winged Teal (*Querquedula discors*).—A small flock was observed on a fresh water pond in southern Paseo County, on Mareh 17, 1927, and a female collected.

American Oyster Cateher (*Haematopus palliatus*).—One individual of this now rare species was seen at Pass-a-Grille on April 13, 1927.

Pigeon Hawk (*Falco c. columbarius*).—One adult was seen bathing at the margin of a small salt water pool near Pass-a-Grille on April 3, 1927.

Nelson's Sparrow (*Passerherbulus n. nelsoni*).—An immature speeimen, much resembling *P. caudacutus*, taken by the writer at Indian Pass on March 25, 1925, has been identified as *P. n. nelsoni* by Dr. H. C. Oberholser. Two typieal adult Nelson's Sparrows were eollected in that vieinity in 1927: one on January 29, the other on February 28. All of these birds were in salt marshes along the gulf eoast, assoeiated with Sharp-tailed Sparrows.

The following three speeies, uneommon in this region, credited in my previous paper to these eounties, by the observations of others, were in 1927 eolleeted there by the writer:

Cabot's Tern (*Sterna sandvicensis acuflavida*).—Previously reported by eourtesy of Mr. A. C. Bent, who "saw several and eolleeted one" in this territory in the spring of 1925. In 1927 these birds were seen by the writer at various times between Mareh 10 and April 16. On March 21, on Mullet Key in a floek of about 175 terns, mostly Royal Terns (*Sterna maxima*), were sixty or seventy Cabot's Terns and eight or ten Forster's Terns (*Sterna forsteri*). Four Cabot's Terns colleeted on that date were all adult males. A floek of sixty or more Cabot's Terns was seen among these keys up to the time the writer came north on April 16; so an arrangement was made with Mr. H. P. Bennett, warden in charge of the Tampa Bay Refuges, to visit possible nesting sites to see if they remained to nest. Therefore, in June, 1927, Mr. Bennett visited all likely nesting beaehes between Mullet Key and Pass-a-Grille without, however, seeing any Cabot's Terns. The old breeding plaees ten miles farther north, near John's Pass, where thousands of terns of several speeies nested a half century ago, are now plaees of publie resort, eonnected by long causeways and bridges with the mainland.

Yellow Palm Warbler (*Dendroica palmarum hypochrysea*).—These birds, previously credited to the region by W. E. D. Scott's record, were found by the writer with a large flock of Palm Warblers near Tarpon Springs, February 26, 1927, and a pair of adults in breeding plumage collected. An immature male was also collected at Pass-a-Grille on April 9, 1927.

Brown-headed Nuthatch (*Sitta pusilla*).—Reported previously by courtesy of Mr. A. C. Bent. Several were seen and one collected by the writer in southern Pasco County, February 27, 1927.

Reddish Egret (*Dichromanassa rufescens*).—This species seen once in 1925 was represented in the spring of 1927 by several yearling birds, one being collected.

Cuban Snowy Plover (*Charadrius nivosus tenuirostris*).—This pale little plover is not uncommon in winter on the mud flats around the mouth of Tampa Bay, and a female with a hard shelled egg ready to be laid was taken on Mullet Key on March 21, 1927.

Scott's Seaside Sparrow (*Passerherbulus maritimus peninsulae*).—Two specimens were collected at Indian Pass, twenty miles south of Tarpon Springs, one on January 24 and one on the 29th, but none were seen there in the next ten weeks. There does not seem to be any previous record of the occurrence of this form south of the type locality, Tarpon Springs.—Wm. G. Fargo, *Jackson, Mich.*

A New Year's Bird Census at Nashville, Tennessee.—The following list of birds was made on January 1, 1928, and on a brief trip the day before, by about thirty members of the Wilson Ornithological Club. January 1 was Field Day of the Annual Meeting, and the census was taken at Idlewild Wood on Stone's River, about ten miles southeast of Nashville.

The morning was spent in the woods bordering the cliffs above the river and on the slope leading to the water's edge. The day being fair but very cold, the southern exposure of this bluff and the plentiful supply of hackberries proved attractive to an unusual number of birds. In the afternoon a brief trip was made to the bottoms, to list the birds of that environment. The water birds listed were noted on December 31, 1927, during on hour's trip to Radnor Lake, five miles south of the city, by a small group of observers. The list for the two trips follows:

Pied-billed Grebe, 1; Mallard, 125; Pintail, 4; Lesser Scaup, 75; Coot, 125; Killdeer, 5; Bob-white, 8; Mourning Dove, 35; Cooper's Hawk, 1; Red-tailed Hawk, 1; Sparrow Hawk, 3; Belted Kingfisher, 2; Hairy Woodpecker, 6; Downy Woodpecker, 10; Yellow-bellied Sapsucker, 2; Pileated Woodpecker, 3; Red-bellied Woodpecker, 7; Flicker, 10; Phoebe, 1; Prairie Horned Lark, 1; Blue Jay, 15; Crow, 250; Starling, 20 (roosting in city); Meadowlark, 12; Goldfinch, 5; Savannah Sparrow, 4; White-crowned Sparrow, 3; White-throated Sparrow, 50; Field Sparrow, 30; Slate-colored Junco, 250; Song Sparrow, 14; Fox Sparrow, 2; Towhee, 9; Cardinal, 55; Cedar Waxwing, 3; Loggerhead Shrike, 1; Myrtle Warbler, 15; Mockingbird, 23; Carolina Wren, 11; Bewick's Wren, 1; Winter Wren, 1; Brown Creeper, 10; Tufted Titmouse, 15; Carolina Chickadee, 25; Golden-crowned Kinglet, 25; Hermit Thrush, 5; Robin, 47; and Bluebird, 12. A total of forty-eight species and 1285 individuals.

In this connection it is of interest to note that a Christmas census, taken a week previous, netted a total of sixty-two species, covering of course a much larger area.—A. F. Ganier, *Nashville, Tennessee.*

BIRD BANDING NEWS

Conducted by Wm. I. Lyon

DUCK BANDING IN LIMA LAKE IN 1927

BY T. E. MUSSELMAN

Lima Lake is a tremendous swamp covering about ten or twelve thousand acres, located half-way between Quincy and Hamilton, Illinois. This site has been a paradise for hunters and fishermen since time immemorial. Numerous attempts have been made to drain the lake, which at places is now criss-crossed with drainage ditches. Although nearly a million dollars have been dropped in the mud, yet Lima Lake continues.

Due to the fact that a new project for its drainage is in the course of completion, I felt that it would be opportune for me to cease my duck banding activities at Scobey Lake, Missouri, and carry on at Lima Lake, Illinois, as I probably shall have not more than two seasons of banding here in which to find the definite migration course of the birds which are passing up and down the Mississippi River.

I was fortunate in being offered a well appointed hunting cabin at the end of one of the lateral drainage ditches. When the Illinois State Game and Fish Department heard of my proposed banding work, they were very generous in offering me the services of their local warden, together with his skiff and outboard motor. I cannot overstate the value of this contribution to my season's work, as Mr. Earl Caldwell, the warden, knows every foot of the lake and is one of the most experienced trappers and hunters that I have ever known.

The use of the boat allowed us to travel to the extremes of the lake where we could place our traps to suit ourselves. Trap No. 1 was constructed well out on a submerged mud flat and was placed in the shade of a couple of small willow trees. It was by far our most successful trap. Traps No. 2 and No. 3 were inland, one being in a small cup of water on the edge of a corn field, the other near a small woodland which was sparsely covered with water. No. 4 was in a slough and was primarily set with the purpose of capturing scaup and teal, while No. 5 was placed in the midst of a fifty-acre lily pond.

The customary covered, heart-shaped traps were built at all places. These traps were set before the ice was off the swamps. Huge flocks of Pintails and Mallards had already arrived from the Southland and were attracted to the vicinity of the traps by shelled corn which was thrown over the surface of the ice. Mr. Caldwell visited these localities from day to day, scattering corn, which resulted in the ducks learning that they could secure food in these spots. As the ice melted live decoys were placed in and about all the traps, resulting almost immediately in very satisfactory catches of the larger ducks.

A letter from Mr. Taber, of Kansas, Illinois, asked me to take the weights and make drawings of the wing expansion of the birds banded. This added much to the interest of banding as it gave me a more intimate knowledge of the various ducks. I believe that he is running an experiment on the relationship of speed in flights to wing area, and no doubt his article will appear shortly in one of the scientific magazines. Ducks which were thus captured, for weighing and drawing were not banded immediately and released, as is ordinarily done, but were put in crates and returned to the cabin.

These crates were built for the reception of the large Mallard decoy ducks, the laths being placed close enough to prevent their escape. On running the traps one succesful morning, we found we had captured an entire flock of twenty-eight Green-winged Teal. They were hard to capture as they dived and swam about under the water; but gradually, one by one, they were caught and dropped into those crates built for the Mallards. We took it for granted that they were secure in these floating crates. However, they flew up and crawled through the slats in the top of the crate, about as fast as we dropped them in the doorway. Consequently very few of these interesting birds carried government bands with them when they said "good bye" to Lima Lake and headed for the Northland.

The high light of the banding season occurred on March 28, when among one of our largest catches was a drake Mallard which carried a heavy leg band, about an inch long, on its left leg. On the inside, was stamped the Bible verse, "God is love." On the outside was a lockbox number at Kingston, Ontario. This was one of Jack Miner's ducks which we had captured. A government aluminum band with number 300,527, was placed upon the right leg of the bird and, after taking the above picture of the bird, it was released again.

Fall is here with its hunting season (1927). Large numbers of returns have already come in — all from Canada, except one from St. Paul. However, from now on, I shall be receiving additional returns from the Dakotas, Iowa, Missouri, and later from Arkansas and Louisiana.

Last spring was not a good season for duck banding because of the tremendous expanses of water which covered the swamp lands. This gave the ducks too much territory over which to feed, and I am hoping that the following spring will be a dry one, so that it will force the ducks to feed in more limited areas.

Of all the banding that I have done in recent years, I enjoy the duck banding more than others, because it requires a spring vacation of ten days to do the work well. Then during the fall, the daily returns stimulate interest. At the present time I cannot give the summary of the 1927 returns but hope to do so in some future issue.

Quincy, Illinois.

DUCK BANDING NEAR THE CHEYENNE BOTTOMS, KANSAS

BY FRANK W. ROBL

In 1924, I banded 88 birds, of which 78 were water fowl. From these I have received 8 returns, or approximately 9 per cent. Among those returns were two Blue-winged Teal that were shot at Palisada in Campeche, Yucatan Peninsula, Mexico; these returns showed that the flock stayed pretty well together. Another Blue-winged Teal that had been banded here, July 16, was shot at Lake City, Minnesota, on September 16, the same year, showing that ducks hatched here may migrate northward before they start the fall migration for the south.

In 1925, I banded 356 birds, of which 347 were water fowl. The returns from these have been 31, or approximately 9 per cent. Four of these were killed in Canada. My best return in this lot was a Pintail banded February 22, 1925, taken on May 20, 1926, near Kotceba, on the Kobuc River in Alaska, about two hundred and fifty miles north of Nome. In 1926, 225 birds were banded by me, of which 208 were water fowl. Thirty-two returns were reported on those, or a fraction more than 14 per cent. So far in 1927 I have banded 220 birds, all of which are water fowl; there have been 9 returns.

Summing up, I have banded 889 birds, with 80 returns, which is an even 9 per cent. Having no information on the returns to other bird banders I do not know whether the percentage on my returns is good, or not. Most of the ducks I have banded are Pintails, followed numerically by Mallards, Blue-winged Teals, Green-winged Teals, Widgeons, and a few other species. I trap all of these ducks on a little creek about a quarter of a mile from my home, which is only four miles from the now famous Cheyenne Bottoms. The 80 duck returns were obtained in the following localities: Alaska 1, Northwest Territory 1, Saskatchewan 4, Manitoba 2, Arkansas 1, California 4, Iowa 3, Kansas 15, Louisiana 3, Minnesota 1, Mississippi 1, Montana 1, Nebraska 12, North Dakota 8, Oklahoma 5, Oregon 1, South Dakota 1, Texas 12, Wyoming 2, Campeche, Old Mexico 2. Toal, 80.

The soil in the Cheyenne Bottoms is blue clay, which is so compact that it makes an almost water-tight bottom. Since there is not natural drainage, evaporation is about the only way for the water to pass off. With another

heavy rainfall next year the water level may be raised high enough to drain off through Cheyenne Creek (where I have my traps), thence into Cow Creek, and thence into the Arkansas River, near Hutchinson.

There is a bill (the Hope Bill, H. R. 7361) now before Congress appropriating $350,000 to pay damages to land owners and to dredge an inlet and an outlet so the lake may be made permanent. Sportsmen and conservationists are strong supporters of this plan, and the state and federal governments are interested.

There is a good deal of curiosity as to the origin of the Cheyenne Bottoms. One theory is that this great bowl-shaped depression is an ancient buffalo wallow. In former times the buffaloes migrated through this region in enormous herds—perhaps by the hundreds of thousands. In the wet seasons these animals would carry away vast quantities of mud sticking to their shaggy fur. In the dry seasons the fine, soft soil would be whipped up by the winds and carried away.

Ellinwood, Kansas.

[On August 12 and 13, 1927, about ten inches of rain fell over about seven townships in central Kansas. This water drained into a lowland known as the Cheyenne Bottoms, and produced an artificial lake of about 25,000 acres in extent. The name comes from the Cheyenne Indians, who fought the Pawnee Indians for possession of this hunting ground. As a result of this heavy rainfall the bottoms are now under water, varying in depth from one to eight feet. There is no outlet or natural drainage, so the water still remains, except as it evaporates. The soil is not especially good, and it has been used chiefly for hay crops. Many haystacks are now partially submerged, thus causing the loss of thousands of tons of hay.

This is not the first inundation of this area. Up to 1927 it had been dry since 1915, but prior to that it had been more or less under water at various times. It is now estimated that the present water, without new influx, will maintain the lake through 1928, and possibly 1929.

What to do about the situation has become a question of general interest. The land owners and others insist upon a plan of drainage to make the land again available. Another group proposes to let the water stand, thus creating an extensive, permanent inland lake. It is looked upon as an important wildfowl refuge or shooting ground. As far back as 1904, "during the wet season," much market hunting was done in this area. In the current reports it is stated that at least 500,000 ducks were killed (in 1904) for the markets of Kansas City, St. Louis, and Chicago. The Federal Government has become interested. We understand that a bill (H. R. 7361) has been introduced in Congress authorizing the appropriation of $350,000 with which to pay for the lands, build dikes, etc.

It is said that those interested in reclaiming the land have a plan for constructing a long drainage ditch, which would be expensive also, and which might result in overflow of new property farther away. What the outcome will be no one can now foretell.—Ed.]

PROCEEDINGS OF THE WILSON ORNITHOLOGICAL CLUB

Fourteenth Annual Meeting

The Fourteenth Annual Meeting of the Wilson Ornithological Club was held at Nashville, Tennessee, on December 30-31, 1927, followed by a Field Day on January 1, 1928. This was the second Nashville meeting, and that city had been chosen in pursuance of an established custom of meeting in conjunction with the American Association for the Advancement of Science when that body meets in the middle west, and in response to an invitation of two years' standing from the Tennessee Ornithological Society who acted as hosts on the occasion. The Friday sessions were held in the beautiful new buildiings of Scarritt College, those of Saturday in the main building of Peabody College, both quarters being attractive and comfortable. The attendance was augumented by those who had remained over from the meetings of the eclogical, entomological, and nature study societies, and allied organizations which had met on preceding days. The program was carried out almost as previously announced, and as follows:

Friday, December 30, 1927

Forenoon Session, 9:00 o'clock. Room 29, Scarritt College.

Business session, a report of which will be found below.

Address of welcome, by Professor Jesse M. Shaver, President of the Tennessee Ornithological Society.

Response, by Dr. Lynds Jones, President of the Wilson Ornithological Club.

1. Recent Bird Records in Northeastern Colorado and their significance in connection with Geographical Distribution. By F. L. Fitzpatrick, Coe College, Cedar Rapids, Iowa.

   An ecological paper which will be published in a future number of the BULLETIN.

2. Notes on the European Tree Sparrow. By Elizabeth Allen Satterthwait, Webster Grove, Mo.

   This introduced species is found locally in the vicinity of St. Louis, apparently non-migratory. Mrs. Satterthwaite gave an excellent account of the color markings, and also discussed the history, feeding and nesting habits.

3. Evolution of the Nesting Habits of Birds. By Z. P. Metcalf, North Carolina State College, Raleigh, N. C.

   Dr. Metcalf presented a very careful analysis of the nest-building habits of birds, including a provisional diagram showing the possible sequence in which the various types of nests have been derived.

4. Bob-white in Washtenaw County, Michigan. By Thos. L. Hankinson, State Teachers' College, Ypsilanti, Michigan.

   An account of the feeding and taming of a winter flock of Bob-whites in the back-yard of a suburban home, illustrated with lantern slides.

5. Scarcity of Potato Beetles Due to Abundance of Bob-whites. By E. L. Moseley, State Teachers' College, Bowling Green, Ohio.

   This paper emphasized the economic value of Bob-white and pointed out a marked increase in these birds since they have been on the protected list in Ohio.

6. A Study of the Mechanism of Pellet formation in the Great Horned Owl. By Dr. and Mrs. C. I. Reed, Baylor University, Dallas, Texas.

   A description of an experiment carried out with birds in an effort to learn something of the digestive processes in the human body.

7. On the Status of Harlan's Hawk. By C. W. G. Eifrig, Concordia Teachers' College, River Forest, Illinois. (Read by A. F. Ganier).

Substantiating the validity of this subspecies, and calling attention to the fact that its summer habitat has been definitely fixed in British Columbia .

Lunch in the Cafeteria of the Southern College of the Y. M. C. A.

Afternoon Session, 1:30 o'clock. Room 29, Scarritt College.

8. Gerard Troost, Nashville's first Naturalist. By W. M. Walker, Nashville, Tenn.

A Dutch naturalist (1776-1850) who came to America in 1808, became first president of the Philadelphia Academy of Science (1810-1815), moved to Nashville in 1825, being shortly afterward made State Geologist, which position he held until his death.

9. Alexander Wilson—a Sketch. By Mrs. H. J. Taylor, Berkeley, California.

10. Alexander Wilson's Visit to Nashville in 1810. By Vera Kearby, Nashville, Tenn.

11. Alexander Wilson as an Artist. By A. C. Webb, Nashville, Tenn.

These three papers were intended to draw attention to a portion of the early ornithological history of America, part of which centered in the region of Nashville. Mrs. Taylor exhibited lantern slide reproductions of all the known portraits of Wilson. Miss Kearby presented lantern slide views of a number of local sites known or supposed to have been visited by Wilson. The Nashville and Tennessee Warblers were found and named by Wilson in this locality at this time. Professor Webb exhibited more than a hundred copper engraved plates belonging to Wilson's "Birds of America," explaining the methods of reproduction and the technique of Lawson and other engravers who etched the plates. It is hoped that these papers may later be published in the WILSON BULLETIN.

12. Notes on the Sparrows which occur in the Nashville Region. By Harry Crawford Monk, Nashville, Tenn.

Notes on the relative and seasonal distribution of the seventeen species of sparrows which have been recorded in this area; with notes also on the nesting habits of those which are found in the summer.

13. Warblers which Nest in Tennessee. By George R. Mayfield, Vanderbilt University, Nashville, Tenn.

An annotated list of the members of the warbler family which have been recorded as breeding in the State, with specific data on the nesting, seasonal distribution, and characteristics, including also a summary of migration records covering twelve years of observation.

Evening Session, 7:00 o'clock. The Grille Room of the Hotel Hermitage.

At this time and place was held the Annual Dinner of the Wilson Ornithological Club, with the members of the Tennessee Ornithological Society. After the dinner each of the forty-six members present was introduced and responded impromptu.

Saturday, December 30, 1927

Forenoon Session, 9:30 o'clock. Social-Religious Building, Peabody College.

14. Are Birds Decreasing in Numbers? By Miss Althea R. Sherman, National Iowa. (Read by Mrs. H. J. Taylor).

From carefully kept records covering a long period of time Miss Sherman reaches the conclusion that there has been an actual decrease of birds in the area under consideration, and discusses the probable etiological factors.

15. Bird Study in the Public Schools. By Mary L. Bailey, Sioux City, Iowa.

Mrs. Bailey has been Supervisor of Bird Study in the Public Schools of Sioux City for a number of years, and has developed a method of presentation which is of general interest, and especially to those engaged in similar work.

16. More detailed data in local lists. By Lynds Jones, Oberlin College, Oberlin, Ohio.

The paper sets forth that specific and definite data are of far greater ornithological value than generalized remarks concerning status.

17. An Itinerant Field Class in Ornithology. By T. C. Stephens, Morningside College, Sioux City, Iowa.

A narrative account of a traveling class in bird study through several northwest states in 1927.

18. The Birds about the Pennsylvania State College Nature Study Camp. By Marjorie Ruth Ross, State College, Pa.

A description of the equipment and environment of the camp in the Alleghany Mountains, where nature study is taught during the summer season, with a description of habitats and the more interesting birds to be found there.

19. Feeding Habits of the Cardinal. By Mrs. Cecil Roberts, Clinton, Ky. (Read by Mrs. E. B. Walker).

A most detailed and interesting record of observations on the life-history and economic and esthetic value of this beautiful bird.

Lunch in the Cafeteria of the Southern College of the Y. M. C. A.

Afternoon Session, 2:00 o'clock. Auditorium, Peabody College.

20. Birds on the Pacific Islands. Lynds Jones, Oberlin College, Oberlin, Ohio.

Motion pictures showing the colonies of seabirds nesting on the islands off the coast of Oregon and Washington.

21. Some Florida Rookeries. Herbert L. Stoddard, Beachton, Georgia.

Mr. Stoddard honored the W. O. C. by exhibiting for the first time this magnificent series of motion pictures of sub-tropical birds, taken near Tallahassee, showing beautiful portraits and groups of the White and Scarlet Ibises, Little Blue Heron, Wood Ibis, Great Blue Heron, and others. This is one of the finest reels ever shown at our meetings.

22. Georgia Bird Studies. Wallace Rogers, Atlanta, Georgia.

These were unusually good motion pictures of common, every-day birds, such as the Cardinal, Prairie Warbler, Mockingbird, Towhee, Yellow-breasted Chat, etc., showing their poses, behavior, eccentricities, and nests. This film brought to our attention the fact that every bird photographer has in his own neighborhood plenty of opportunity to exercise his skill, without going on long expeditions.

23. The Nest Life of the Loon in northern Wisconsin. Owen J. Gromme, Milwaukee Public Museum, Milwaukee, Wisc.

These remarkable motion pictures of the Loon in its native haunt were shown last year at Chicago, but were new to most of the members at the Nashville meeting. When the close-ups were projected one might easily imagine himself concealed in the blind, within a few feet of the nest. The reel also included most interesting pictures of the young and the parents on the open lake, the latter hysterical, yet bold, in their efforts to guide and protect the young. The Loon is here shown practicing an old avian trick—feigning injury in an endeavor to detract the attention of the pursuer. Splendid pictures.

24. Intimate Studies of Birds by the Banding Method. S. Prentiss Baldwin, Cleveland, Ohio.

A detailed resume, by motion pictures, of the most approved methods of banding birds as practiced at Mr. Baldwin's Laboratory near Cleveland. These pictures afforded a fitting climax to an afternoon of wonderful bird movies.

A short business session followed, after which the formal sessions of the Club were adjourned.

The following additional papers on the program were read by title, because either of lack of time or the absence of the authors:

Notable Records of Rare Birds in Tennessee. By A. F. Ganier, Nashville, Tenn.

Chimney Swifts in November. By Otto Widmann, St. Louis, Mo.

Bob-white. By W. B. Taber, Kansas, Ill.

Bird Parasites. By R. O. Malcolmson, Sioux City, Iowa.

Notes on the Nesting of the Ruby-throated Hummingbird in Tennessee. By Harry S. Vaughn, Nashville, Tenn.

The Bird Life of Thule, Northwest Greenland. By W. Elmer Ekblaw, North Crafton, Mass.

A Study of a Wet Weather Lake. By Gordon Wilson, Bowling Green, Ky.

A Study of a Nesting of Oven-birds. By Mrs. Margaret M. Nice, Columbus, Ohio.

Some New Birds for Oklahoma from Okmulgee and Tulsa Counties. By Edith R. Force and W. H. Koons, Tulsa, Okla.

The Snowy Owl in Ohio. By Edward S. Thomas, Columbus, Ohio.

The manuscripts of most of these papers were at hand and will be published in the WILSON BULLETIN.

On Saturday evening an informal reception was held at the home of Mr. and Mrs. A. F. Ganier, which was most pleasantly enjoyed by all who attended. Mr. Ganier's collections of bird-skins, nests, and eggs taken in the central south were on display. This is, doubtless, the most complete "personally taken" collection of this area in existence. Dr. H. S. Vaughn also exhibited cases containing a complete collection of the nests and eggs of North American warblers.

Early on the following morning cars were in readiness to convey all members to Idlewild Wood on the Stones River, some ten or twelve miles south of Nashville, where Messrs. Ganier, Vaughn, and Mayfield have their summer homes. As the folks assembled they were glad to gather around the huge log fire in Dr. Vaughn's cottage. The forenoon was spent along the crest of the cliffs and among the cedar forests. Early in the afternoon all parties re-assembled, and it was found that a total of thirty-eight species of birds had been seen.

A bountiful dinner was then served by our hosts, the Tennessee Ornithological Society. After an hour or two of visitation individuals or groups found it necessary to take leave for their trains, and thus came to a close the second Nashville meeting of the W. O. C., one never to be forgotten by those in attendance.

Business Sessions were held at the opening and at the close of the meeting. Miss Marjorie Ruth Ross was appointed Secretary *pro tempore*, in the absence of Secretary Gloyd. The minutes of the last annual meeting, in 1926, were read and approved. The Secretary's report was read and approved. The Treasurer's report was not at hand, but the President was instructed to appoint an auditing committee in order that the report may be published.

The President appointed a Nominating Committee consisting of T. C. Stephens, Z. P. Metcalf, and Thos. L. Hankinson; and a Resolutions Committee consisting of Mrs. H. J. Taylor and E. L. Moseley. Doctor Jones reported that about $150 had been received from the sale of old sets and numbers of the Wilson Bulletin, and that this fund would be used in reprinting out-of-print numbers. The Editor made an informal report in which the suggestion was made than an entire number of the Wilson Bulletin be devoted to Wilsoniana, provided sufficient material can be compiled. A committee was authorized to investigate the feasibility of such an enterprise. In the absence of the Chairman, T. H. Whitney, the President made an informal report for the Endowment Committee. The legal steps toward incorporation are necessarily slow, but this work has now been completed. (Later word from Mr. Coffin states that a seal has been made, and forwarded to the Secretary, and that final papers have been completed and delivered to Mr. Whitney). By vote the Club ratified the acts of the Endowment Committee to date. On motion of Mr. Ganier a rising vote of thanks was given to the officers of the Club for their efficient services during the past year.

There was read an invitation from the Director of the University of Michigan Museum, Ann Arbor, to hold the annual meeting of the W. O. C. there in 1928. It was voted unanimously to accept this invitation and hold our meeting at Ann Arbor in 1928. An invitation was then read from the Des Moines Audubon Society to hold the annual meeting in 1929 at Des Moines in conjunction with the meetings of the American Association for the Advancement of Science. This invitation was received with appreciation and referred to the Council for consideration at the proper time. It was then moved and carried that the Club re-affirm its policy of holding its annual meetings in conjunction with the American Association when the latter meets in the Mississippi Valley.

The Committee on Resolutions presented a report thanking the hosts, the Tennessee Ornithological Society, whose officers and committees were so successful in planning and carrying out the arrangements for a most enjoyable and profitable meeting; and thanking the officials of Scarritt College and of Peabody College for their hospitality in opening their doors to our sessions.

The Nominating Committee presented a report recommending the re-election of all officers for the ensuing year. Upon unanimous adoption of this report the following officers were declared elected as officers for the year 1928:

President—Lynds Jones.

Vice-President—Thomas H. Whitney.

Treasurer—J. W. Stack.

Secretary—Howard K. Gloyd.

Counsellors—A. F. Ganier, P. B. Coffin, Dr. Alfred Lewy, Chreswell J. Hunt, Clarence Bretsch.

There being no further business, the meeting was formally adjourned.

Items

We surmise that the Nashville chapter of the T. O. S. is perhaps the largest and strongest inland local bird club on record. They form a compact and active group.

The arrangements for the meeting were systematically handled by nine committees, viz., publicity, program and printing, quarters and equipment, annual dinner, transportation and signs, field day, registration and acquaintance, and attendance, with Mr. Ganier the co-ordinating chairman of the general committee.

Our gratitude is due all of the gentlemen who loaned reels of moving pictures for the Saturday afternoon program. It was a wonderful lot of pictures. H. L. Stoddard's pictures show clearly enough that there are still beautiful and picturesque birds in the south which need protection.

Incidentally, while at the reception Saturday evening some of us learned that Mr. Ganier plays the shell game, having in his cabinet quite an assortment of local land and fresh-water shells.

Mr. and Mrs. C. L. Harris came all the way from Eldorado, Kansas, to attend the meeting, having had a taste at Kansas City in 1925.

Three old standbys are running each other a close race for attendance records. Lynds Jones has missed only one of the fourteen meetings, A. F. Ganier has attended the last ten, and T. C. Stephens has attended eleven out of the fourteen.

Mr. McNish was driving a group of young ladies out to the Stones River on Sunday morning, when they passed a road sign which read: "John II, 25-26." It caught McNish's eye and he read it to the crowd thus, "John eleven, 25-26." Some of the young ladies giggled, and Mrs. Taylor said, "Why, Mr. McNish, you do not seem to be very familiar with your Bible." "Oh," replied McNish, "My Bible is Chapman's Handbook, and I know that all right." [We do not find that many verses in John II.—Ed.]

There were many attractive and novel items in the field day luncheon menu. Fricasseed pig and "spiced round" were new to many of us. We must compliment Dr. Vaughn also upon his coffee. The Committee in charge of this affair consisted of Dr. Vaughn, Mrs. A. F. Ganier, and Mrs. W. M. Leftwich, and the committee performed its function with great credit and generosity.

The high-light of the field day occurred when a pair of Pileated Woodpeckers permitted a close-up view by the crowd and leisurely did their stunts.

At the time set for the group photograph to be taken the rain was coming down in torrents. A good group photograph was made on Saturday, however, while many of the members were absent. Copies of this picture may be obtained through Mr. Ganier at seventy-five cents each.

According to the official reports the Nashville meeting of the A. A. A. S. was attended by 1662 scientists and their friends.

Register of Attendance at the Second Nashville Meeting

From the District of Columbia: W. B. Bell, Washington. From Pennsylvania: Miss Marjorie Ruth Ross, State College. From New York: Dr. Bertha Chapman Cady, Miss Grace G. Wyman, Dr. G. Clyde Fisher, New York. From Massachusetts: Miss Claudia Schmidt, Springfield. From Michigan: Prof. T. L. Hankinson, Ypsilanti. From Ohio: Dr. Lynds Jones, Oberlin; Prof. E. L. Moseley, Bowling Green. From California: Mrs. H. J. Taylor, Berkeley. From Texas: Miss Elizabeth Sterry, San Marcos; Miss Very Kearby, Orange; Dr. C. I. Reed, Dallas. From Kansas: Mr. and Mrs. C. L. Harris, Eldorado. From Nebraska: Miss Mollie Vlasnik, Niobrara. From Iowa: Miss Lillian Hethershaw, Des Moines; Prof. E. L. Fitzpatrick, Cedar Rapids; Mrs. Mary L. Bailey, Mr. and Mrs. T. C. Stephens, Sioux City. From Missouri: Mr. and Mrs. A. F. Satterthwait, Webster Grove. From Mississippi: Prof. R. N. Lobdell, A. & M. College. From Alabama: W. A. Ruffin, Prof. Henry G. Good, Prof. J. M. Robinson, Auburn. From Georgia: Miss Ethel Purcell, Atlanta; Prof. M. C. Quillian, Macon. From North Carolina: Miss Betty White, Greenville; Prof. Zeno P. Metcalf, Raleigh. From Kentucky: Miss Emilie Yunker, Mrs. C. E. McBride, Louisville; Miss Grace Wyatt, Murray. From Tennessee (outside of Nashville): Miss Dorothy Bachtel, Chattanooga; John M. Frazier, Cleveland; Miss Florence English, Adamsville; Prof. J. A. Robins, McKenzie; E. M. McNish, Madison; Miss Mary Beard, Miss Evelyn Willoughby, Mr. and Mrs. P. C. Avery, Knoxville. From Nashville: Prof. J. M. Shaver, Dr. H. S. Vaughn, A. F. Ganier, W. M. Walker, Jr., Dr. Geo. R. Mayfield, R. A. Wilson, Ben B. Coffee, Miss Alma Hollinger, Miss Jessie French, Miss Margaret McIntyre, Miss Frances Bottom, Mrs. K. P. Wright, Mrs. E. B. Walker, Mrs. A. F. Ganier, Mrs. G. R. Mayfield, Mr. and Mrs. W. M. Leftwich, Mrs. H. S. Vaughn, Grover Cook, Vernon Sharp, Jr., Harry C. Monk, Prof. A. C. Webb, H. A. Webb, R. A. Wilson, L. P. Bellah, H. B.Bradley, J. T. Moore, P. L. Cox, Mr and Mrs. J. M. Cate, Mrs. Eugene Crutcher, Miss Lillian Taylor, Mrs. A. Loveman, Mrs. T. C. Laskey.

Summary of Attendance: District of Columbia, 1: Pennsylvania, 1; New York, 3; Massachusetts, 1; Michigan, 1: Ohio, 2; California, 1; Texas, 3; Kansas, 2; Nebraska, 1; Iowa, 5; Missouri, 2; Mississippi, 1; Alabama, 3; Georgia, 2; North Carolina, 2; Kentucky, 3: Tennessee (outside of Nashville), 9; Nashville, 32. Total, 75; total outside of Nashville, 43. Total attending the banquet, 46. Total on the Field Day trip, 31.

REPORT OF THE SECRETARY FOR 1927

To the Officers and Members of the Wilson Ornithological Club:

Allow me to submit a report of the activities of the Secretary's office for the current year.

The campaign for increasing the membership has been in progress throughout the year, although it was interrupted to some extent on my part by spending the summer months in camp with inadequate facilities for such work. A total of sixty-five members and subscribers have been added to the roll; sustaining, none; 26 active, 46 associate, and 4 subscribers.

The distribution of new members by states is as follows: California 2, Connecticut 1, Florida 1, Georgia 3, Idaho 1, Illinois 10, Indiana 1, Iowa 6, Kentucky 4, Kansas 3, Maine 1, Maryland 1, Michigan 2, Minnesota 2, Missouri 2, Montana 2, Nebraska 3, New York 2, North Carolina 1, North Dakota 1, Ohio 8, Oklahoma 2, Oregon 1, Pennsylvania 3, South Carolina 2, South Dakota 1, Tennessee 6, Vermont 1, Virginia 1, Wisconsin 2, District of Columbia 1.

Those who sent in the applications of new members are as follows: T. C. Stephens 24, H. K. Gloyd 18, A. F. Ganier 6, J. W. Stack 6, W. A. Strong 4, Emilie Yunker 4, W. I. Lyon 3, F. A. Hanawalt 2, P. A. Livingston 2, and one each by Gordon Wilson,Edith B. Stoltz, Althea R. Sherman, Margaret M. Nice, G. R. Mayfield, H. L. Stoddard, W. W. Bennett, G. F. Abbey, and George L. Fordyce.

The total membership now is 663: honorary 4, sustaining 68, active 244, associate 347. In addition to these totals the BULLETIN has 39 subscribers according to the Secretary's files. During the current year 17 members have resigned, 6 are deceased, 2 subscriptions have been discontinued, and 11 have been dropped from the roll because of long-standing delinquency, or because of unknown address. The total number of members discontinued for these reasons is 36.

There is further need of work in building up the membership in the middle west and south. It is to be hoped that the members in these regions will make a special effort to stimulate local interest in the work of the Wilson Club, and every member of the organization is urged to help by notifying the Secretary of colleagues, acquaintances, and correspondents who may be prospective members.

An itemized list of the Secretary's expenses has been sent to the Treasurer each month. The helpful co-operation of the other officers and members of the Club throughout the year has been greatly appreciated.

Very sincerely yours,

HOWARD K. GLOYD, *Secretary*.

REPORT OF THE TREASURER FOR 1927

East Lansing, Mich., November 1, 1927.

Receipts for 1927

Received from former Treasurer	$318.21	
Dues from Sustaining Members	290.00	
Dues from Active Members	510.00	
Dues from Associate Members	387.00	
Subscriptions from Organizations	48.00	
Sale of exchanges	57.00	
Special contribution	20.00	
Excess on checks and sale of Bulletins	7.92	
Total income		$1,638.13

Disbursements for 1927

Printing 4,000 mailing envelopes	$ 27.00	
Printing four issues, Wilson Bulletin	1,034.70	
Correction of error	6.50	
Cover card envelopes	4.50	
Cost of mailing Bulletins for 1927	24.73	
Addressograph work	4.00	
Halftones and zinc plates	62.97	
Cost of publication		$1,164.40
Secretary's expense		60.39
Treasurer's expense		14.64
Cost of Incorporation		60.00
Refund to Morningside College		2.37
Printing of Stationery		22.00
Total disbursements		$1,323.80
Cash balance on hand		314.33
Endowment Fund on hand		25.00
Total on hand, November 1, 1927		$ 339.33

J. W. Stack, *Treasurer.*

REPORT OF THE ENDOWMENT COMMITTEE

To the Officers and Members of the Wilson Ornithological Club:

The Trust Agreement between the Wilson Ornithological Club and the Illinois Merchants' Trust Company is now complete. Everything has now been done that can be done in preparation for the fund. We are now ready to receive contributions.

Respectfully,

Thos. H. Whitney, *Chairman.*

Atlantic, Iowa.

The Cleveland Meeting

On November 25, 26, and 27, 1927, a joint meeting of the Wilson Ornithological Club and the Inland Bird Banding Association was held at the Cleveland Museum of Natural History. A detailed report of this meeting has not been sent for publication, but we publish below the announced program; there were doubtless some variations in the actual proceedings which are not recorded here.

The Cleveland Program

Friday, November 25, 1927

Forenoon Session, 10:00 o'clock. Cleveland Museum of Natural History.

Address of welcome, by Mr. L. B. Williams, President of the Cleveland Museum of Natural History.

Response, by Dr. Lynds Jones, President of the Wilson Ornithological Club.

1. In Memoriam—Louis Agassiz Fuertes. By J. P. Harris, Cleveland, Ohio.
2. Local distribution of the House Wren. By W. W. Bowen, Baldwin Research Laboratory, Cleveland, Ohio.
3. Bird Banding at Michigan State College. Professor J. W. Stack, East Lansing, Michigan.
4. Diseased Feet of Chipping Sparrows. By T. E. Musselman, Quincy, Illinois.
5. A Study of a Nesting of Myrtle Warblers. By Mrs. Margaret M. Nice, Columbus, Ohio.
6. A Study of Perching Birds Carrying Things in their Feet during Flight. Robert L. Baird, Oberlin, Ohio.
7. A Wild Game Farm—Small Movie. By Chester K. Brooks, Mentor, Ohio.
8. Birds of Treasure Island. (Slides). By George Finlay Simmons, Cleveland Museum of Natural History.
9. Glimpses of Bird Life in the Magdalen Islands. (Slides). By Herbert W. Brandt, Cleveland, Ohio.

Afternoon Session.

In the early afternoon the program included an inspection of the aviary of foreign birds at the home of Mr. Kenyon V. Painter. In the evening open house was held at the homes of Mr. and Mrs. S. Prentiss Baldwin and Mr. and Mrs. Herbert W. Brandt.

Saturday, November 26, 1927

Forenoon Session, 10:00 o'clock. Cleveland Museum of Natural History.

10. Temperature Control in Nestling Birds. (Slides). By S. Prentiss Baldwin, Cleveland, Ohio.
11. Notes on Harlan's Hawk. By C. W. G. Eifrig, Oak Park, Illinois.
12. The Short-billed Marsh Wren. By Frank M. Phelps, Elyria, Ohio.
13. Banding Birds on the South Atlantic Expedition of the Cleveland Museum of Natural History. By W. Kenneth Cuyler, Cleveland Museum of Natural History.
14. Relation of Flood Control to Bird Life in Miami Valley, Ohio. By Ben J. Blincoe, Dayton, Ohio.

THE CLEVELAND MEETING OF THE W. O. C. AND THE I. B. B. A.

KEY TO THE GROUP PICTURE: 1, C. H. Ehrbar. 2, Mrs. L. H. Ehrbar. 3, C. W. G. Eifrig. 4, Miss Brandt. 5, Mrs. C. Bretsch. 7, Mrs. Lynds Jones 8, Dr. Lynds Jones 9, S. Prentiss Baldwin. 11, Mrs. W. I. Lyon. 12, Prof. J. W. Stack. 13, Mrs. W. W. Bowen. 15, Wm. G. Cramer. 16, Mary C. Palmer. 18, Percival B Coffin. 19, W. W. Bowen. 20, Mrs. Margaret M. Nice. 21, Mrs. Percival B. Coffin. 22, Mrs. C. E. Feser. 23, Mrs. I. T. Frary. 24, Miss A. E. Layer. 26, George T. Jones. 27, S. E. Perkins III. 29, J. E. Hubbe. 30, Mrs. Herbert W. Brandt. 31, Herbert W. Brandt. 32, Leonard Wing. 33, Prof. E. L. Moseley. 34, J. Duer. 35, Ben J. Blincoe. 36, George Wing. 37, C. M. Shipman. 39, George L. Fordyce. 40, F. C. Lincoln. 41, R. L. Baird. 42, Emerson Kemsies. 43, C. Bretsch. 44, H. L. Madison 45, D. B. Hillmer. 47, Harold Wing. 48, E. S. Thomas. 49, John C. Pallister. 51, Mrs. John C. Pallister. 52, A. B. Williams. 53, Prof J. S. Hine. 54, W. Kenneth Cuyler. 55, A. B. Fuller.

15. Notes on the Nesting Habits and Song of the Mockingbird. By Dr. J. Paul Visscher, Western Reserve University, Cleveland, Ohio
16. Bob-white. By W. B. Taber, Jr., Kansas, Illinois.
17. A Study of a Wet-weather Lake. By Gordon Wilson, Bowling Green, Ky.
18. Bird Banding on Islands in Lake Michigan and Lake Huron. By Wm. I. Lyon, Waukegan, Illinois.

Afternoon Session, 2:30 o'clock. Cleveland Museum of Natural History.

19. Rapping the Raptores. By C. M. Shipman, Willoughby, Ohio.
20. Recent Explorations on the American Eagle. By Dr. Francis H. Herrick, Western Reserve University.
21. Banding the European Starling. By E. S. Thomas, Columbus, Ohio.
22. Chimney Swifts in November. By Otto Widman, St. Louis, Mo.
23. Seasonable Changes in a Texas Bird Habitat. By C. W. G. Eifrig, Oak Park, Illinois.
24. Birds on the Pacific Islands. (Small movie). By Dr. Lynds Jones, Oberlin College, Oberlin, Ohio.
25. Traps and Baits. (Slides). Professor J. W. Stack, East Lansing, Michigan.
26. Bird Hunting with a Camera along Lake Eric. By Arthur B. Fuller, Cleveland Museum of Natural History.
27. Methods in Bird Research. (Motion pictures). By S. Prentiss Baldwin, Cleveland, Ohio.

Evening Session, 7:00 o'clock.

At this time the banquet was held in the Hotel Statler, with Dr. Francis H. Herrick, dean of Ohio ornithologists, presiding, and Mr. S. Prentiss Baldwin, acting as toastmaster.

On the following day, Sunday, automobiles conveyed the visitors to the Baldwin Bird Laboratory, at Gates Mills. In the afternoon a similar visit was made to the Game Preserve of Mr. Chester Brooks, at Mentor.

Items

There were several very unusual and most enjoyable features of the Cleveland meeting, besides the excellent program of papers.

The visit on Friday afternoon to the estate of Mr. Kenyon V. Painter proved to be wonderfully interesting. Mr. Painter has a large aviary of foreign birds, the history of which was carefully described for the visitors. After showing his birds Mr. Painter conducted the party to his library and then to his trophy room, an unusually large reception hall completely filled with specimens of mammals, birds, fish, and animals of many other kinds.

On Friday evening the beautiful home of Mr. and Mrs. S. Prentiss Baldwin was opened to the visitors. Here we enjoyed a glimpse of Mr. Baldwin's library and comfortable den. Later in the evening a call was made at the home of Mr. and Mrs. Herbert W. Brandt, at Shaker Heights. Mr. Brandt also has a large room filled with specimens. The large collection of birds' eggs was displayed in round, glass-covered boxes, thus giving a more realistic setting. Mr. Brandt's sons exhibited a very creditable collection of local butterflies and other insects.

The banquet on Saturday evening was a novel one. Those present will not forget the officious head-waiter who spoke rudely to some of the guests. This was carried to a point which required the presence of the manager, who peremptorily discharged the offender. The clever actor was now retained for the entertainment of the banqueters. A model of a bird sculptured in ice adorned each service of dessert.

The visit to Mr. Baldwin's laboratory on Sunday was a memorable event. Some of the traps contained birds at the time. After a stop at Mr. Baldwin's summer home the visitors were conducted to the laboratory itself, where all the mysterious apparatus was exhibited in full operation. At noon automobiles carried the party to Willoughby, where a steak dinner was to have been cooked in the oven over live coals; but on account of rain a large hall with an open fire-place was secured, which permitted indoors much of the freedom of an outdoor lunch.

In the afternoon another jaunt was taken to the home of Mr. Chester Brooks, at Mentor. It has been stated that Mr. Brooks has raised more species of wild ducks and geese than anyone else in America. Those who saw his immense flocks of wildfowl did not question this statement.

Merely as a matter of record it may be stated that the Cleveland meeting was a success; it could not have been otherwise with the enthusiastic and generous local constituency.

COMMUNICATIONS

Editor, Wilson Bulletin: On reading your article entitled "Down with the Wren Boxes," I am surprised to think that you would print such an article on account of the harm you will do this dear little bird, which is not only strictly insectivorous, taking its quota of mosquitos, moths, and other insects every day, but is one of the few birds that sings all day, from before the sun comes up until after the sun goes down, and it has more friends among bird lovers than any other song bird.

I attract all the wrens to beautiful "Bird Lodge" that I can get to make their homes here, and I have yet to see one interfere or harm other birds or bird's nests. I have about twenty wren houses up and most of them occupied and will put up five or ten more the coming year as I dearly love to have this sweet little singer at "Bird Lodge;" they lend such an air of beauty and harmony with their pert appearance and sweet singing.

My long experience with the song birds (covering forty-five years) has shown me that birds have different dispositions the same as people, and at times they are cross and irritable, this fretful period only appearing on cold or rainy days. I can only think that the bird that Miss Sherman speaks of must have been a bad actor.

Yours very truly,

Joseph H. Dodson,
President American Audubon Association.

August 4, 1925.

[It has been suggested that the pages of the Wilson Bulletin must be open to both sides of the House Wren controversy; hence we are glad to present the preceding communication from Mr. Dodson, the well-known bird house dealer.—Ed.]

SUMMER COURSES IN ORNITHOLOGY

It is the desire of the Wilson Bulletin to use this page in each March issue for announcements of summer courses in ornithology in the inter-mountain region.

The Ninth Tour of the Ecology Class of Oberlin College is scheduled to leave Oberlin, Ohio, on June 20, 1928, and return to Oberlin on August 15. The objective will be the Pacific Coast, and the route will include Lake Okoboji, Iowa, the badlands and Black Hills of South Dakota, Yellowstone Park, Glacier Park, Ranier Park, California, Yuma, Phoenix, the Grand Canyon, across Texas, Oklahoma, and Arkansas, and on to Nashville; thence to Louisville, Cincinnati, and Oberlin. The new Ford cars will be used for transportation. An opportunity for a reconnaissance of plant and animal life with particular attention to birds. For further information address, Dr. Lynds Jones, 352 West College Street, Oberlin, Ohio.

A Nature Study Camp Under the Auspices of Pennsylvania State College will be conducted during the summer of 1928 in the heart of the Allegheny Mountains. Instruction will be by a staff of experts. Three weeks of intensive field work for teachers and nature lovers. For announcements address, Prof. George R. Green, State College, Pa.

The Second Itinerant Field Course in Ornithology will be Offered by Morningside College in 1928, June 7 to August 15. The objective will be Yellowstone National Park. The route will include Lake Okoboji, Lake Itasca and the pine forests of Minnesota, the prairies, sloughs, and badlands of North Dakota, Yellowstone Park and vicinity, the plains of Wyoming, and return by way of either the Black Hills of South Dakota or the Sand Hills of Nebraska. About eight weeks of camp life and travel, 4000 miles, college credit, $250. For announcements address, Prof. T. C. Stephens, Morningside College, Sioux City, Iowa.

A Course in Ornithology will be offered by Prof. Howard K. Gloyd at the Kansas State College of Agriculture. For information address, Prof. Howard K. Gloyd, Manhattan, Kansas.

Two Courses in Ornithology will be Given by Dr. Alfred O. Gross this summer at the Biological Station of the University of Michigan, at Douglas Lake. The twentieth season of this Station will be from June 25 to August 17, 1928. For further information address the Director, Dr. George R. La Rue, University of Michigan, Ann Arbor, Michigan.

Annual Meetings of the Wilson Ornithological Club

	Retiring President
1914—Chicago. February 5. Chicago Academy of Sciences.	
1914—Chicago. December 29-30. New Morrison Hotel	T. C. Stephens
1915—Columbus. December 28-29. With the A. A. A. S.	T. C. Stephens
1916—Chicago. December 27-28. New Morrison Hotel	T. C. Stephens
1917—Pittsburgh. January 1-2, 1918. With the A. A. A. S.	W. F. Henninger
1918—No meeting on account of the exigencies of war	M. H. Swenk
1919—St. Louis. December 29-30. With the A. A. A. S.	M. H. Swenk
1920—Chicago. December 27-28. With the A. A. A. S.	R. M. Strong
1921—Chicago. December 26-27. The Field Museum	R. M. Strong
1922—Chicago. October 26	T. L. Hankinson
1923—Cincinnati. Dec. 31, 1923-Jan. 1, 1924. With the A. A. A. S.	T. L. Hankinson
1924—Nashville. November 28-29-30. Peabody College	A. F. Ganier
1925—Kansas City. December 28-29. With the A. A. A. S.	A. F. Ganier
1926—Chicago. November 26-27. Chicago Academy of Sciences	A. F. Ganier
1927—Nashville. Dec. 30, 1927-Jan. 1, 1928. With the A. A. A. S.	Lynds Jones

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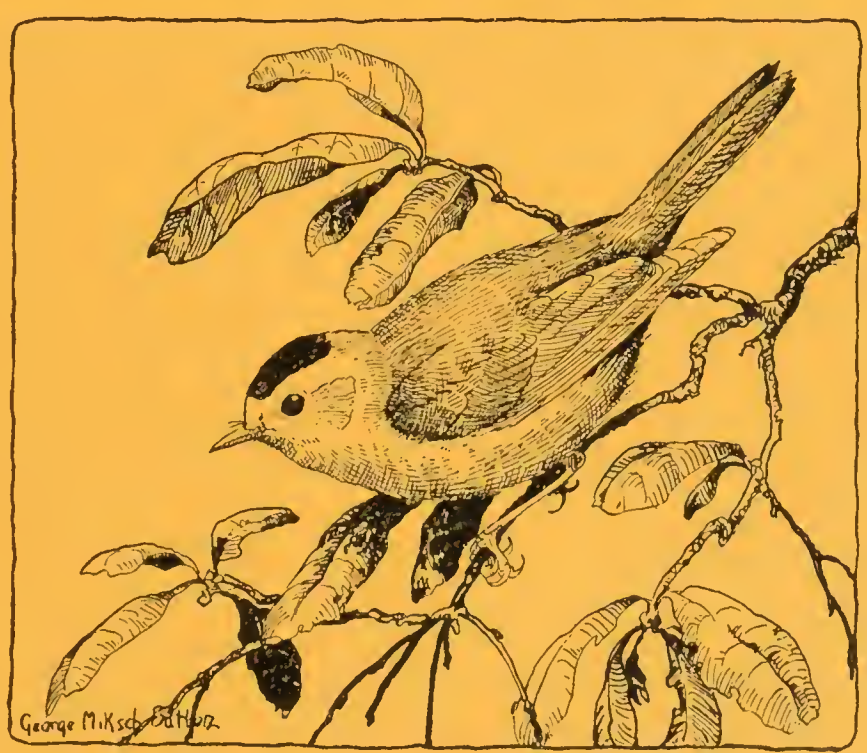
THE WILSON BULLETIN



A Magazine of Field Ornithology

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CONTENTS

THE WILSON BULLETIN

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The Wilson Bulletin is sent to all members not in arrears for dues. The subscription price is $1.50 a year, invariably in advance, in the United States. Outside of the United States the subscription rate is $2.00. European Agents, Dulau and Company, Ltd., 34-36 Margaret St., Oxford Circus, London, W. 1., England.

All articles and communications for publication, books and publications for notice, and exchanges, should be addressed to the Editor.

New subscriptions, changes of address, and applications for membership should be addressed to the Secretary. Personal items, news of events in the scientific world, and other notes suitable for our "Notes Here and There" department may also be addressed to the Secretary.

Claims for lost and undelivered copies of the magazine may be addressed to the Editor.

THE WILSON ORNITHOLOGICAL CLUB

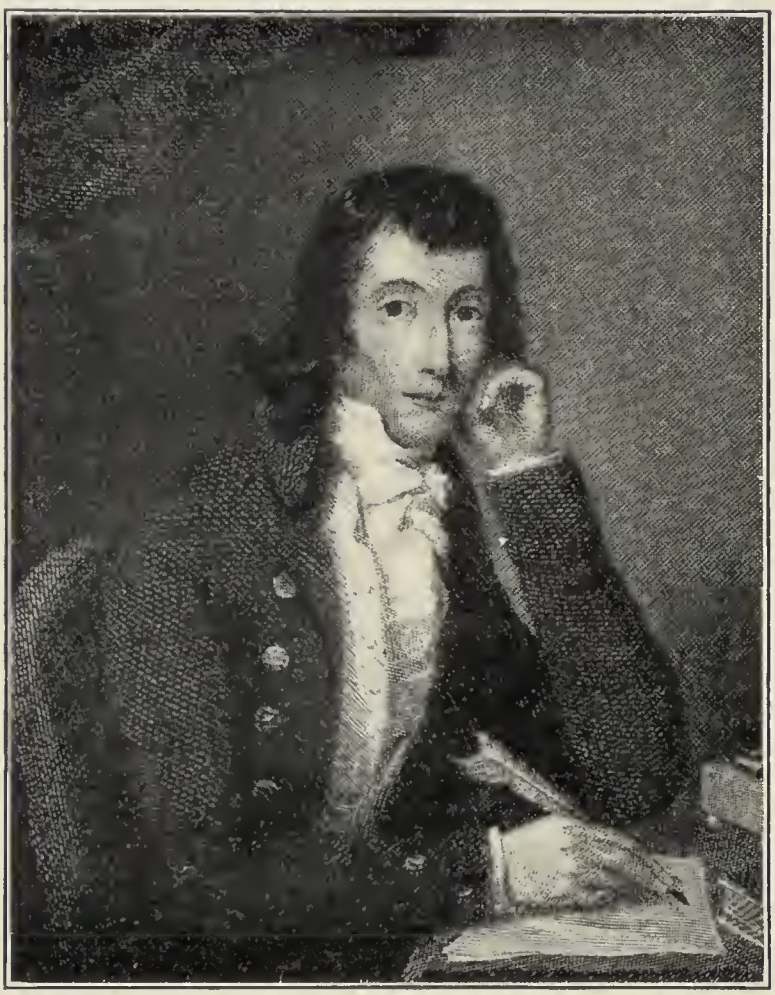
Founded December 3, 1888. Named after Alexander Wilson, the first American ornithologist.

The officers for the current year are:
President—Dr. Lynds Jones, Spear Laboratory, Oberlin, Ohio.
Vice-President—Mr. Thos. H. Whitney, Atlantic, Iowa.
Treasurer—Prof. J. W. Stack, M. A. C., East Lansing, Mich.
Secretary—Prof. Howard K. Gloyd, K. S. A. C., Manhattan, Kansas.

The membership dues are—Sustaining membership, $5.00; active membership, $2.50; associate membership, $1.50 per year.

The following societies are affiliated organizations:

The Nebraska Ornithologists' Union.
The Iowa Ornithologists' Union.
The Kentucky Ornithological Society.
The Tennessee Ornithological Society.



ALEXANDER WILSON

This portrait is a halftone reproduction of the engraving which appears as a frontispiece in the Jameson edition of Wilson's work, and which was after the original painting by James Craw.

THE WILSON BULLETIN

A QUARTERLY MAGAZINE OF ORNITHOLOGY
Published by the Wilson Ornithological Club

Vol. XL. (Old Series) No. 2 June, 1928

Vol. XXXV (New Series) Whole Number 143

ALEXANDER WILSON: A SKETCH

BY MRS. H. J. TAYLOR

Wherever life attains a fullness of development and gives to the world expression out of its fullness, with such a life we need intimate acquaintance to find the well-spring of inspiration that led to its growth. Alexander Wilson's is such a life.

Between 1808-1813, he published "American Ornithology" in eight volumes. The ninth volume was published by his friend, George Ord, who also wrote a memoir of Wilson for this volume. Each of the full page plates in these volumes contains several species, sketched in outline and colored by hand. The description of each bird, its habits and life history in its natural abode is written from his own observations in the field. Three hundred and twenty species are described, and of these fifty-six were new. This work is standard today and contains all the birds of the Middle States save about twelve. Such a contribution to the world by one man, poor in all material things, but rich in courage and perseverance, merits the title, "Father of American Ornithology."

Wilson's introduction to his Ornithology contains these simple, direct, deepfelt words: "My hopes on this head, are humble enough; I ask only support equal to my merits, and to the laudability of my intentions. I expect no more; I am not altogether even certain of this."[1] Volume I contains two plates colored by Wilson's own hand, and in the Ord edition, Malvina and Helen Lawson colored by hand practically all of the plates. Wilson's style is natural and unaffected. It radiates a joy and an out-of-door atmosphere. The original edition of nine thin volumes, 11x14 inches, sold by subscription at $120, is now rare.

The following extracts are from Wilson's letter to his father on the completion of the first volume of his American Ornithology:

[1]American Ornithology; or the Natural History of the Birds of the United States. By Alexander Wilson, and Charles Lucian Bonaparte. Edited by Robert Jameson, Esq. Edinburgh: 1831. Volume I, page xc.

". . . I have transmitted to you . . . the first volume of my American Ornithology . . . and shall, if I live to finish it, send you regularly the remaining nine volumes as they appear. In giving existence to this work, I have expended all I have been saving since my arrival in America. I have also visited every town within 150 miles of the Atlantic coast, from the river St. Lawrence to St. Augustine in Florida, . . . and would willingly give a hundred dollars to spend a few days with you all in Paisley, but like a true bird of passage, I would again wing my way across the western waste of waters, to the peaceful and happy regions of America. . . . I trust the publication I have now commenced, and which has procured for me reputation and respect, will also enable me to contribute to your independence and comfort, in return for what I owe you. To my stepmother, sisters, brothers, and friends, I beg to be remembered affectionately. Your grateful son."[2]

Alexander Wilson was born in Paisley, Scotland, July 6, 1766. He died in Philadelphia, August 23, 1813, aged 47 years. He lies buried in the churchyard of Gloria Dei, the old Swedish church at Swanson. He inherited the sterling qualities that characterize the Scotch: industry, thrift, courage, perseverance and absolute integrity. His father, a man of superior intelligence, was a master weaver; he also distilled whisky on his own premises. This was no disgrace at that time and he lost none of the people's respect for illicit distilling. He expected to give his son a liberal education, and entertained the hope, almost universally found in the hearts of humble Scottish parents, that Alexander might some time preach the gospel of peace. The family was poor and became still poorer when the mother died, leaving a family of three small children—three other children had died in infancy. Alexander was at this time ten years old. The father soon married a widow with a family of children, and others followed by this union. Alexander's school days were over. He had gotten a foundation in the old Scotch school that opened at six in the morning and closed at six in the evening. But his education was scarcely begun for he had an inherited taste for learning.

The oldest sister married Wm. Duncan, also a weaver. To him Alexander, aged thirteen years, was bound apprentice for three years. The original indenture bears the date July 31, 1779, and at the end there appears in Wilson's own hand writing these lines:

[2]The Poems and Literary Prose of Alexander Wilson, the American Ornithologist. By the Rev. Alexander Grosart. Paisley, 1876. Volume I, pp. 168-170.

"Be't kent to a' the warld in rhime,
That wi' right meikle wark and toil,
For three lang years *I've ser't my time*,
Whiles feasted wi' the hazel oil." Agst 1782.

For seven years Wilson worked at the loom. It was irksome to him. He was restless and ill content. Confinement became almost unbearable. He longed for freedom and the out-of-doors. Paisley in 1782 had forty-five houses, eighty families, and sixty-six looms. This must have been monotonous to one whose life had the creative instinct.

The loom was not very lucrative and Duncan decided to make a tour of Scotland, taking Wilson with him. This was delightful relief. Wilson showed poetic feeling early in life by publishing some verse in the local newspaper. His poems are not great, but they are expressive and reveal a soul struggling to break out of the narrow bounds of earning bread, to live under a boundless horizon. In "Groans from the Loom," he says:

"Good gods! Shall a man with legs
So low uncomplaining be brought!"

No wonder he was called "The Melancholy Poet."

In the four years as traveling pedler, he visited all the places in Scotland renowned in song and story. No place was too out of the way, if it led him to the haunt of poet or Scottish Chief. These years gave him opportunity for observation, reading and expression. He had poems enough for a book, for which, while he was offering his muslins for sale, he solicited subscriptions. He met with many disappointments, and often his pride was deeply wounded. His keen perception convinced him that much of this was due to his vagrant appearance as a pedler, which was a lower grade of work than weaving. In a letter to a friend dated November 10, 1789, from Edinburgh, he says:

". . . I assure you, sir, that my occupation is greatly against my success in collecting subscribers. A *Packman* is a character which none esteem, and almost everyone despises. The idea which people of all ranks entertain of them is, that they are mean spirited, loquacious liars, cunning and illiterate, watching every opportunity, and using every low and mean art within their power to cheat. . ."[3]

His poems published in 1790 had little success. His most successful poetic effort was "Watty and Meg," published anonymously in 1792. It was ascribed to Burns, who said he would be proud to claim its authorship. One hundred thousand copies were sold in a

[3]From Grosart: *Op. cit.*, vol. i, p. 49.

few weeks, and Wilson's share of the sales was twelve copies of the book. On reading the story of "Watty and Meg," a wife exclaimed to her husband, "D'ye ken what Sandy Wilson has done? He's poem'd us.."

Wilson also wrote satire, one published anonymously was judged libelous. He frankly acknowledged its authorship and was condemned to burn the satire and pay a heavy fine. The satire he burned publicly at Paisley Cross. Being unable to pay the fine of £12. 13s. 6d. he was imprisoned. He felt the disgrace and the hurt was deep. On his release he was broken in spirit. He was suspected and looked upon as dangerous because of his sympathy with the French people in the oncoming revolution. Poetic success was impossible. Accounts of free and vast America must have opened a door to him. With his nephew, Wm. Duncan, he determined to enter its boundless forests. To earn money for his passage, he returned to the loom for four months and lived on a shilling a week.

He slept on the deck of a crowded sailing vessel, seven weeks, reaching Newcastle, N. J., July 14, 1794. He walked from Wilmington to Philadelphia, thirty miles. He shot the first bird he saw, a Red-headed Woodpecker, and thought it the most beautiful bird he had seen. His description of this walk reveals his interest in birds and out-of-door life. Wilson worked at most anything obtainable while preparing himself in writing and arithmetic. He began teaching and continued nearly ten years; at Milestown, Pennsylvania, he taught about six years. His poem "The Schoolmaster," has a place in Spofford's Choice Literature.

While teaching at Milestown, Pa., he writes to his father in a letter dated August 22. 1798, ". . . I should be happy, dear parents, to hear from you, and how my brother and sisters are. I hope David will be a good lad, and take his father's advice in every difficulty . . . I should wish also that he would endeavour to improve himself in some useful parts of learning, to read books of information and taste, without which a man in any country is but a clodpole; but beyond everything else, let him indulge the deepest gratitude to God, and affectionate respect for his parents. . ."[4]

In 1802, he went to Gray's Ferry, four miles from Philadelphia. This was his last and most fortunate move while teaching. Here he made lasting friendships and received help and encouragement for his great work. George Ord was an unfailing friend and often a companion on expeditions. William Bartram, the botanist, gave him

[4]From Grosart: *Op. cit.*, vol. i, p. 65.

free access to his library and gardens. Lawson, the engraver, gave him lessons in drawing, coloring and etching. So excellent was his drawing of birds, and so encouraged was he, that he determined to make a collection of birds.

In October, 1804, with his nephew, Wm. Duncan, and Isaac Leech, the son of his landlady, he made an expedition to Niagara Falls and back, reaching Philadelphia December 7, having walked nearly 1300 miles in fifty-nine days. He made forty-seven miles the last day. In a letter to his father at this time, he says: "My heart has ever preserved the most affectionate veneration for you and I think of you often with tears." In a letter to William Bartram dated December 15, 1804, Wilson writes: "Though now snug at home, looking back in recollection on the long, circuitous journey which I have at length finished, through deep snows, and almost uninhabited forests; over stupendous mountains, and down dangerous rivers; passing over, in a course of thirteen hundred miles, as great a variety of men and modes of living, as the same extent of country can exhibit in any part of the United States . . . yet so far am I from being satisfied with what I have seen, . . . that I feel more eager than ever to commence some more extensive expedition; . . . With no family to enchain my affections, no ties but those of friendship, and the most ardent love of my adopted country; with a constitution which hardens amidst fatigues, . . . I have at present a real design of becoming a traveller. . ."[5]

On the Niagara Falls expedition Wilson wrote his longest poem, "The Foresters." Dr. Elliott Coues advises every one to read this "for the interesting facts." It also contains many beautiful descriptions.

On his return from Niagara Falls, Wilson records in his journal, "I have seriously begun to make a collection of drawings of birds in Pennsylvania." In a few months he extended his plan to include the whole of the United States. Wilson never lost an opportunity of defending the value of a bird if to some one it seemed a nuisance. Once he encountered an old German who accused the Kingbird of eating his *peas*. Wilson denied the charge, "They never ate a pea in their lives." The German said emphatically, "Vell, I have seen 'em with mine two eyes, blaying about the hifes and snapping up de pees." I suppose the ornithologist and the accurate observer were both satisfied.

Between 1805 and 1813, Wilson explored different parts of the country to enlarge his observations, to collect specimens and to study

[5]From Grosart: *Op. cit.*, vol. i, p. 112.

the life of birds in their native haunts. With his friend, George Ord, he spent four weeks at Egg Harbor. This was the last of six trips to New Jersey coast to study water birds. Wilson traveled through New Jersey and the New England States to Maine, and south to Florida. He made an expedition to New Orleans, going from Pittsburgh to Louisville by skiff.

The summer of 1807 taxed Wilson's strength to the limit with close and constant application to his manifold tasks. September, 1808, his first volume, an edition of 200 copies, appeared. The text, 158 pages, nine beautiful plates, with thirty-four hand-colored specimens. Wilson set out for subscribers. He received compliments on his work, but subscriptions at $120 for the set were not easily obtained. It is of interest that Robert Fulton subscribed. Thomas Jeffersan, then President of the United States, also was a subscriber, and wrote to Wilson thus: "Th: Jefferson having a few days ago only received a copy of the printed proposals for publishing a work on American ornithology by mr. Wilson, begs leave to become a subscriber to it, satisfied it will give us valuable new matter as well as correct the errors of what we possessed before. he salutes mr. Wilson with great respect. Washington, Oct. 9, 07."[6]

Mr. Wilson visited the professor of Natural History at Princeton. He wrote in his journal. "I found to my amazement that he scarcely knew a sparrow from a woodpecker." Wilson also solicited the Governor of New York, D. T. Tompkins, and relates that "he turned over a few pages, looked at a picture or two, and asked me my price, and while in the act of closing the book added—'I wouldn't give $100 for all the birds you intend to describe even if I had them alive'."

On June 6, 1811, Wilson wrote the following lines to his brother, David:

". . . By the first opportunity, I will transmit a trifle to our old father, whose existence . . . is as dear to me as my own. But, David, an ambition of being distinguished in the literary world, has required sacrifices and exercises from me with which you are unacquainted. . . . Since February, 1810, I have slept for several weeks in the wilderness alone, in an Indian country, with my gun and my pistols in my bosom, and have found myself so reduced by sickness as to be scarcely able to stand, when not within 300 miles of a white settlement, and under the burning latitude of 25 degrees. . ."[7]

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[6]Alexander Wilson, Poet-Naturalist. A Study of His Life with Selected Poems. By James Southall Wilson, Ph. D. New York and Washington. 1906. Page 84.

[7]Grosart: *Op. cit.*, vol. i, p. 226.

The accommodations in Virginia, the Carolinas, and indeed all through the South, Wilson found desolate and wretched. Everything was conducted by negroes. Rooms with barren broken walls, a place to lie down and a broken chair or bench were everywhere the same. He says, "The meals were so served up that a wolf would have shrunk back in dismay. These 'hospitable mansions' were raised from the ground on posts, leaving a retreat below for hogs, which kept up their serenade all night."

In 1810 Volume II was ready. Again Wilson set out on a strenuous expedition for specimens of birds and subscribers to the American Ornithology. The latter was a much more difficult task than the former. From Pittsburgh to Louisville he went by skiff, then on foot through almost an impenetrable wilderness to Natchez and New Orleans, sleeping in the woods and subsisting on biscuits and whatever his gun could procure. Soliciting for subscriptions was full of disappointments, hard rebuffs, indifferences, insults. He had letters of introduction to possible subscribers in Louisville, but not one subscribed. He met almost by accident, Audubon, who had a store in Louisville. Wilson requested Audubon's patronage. Then and there between these two remarkable men, the only active ornithologists of that time, began quarrel and strife, the embers of which have been kept aglow for more than a century. Two men more different in personality, and more marked in family background, could scarcely be found. The Scottish life of toil, industry, poverty, struggle, with its sterling qualities of truth and faith and perseverance, were all typified in Wilson. Audubon was born, according to Herrick,[8] at Les Cayes, Haiti, on April 26, 1786. A part of his education was obtained in Paris. He studied design under the eminent painter, David. He inherited lands near Philadelphia. He was a graceful dancer—at times, a charming dancing master. He had open door to the most exclusive social life of the day.

Wilson, a man of forty-four, was working beyond his limit, enduring disappointment, rebuffs and insult in his attempt for subscribers. Audubon, a young man of twenty-four, had not yet received any of the hard knocks which Wilson had known from childhood. These are the two men as they met face to face in Louisville, March 9, 1810. Audubon wrote, "I felt surprised and gratified at the sight of his [Wilson's] volumes, turned over a few of the plates, and had already taken a pen to write my name in his favour, when my partner rather abruptly said to me in French, 'My dear Audubon, what induces

[8]Audubon the Naturalist, A History of His Life and Time. By Francis Hobart Herrick, Ph.D., Sc.D. New York, 1917. Page 53.

you to subscribe to this work? Your drawings are certainly far better, and again you must know as much of the habits of American birds as this gentleman.' Whether Mr. Wilson understood French or not, or if the suddenness with which I paused, disappointed him, I cannot tell; but I clearly perceived that he was not pleased. Vanity and the encomiums of my friend prevented me from subscribing."[9] And just a few lines further along (page 439) he wrote: ". . . I did not subscribe to his work, for, even at that time, my collection was greater than his."

A weeks' canvass in Louisville produced for Wilson not a single subscriber. He wrote in his diary, "Science or literature has not one friend in this place." His lines,

"Though western forests deep and drear
Far from the haunts of science thrown,
My long laborious course I steer
Alone, unguided and unknown."

must have expressed his feelings on leaving Louisville.

I know of no value to science that has come through the long continued controversy. It is of no great moment whether Wilson or Audubon first saw the small flycatcher. Time helps us all to evaluate life. Looking out over a wider horizon, the experiences of the years are softened and blended into the background. Bitterness that thrives in the tenseness of rivalry, withers when life is seen in its reality.

In 1836, when Audubon was 50 years old, he visited the scenes of his youth in and around Philadelphia. In his journal under date of October 15, 1836, we read, "Passed poor Alexander Wilson's school house and heaved a sigh. Alas! Poor Wilson! Would that I could once more speak to thee and hear thy voice!" This was the expression of a great soul to a soul whose greatness he had been unable to recognize twenty-six years before. Battle and strife are over. The essence of these two lives, expressed through their work on ornithology, has enriched the world. We are grateful debtors to Audubon and to Wilson.

Wilson never married. It is not revealed whether the little lass mentioned in some of his early poems was a deep heart affair. Soon after coming to America, another came into his life, stirring the depths of his heart with fulness and power. Realizing she was not for him, because she belonged to another, he moved away with a heart sore and distressed. Intense work to earn bread; intense study that he might live more abundantly; intense heartache that could not be satisfied—were enough to cause melancholy days at Gray's Ferry.

[9]Audubon's Ornithological Biography, Volume I, pp. 438-439.

Here another romance came into his life with Ann Bartram, granddaughter of the botanist and niece of Wilson's friend, Wm. Bartram. Ann's father sternly refused his consent. A poor school teacher was no match for his daughter. Parental authority was final in those days. Ann soon married, and perhaps Wilson came to know that not all of life's happiness comes through one avenue. He laid hold of his ornithology as a profession and worked more seriously than ever. Years later he became engaged to Miss Sarah Miller, sister of Congressman Miller of Pennsylvania. Death called him before they were married. She and George Ord were executors of Wilson's estate.

The great strain under which Wilson worked for so many years, and at manifold tasks, proved too much for even his strong constitution. He had been realizing this for some time. His unbounded perseverance knew no limit. Early in July, 1813, the eighth volume was ready. The strain was telling—still he pursued. While talking to a friend, about August 12, he saw a bird of a species he wanted. He followed it, swam the river with his clothes on. He secured the bird. A severe cold followed. In ten days the struggle was over. His brother, David, who had emigrated to America in 1811, reached his bedside a few hours before the end. David says, "I caught his hand, he seemed to know me and that was all. He died next morning at nine o'clock and was buried the next day with all the honors due his merit."

Wilson had sometime expressed the wish "to be buried in some rural spot, sacred to peace and solitude." This wish, no doubt, would have been carried out had it been known at that time. He was laid in the little churchyard of Gloria Dei, the old Swedish church at Swanson. The tomb which covers the grave was erected by Miss Sarah Miller and the inscription reads:

THIS MONUMENT
COVERS THE REMAINS OF
ALEXANDER WILSON
AUTHOR OF
"AMERICAN ORNITHOLOGY."
HE WAS BORN IN RENFREWSHIRE, SCOTLAND,
ON THE 6TH OF JULY, 1766,
EMIGRATED TO UNITED STATES
IN YEAR 1794
AND DIED IN PHILADELPHIA
OF THE DYSENTERY
ON THE 23D AUGUST, 1813,
AGED 47.

Alexander Wilson lived forty-seven years of intense earnestness. The expression of his life has enriched the world not only through his ornithological work, but also through his character, so strong in its purpose that it became indomitable through hardships and suffering. His work on birds grows in value with the years, and the old churchyard of Gloria Dei will be a Mecca because it holds the grave of Alexander Wilson.

Sioux City, Iowa.

NOTES ON A COLLECTION OF HAWKS FROM SCHUYLKILL COUNTY, PENNSYLVANIA

BY GEORGE MIKSCH SUTTON

Illustrated with diagrams by Leo A. Luttringer, Jr.

On October 19 and 20, 1927, the writer visited the region of Drehersville, Schuylkill County, Pennsylvania, for the purpose of observing a remarkable migration of hawks which had been reported by Game Protector Archie C. Smith of Lavelle, Pennsylvania, as occurring at certain points along Blue Mountain. A study of the local aspects of the migratory movement of these birds will appear in a subsequent paper after further investigations have been made. Interesting data were gathered, however, concerning the weight, food, and plumage of the birds collected and it seems advisable to present this material separately.

On October 17 Mr. Smith and certain sportsmen from Drehersville, Pottstown, and Reading, secured, among other birds of prey which were not saved, eighteen Sharp-shinned Hawks (*Accipiter velox*). On October 19 four Goshawks (*Astur atricapillus*) were secured. On October 20, while on Blue Mountain, we collected five more sharp-shins. On October 22 several gunners accompanied Mr. Smith to a point along the mountain past which the hawks flew in numbers, and secured, in a remarkably short time, a total of ninety sharp-shins, sixteen Goshawks, eleven Cooper's Hawks (*Accipiter cooperi*), thirty-two Red-tailed Hawks (*Buteo borealis borealis*), and two Duck Hawks (*Rhynchodon peregrinus anatum*).

Specimens were taken from 8 A. M. until almost 5 P. M., but unfortunately no data were preserved as to just when individuals were secured so that we cannot correlate our information on stomach contents with the time of day the specimens were taken, and cannot say, therefore, at just what periods migrating hawks are likely to spend time in capturing prey and eating their meals. It would seem from the evidence at hand that prey is captured actually *en route* and that

pauses are made only as the taking of prey justifies them, although it is likely that food is taken, if possible, early in the morning, before the day's flight has begun.

Sharp-shinned Hawk

Of the one hundred and thirteen sharp-shins collected twenty were females, and ninety-three were males; all were in adult plumage save ten, eight males and two females, which were wholly in the brown, mottled plumage of the immature bird. Most of these birds, while in excellent physical condition, were not particularly fat; and the stomachs of half of them held food though most of them, at the time they were shot, had not filled themselves to capacity. It is thought that the females were actually less numerous than the males on the days these birds were collected; it may be that they were flying higher, however, and therefore did not so often come within gun-range.

The weight of the birds varied somewhat, of course, with the amount of food they had eaten. Males which had nothing in their stomachs or crops averaged under 4 ounces in weight, the lightest specimen weighing a fraction over 3 ounces, the heaviest, almost 4⅛ ounces. Males whose stomachs held food weighed a little more than those whose stomachs were empty, the lightest being 3¼ ounces, the heaviest 4¾ ounces. The females were considerably heavier. Females whose stomachs were empty ranged in weight from 6 ounces to almost 8 ounces, while those whose stomachs contained food ranged from a little over 6 ounces to 8½ ounces, with an average of approximately 6⅗ ounces. In no case were the stomach and crop packed to capacity with food. According to our data the average female sharp-shin, therefore, weighs about 2½ ounces more than the male. Audubon gives the weight of the male as 3½ ounces; of the female 7½ to 8¼ ounces.

All the sharp-shin stomachs held remains of small birds. This species evidently eats its prey in rather small mouthfuls, and plucks its victims fairly well, before or while eating, even though the necessity for haste during migration may cause the birds to be less tidy in swallowing food at this season than otherwise. In most cases bills and feet of the birds, along with most of the bones, aside from the sternum and the cranium, were eaten, the feet always, apparently, being swallowed entire. Mandibles, in three cases, were found joined together as though the front of the head had been swallowed in one piece. In only one case had large feathers been swallowed: a female sharp-shin had plucked four of the rectices of a Myrtle Warbler and swallowed the tail bones with the remaining eight feathers attached.

There was considerable evidence that these hawks capture as much prey as they can eat, and perhaps more. Six individuals contained more than one species of bird, and one, a female, had eaten three small birds, apparently at one time, if we may judge from the stage of digestion which was apparently about the same in all three. We found no evidence that sharp-shins cast up pellets of indigestible matter, though they probably do so.

The largest species which the sharp-shin had killed were the Robin and Rusty Blackbird. There was not a trace of fur or mammalian bones. Insects which were found may be attributed to the small birds whose gizzards had been swallowed entire; bits of vegetable matter doubtless were of similar origin. Since the remains of Robins were found in both male and female sharp-shins it may be inferred that, in spite of the difference in the size of the sexes, they are equally savage and powerful in dealing with their prey. The females, however, often had their crops proportionaltely fuller than did the males, as though they habitually gorge more often than do their daintier, smaller-boned mates.

Fifty-one of the sharp-shin stomachs were empty; in the other sixty-two stomachs were found the remains of twelve Song Sparrows (*Melospiza melodia melodia*), nine Myrtle Warblers (*Dendroica coronata coronata*), six Slate-colored Juncos (*Junco hyemalis hyemalis*), five Golden-crowned Kinglets (*Regulus satrapa satrapa*), five Hermit Thrushes (*Hylocichla guttata faxoni*[1]), three Tree Sparrows (*Spizella arborea arborea*), three Fox Sparrows (*Passerella iliaca iliaca*), three Black-poll Warblers (*Dendroica striata*), three Robins (*Turdus migratorius migratorius*), two Downy Woodpeckers (*Dryobates pubescens medianus*), two Towhees (*Pipilo erythrophthalmus erythrophthalmus*), two Winter Wrens (*Nannus troglodytes hiemalis*), two Brown Creepers (*Certhia familiaris americana*), two Ruby-crowned Kinglets (*Corthylio calendula calendula*), one Prairie Horned Lark (*Otocoris alpestris praticola*), one Rusty Blackbird (*Euphagus carolinus*), one Goldfinch (*Astragalinus tristis tristis*), one Henslow's Sparrow (*Nemospiza henslowii susurrans*), one White-throated Sparrow (*Zonotrichia albicollis*), one Cape May Warbler (*Dendroica tigrina*), one Chickadee (*Penthestes atricapillus atricapillus*), one Olive-backed Thrush (*Hylocichla ustulata swainsoni*), and five held the feathers of species we could not satisfactorily determine.

[1]It is the general policy of the Wilson Bulletin to follow, in the matter of nomenclature, the A. O. U. Check-list and its official supplements.—Ed.

Most interesting of these items was, perhaps, the Henslow's Sparrow, not alone because it is rare in Pennsylvania, but because it is a very retiring species of the open fields which we would not expect the sharp-shin normally to catch. Evidently the Chickadee, in spite of its abundance in the autumn woods, is not often caught, and the Myrtle Warbler and Song Sparrow probably furnish a large proportion of the food of the migrating sharp-shins while they are in this region.

The eight specimens which were obviously immature, in brown, mottled plumage, showed no evidence of molt. There were no clear, gray feathers among the brown of head or back, and the remiges and rectrices evidently had not even started to drop out. Evidently the dropping of the feathers of this first winter plumage does not begin during the period of the fall migration.

The apparently adult individuals, on the other hand, with but few exceptions, showed evidence of a certain immaturity, chiefly in the brownish, worn rectrices, in the occasional rusty-edged upper tail coverts, lesser wing coverts and scapulars, and in the outermost rectrix, which was, in length, shape, and pattern, often different from the other rectrices. It now appears to me that most of these birds were of about the same age; whether they were young of the previous year emerging into a plumage somewhat more perfect than that of their first breeding season, or fully adult birds more than two years old, with their old plumage so faded a brown as to have the appearance of immaturity, is open to question. It is known that the plumage of the immature bird during its first winter is invariably brown, and rusty-edged; but I find no definite data regarding the first adult plumage, which may be different in minor details, from subsequent plumages.[2]

In only two of the mature birds were the outermost rectrices obviously new, and in these specimens the barring of the outer rectrix was virtually the same as that of the adjacent feathers. Since in all the other apparently mature birds the outer rectrix either had a pattern distinctly different from that of the adjacent feather or was noticeably different in length and shape from the other rectrices; and since the barring of these worn outer rectrices inclined toward that of the first winter plumage, we are led to believe that most of these birds were two years of age, molting into their second winter plumage which is not complete, it would seem, before the birds reach their winter range; and that but two of the birds were in fully adult plumage, molting into the high plumage of the coming breeding season. If this be true

[2]Forbush says: "highest plumage may require another year or more" [after the post-juvenal molt]. Birds of Massachusetts and other New England States, Volume II, 1927, p. 105.

it is interesting indeed to note that the outermost rectrix of the two-year old bird drops out *after* the migration has been performed, whereas the adult bird molts this rectrix presumably before migration starts.

It seems strange that the molting of the outer rectrix in the two-year old should differ from that of more mature birds; yet some purpose at present unknown may be served by such process.

It appears, furthermore, that in many of the two-year old birds the old, outermost rectrix which has not dropped out is noticeably longer than any of the fully developed *new* rectrices. (See Fig. 3). This suggests that the tail of the year-old and two-year old may actually be longer than it is in the third year. The molts which lead up to a fully adult plumage, therefore, tend toward a reduction of number of bars on the outermost rectrix, and to an actual shortening of the tail. The two fully adult males in the series had tails of exactly the same length as that of the average fully-developed *new rectrices* in the two-year old birds.

If it be true that two-year old birds do not molt the outer rectrix before or during migration we may infer that these old feathers are just as efficient as new ones.

Among the birds which I believe to have been two years old, there was a noticeable parallelism of the molt in wings and tail. Specimens in which the primaries were not fully molted had, without exception, tails in which two or more feathers were short. As a rule only the outermost primary was underdeveloped; in such specimens the rectrices adjacent to the outermost were often short. If the two or three outer primaries were not fully developed the rectrices were, as a rule, of variable length, from two to six of them usually being short. While the feathers apparently were developing at about the same rate on both sides of the tail there was often considerable difference in length of opposite pairs.

It was noticeable that the actually though not relatively longer tails of the females usually had more bars than those of the males. It is not easy to understand why the sexes of a species, otherwise so similar in color pattern, should find it necessary to differ in this respect. There were usually five distinct bars on the outermost rectrix of the two-year old males; on the outermost rectrices of the females there were usually six distinct bars. None of the females, according to our belief, was more than two years of age.

In most specimens the barring of the rectrices was bilaterally symmetrical. But in some specimens the barring was asymmetrical, in

others the bars were peculiarly or incompletely formed, and in some the fully developed opposite outer rectrices were of different length.

The tails of year-old and two-year old female specimens were *all* somewhat rounded, as in the Cooper's Hawk. This roundness was evident in but three of the male specimens, whereas the tendency toward furcation which was evident in many of the male specimens was not evident in any of the females.[3]

If we are right in our supposition that most of these birds were two years old, then the preponderance of birds of this age is interesting. One might expect to find a large proportion of young of the year

FIGURES 1-4

during any fall migration. Perhaps these young move in a body largely at another period of the fall, however; or perhaps mortality among juvenals is greater than we realize, and the two-year old birds are actually more abundant during the fall migration than birds of other ages.

The average lengths, in inches, of the two fully adult males were: tarsus, 1.41; wing, 6.69; tail, 5.24; of the two-year old males: tarsus, 1.43; wing, 6.59; tail, 5.33; of the one-year old males: tarsus, 1.38; wing, 6.5; tail, 5.27 (the year-old males are all small individuals, apparently). The two-year old females measure: tarsus, 1.54; wing, 7.92; tail, 6.29; the year-old females: tarsus, 1.56; wing, 7.87; tail, 6.51.

[3]Forbush states that the tail of the sharp-shin is "very rarely slightly rounded." *Op. cit.*, II, page 104.

Cooper's Hawk

All of the eleven Cooper's Hawks were adult, seven being males and four, females. Females of both the sharp-shin and Cooper's Hawk seem to have been noticeably less abundant than the males. The males whose stomachs were empty weighed from slightly under 12 ounces to a little less than 13 ounces; those whose stomachs contained food, from a little more than 11 ounces to almost 13½ ounces, with an average weight of over 12½ ounces. The females, on the other hand, weighed over a pound in every case, the one specimen with an empty stomach weighing 1 lb. 4 oz., while those with food in their stomachs ranged from 1 lb. 2 oz. to 1 lb. 6½ oz., with an average weight of a little over 1 lb. 4 oz. Average females, according to our data, therefore weigh about 8 ounces more than average males, and the average male Cooper's Hawk weighs about twice as much as the average female sharp-shin.

It is at once evident from our limited investigation that the larger Cooper's Hawk captures much heavier prey than does the sharp-shin. Four of the stomachs were empty. Each of the stomachs containing food held the remains of but one creature which had been captured, save one which held two birds. One stomach held the hind quarters of a Gray Squirrel (*Sciurus carolinensis leucotis*); two, Song Sparrows; two, Robins; one, the head and breast of a Bob-white (*Colinus virginianus virginianus*); and one a Fox Sparrow, with another small bird the species of which was not determined. Both the Gray Squirrel and Bob-white had been captured by female hawks.

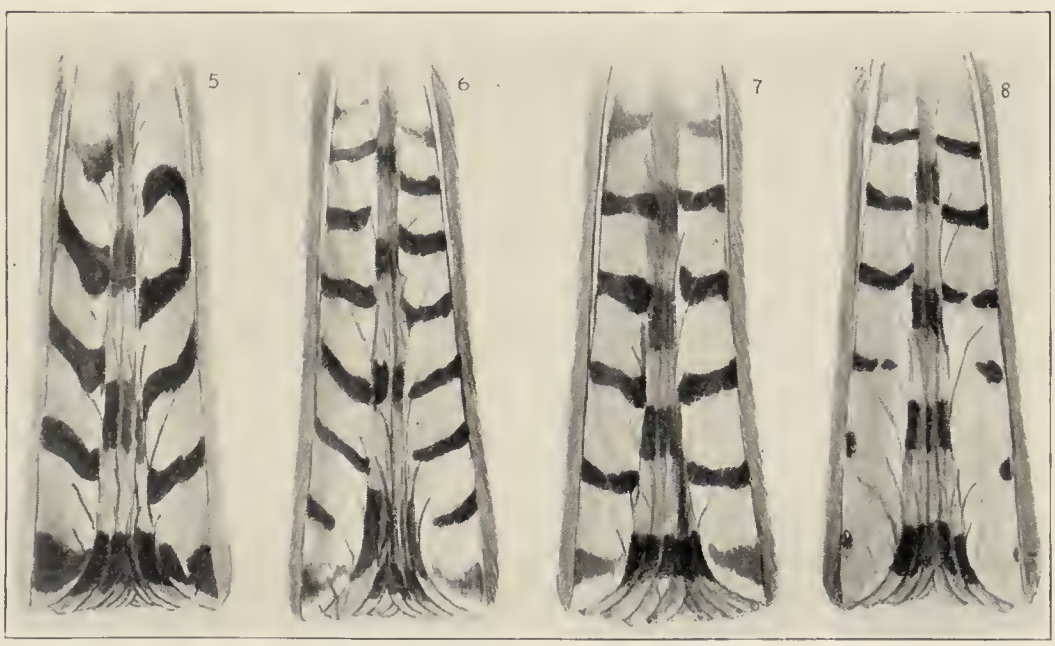
The series of Cooper's Hawks showed little variation in color; three males were so richly colored and heavily barred below that a band across the breast presented the appearance of an almost solid color area. The females were, in every instance, less intensely colored than the males.

In no specimen was the molt of either the primaries or rectrices complete. As a rule the outermost primary was but partly developed. In most specimens this feather was well out of the sheath, save in two, where the tip was not yet exposed. The outermost rectrices had not, in any case, been dropped, though all the other tail feathers were new, and most of them of full length. These outer rectrices did not have the appearance of old, worn feathers, but they had a slightly paler coloration, the barring was noticeably different and not so intense as in the rest of the tail, their tips were different in shape from the other more rounded rectrices, and their length in some cases varied so much from what might normally be expected, that I assume the feathers to

be part of the former plumage, and perhaps of the first adult plumage, as in the sharp-shin.

Molting of the rectrices evidently does not take place in a systematic fashion, for new feathers occurred anywhere, usually adjacent to the outer feathers, or in the middle of the tail. If the unmolted outer feather in these specimens is of the first adult plumage, then it is interesting to observe that its comparatively square tip approximates that of the average sharp-shin tail feather, and therefore suggests the possible development of this species from an ancestor similar to the smaller bird.

The average length, in inches, of the male specimens were: tarsus, 1.8; wing, 9.11; tail, 7.6; of the females: tarsus, 1.98; wing, 10.51: tail, 8.86.



Figures 5-8

Goshawk

The twenty Goshawks, four males and sixteen females, were all fully adult. The males ranged from 1 lb. 4 oz. (empty) to 2 lbs. 3 oz. (stomach filled) with an average weight of 1 lb. 13½ oz. The weight of the females varied considerably, some of those with empty stomachs weighing much more than others which had crops fairly full. Those which had no food in their stomachs weighed from 2 lb. 1 oz. to 2 lb. 8 oz. with an average of 2 lb. 4½ oz. Those which had eaten food ranged from 2 lb. 3 oz. to 2 lb. 12 oz. with an average of 2 lb. 8¼ oz. The average weight of all females was 2 lb. 6⅓ oz. Female Goshawks therefore, weigh about 9 ounces more than the males.

The Goshawk, heavy and powerful as it is, evidently does not hesitate to capture large quarry. Ten of the stomachs were empty. Four of these stomachs were of birds shot early in the morning, apparently before they had had opportunity to capture food. Males and females captured equally large prey. Two stomachs held Ruffed Grouse (*Bonasa umbellus umbellus*); one, a Gray Squirrel; one, a Cottontail Rabbit (*Sylvilagus floridanus transitionalis*); one, a Red Squirrel (*Sciurus hudsonicus hudsonicus*); two, Chipmunks (*Tamias striatus lysteri*); and one, an adult White Leghorn Chicken. The feet of the two grouse had been swallowed entire.. Very few feathers were found, however, and the tails of the squirrels had evidently been rather carefully plucked before they were eaten. The Goshawk swallows proportionately larger mouthfuls than either the Sharp-shinned or Cooper's Hawk.

The plumage of most of these specimens was at first glance complete. It was found, however, that in most of the tails many of the rectrices were old, though their tips were in remarkably good condition. Most of the new rectrices were of full length, as though the dropping and complete growth of one rectrix took place before the molting of the next feather. The first or second distal primaries in nine specimens were not fully developed.

Much variation in the markings of the underparts was noticeable. One male, small in size, was very evenly colored, the breast and belly being finely barred and streaked with such soft tones as to give the appearance, almost, of a solid color. Two of the females were rather heavily streaked on the breast.

Not much variation occurred in the barring of the rectrices. The outer rectrix was usually but faintly barred, principally toward the tip, the other rectrices being barred but not in so definite a manner as in the Sharp-shinned and Cooper's Hawks.

The smallest male's measurements, in inches, were: tarsus, 1.95; wing, 11.94; tail, 8.5; the largest male's: tarsus, 2.22; wing, 12.8; tail, 9-12; the average measurements of the males were: tarsus, 2.1; wing, 12.47; tail, 8.89. The smallest females' measurements were: tarsus, 2.16; wing, 12.37; tail, 9.22; the largest female's: tarsus, 2.43; wing, 13.87; tail, 11.13; the average measurements of the females were: tarsus, 2.28; wing, 13.54; tail, 10.46.

Red-tailed Hawk

The thirty-two red-tails were chiefly adult, there being but three immature birds, one of which had virtually completed the dropping of the barred rectrices of its first year's plumage. The average weight

of the males was 2 lb. 1 oz.; of the females, 2 lb. 6 oz. Of the three immature birds one was a male weighing 1 lb. 3 oz. (stomach empty), and two were females, weighing 2 lb. 2 oz. and 2 lb. 6 oz. respectively, the stomachs of these specimens being fairly well filled. Of the twenty-nine adults fifteen were males and fourteen females. The adult males ranged in weight from 1 lb. 13 oz. (with empty stomach) to 2 lb. 4 oz. (much food). Males without food in their stomachs averaged 2 pounds. The females ranged from 2 lb. 5 oz. (one with stomach empty; two with some food) to 2 lb. 13 oz. (stomach empty), those without food in their stomachs averaging 2 lb. 7 oz. The heaviest female, referred to above, was a thin but very heavy-boned individual with magnificent plumage. Average female red-tails weigh 7 ounces more than the males, according to these data.

FIGURES 9-11

That the character of the food of the red-tail is very different from that of the sharp-shin, Cooper's Hawk, and Goshawk, was apparent upon examination of the first stomach, which chanced to hold two Short-tailed Shrews. Twelve stomachs were empty; in the twenty stomachs which held food were eleven Field Mice (*Microtus pennsylvanicus*), four Short-tailed Shrews (*Blarina brevicauda talpoides*), three Red-backed Mice (*Evotomys gapperi gapperi*), three Chipmunks, three small Garter Snakes (*Thamnophis sirtalis sirtalis*), two Red

Squirrels, one Winter Wren, one Song Sparrow, one Hermit Thrush, one Gray Squirrel, one Brown Rat, one half-grown White Leghorn Chicken, one large grasshopper, two crickets, and one large beetle of the family *Elateridae*. Such an array of food items in only twenty-two stomachs is noteworthy. Only seven of these stomachs held but one item; the others had a variety in each. If the above stomach contents are at all normal the red-tail captures about five harmful or unimportant organisms to one economically valuable one. There is evidence from the above diagnosis of stomach contents that the red-tail during migration does not confine its hunting to the open fields, though it probably has a tendency to do so. The Red-backed Mice and Winter Wren, at least, probably required pursuit in heavily wooded areas. The three snakes are interesting since it was so chilly at Drehersville during our stay that no snakes were about; yet the hawks had somehow found them, probably north of Schuylkill County. The red-tail apparently swallows more feathers and hair with its prey than do the preceding species; and the probability is that the pellets of indigestible material which it ejects are correspondingly larger. The red-tail has a tendency to bolt its food. The mice and shrews, snakes, and other smaller items were swallowed almost entire; the Chipmunks had been torn into four or five pieces.

The immature male specimen, while in good feather, was quite small, having the following measurements (inches): tarsus, 2.16; wing, 13.12; tail, 7.62. The two immature females varied considerably in size and color, one having only six of the barred rectrices of the immature plumage remaining in the tail. The average lengths of the immature females were (inches): tarsus, 2.25; wing, 14.25; tail, 8.9.

The most noticeable feature of the plumage of the adult birds was the almost uniformly perfect development of the primaries in specimens where the tail was only partly molted. In only four specimens were primaries undeveloped, whereas in only six specimens were the tails perfectly molted. Such a state of affairs may indicate that the full development of the remiges is of much more importance to the migrating red-tails than it is to the sharp-shins; and the status of the rectrices is of comparatively small importance.

The old rectrices of fully adult birds were much paler and more frayed than the new feathers, the age of such specimens being obviously greater than two years. One specimen had such a ragged tail that the powers of flight of the individual must have been impaired.

Most of the adult specimens were normally marked. One, however, had unusually bold markings on the underparts, the lighter areas

almost white, the brown areas clearly distinct. The subterminal band of black on the tail was about the same throughout the series, and there was considerable tendency to barring at the bases and near the shafts of feathers in birds not obviously fully mature. Some specimens had noticeable barring on the upper surface of the outer vane of the outermost rectrices. One specimen, a male, was very pale above, especially on the head, where the wide, light margins of the feathers gave a mottled and streaked appearance.

The adult males averaged (inches): tarsus, 2.07; wing, 13.9; tail, 7.97; the adult females averaged: tarsus, 2.25; wing, 14.9; tail, 8.44.

Duck Hawk

Of the two specimens of this species secured, one was an immature female weighing 2 lb. 7 oz., the stomach of which held a few feathers of a Robin. The other was an adult male, very fat, weighing 1 lb. 10 oz., with an empty stomach.

The immature female was in normal, perfect plumage, the tips of the rectrices being a little frayed, perhaps from being used as a brace against rocks while the bird was eating its prey.

The plumage of the adult, while perfect in appearance, was not complete. The primaries were all new and of full length, save the two distals. The outermost had not yet been molted, though it was in excellent condition, and the adjacent quill had barely broken from its sheath. All of the rectrices were apparently new, but the pair adjacent to the outermost were just breaking from their sheaths.

The plumage of the underparts of this specimen was soiled in appearance, this being due, I believe, to actual coloring of the feathers, for the specimen was thoroughly washed.

The lengths of the immature female, in inches, were: tarsus, 1.86; wing, 14.94; tail, 7.56; of the adult male: tarsus, 1.29; wing, 12.25; tail, 6.13.

State Board of Game Commissioners,
Harrisburg, Pa.

INDIVIDUALITY IN BIRD SONG*

BY LUCY V. BAXTER COFFIN

Since Darwin voiced the idea that the bird with the finest song was the choice of the female, the songs of birds have been discussed from various angles. Latterly has come the idea that a bird's song is a mark of his own individuality. From observations over several

*Read before the Chicago Ornithological Society, April 19, 1927.

years. I am convinced if we have discerning ears and are observant we will find that birds may be recognized by their voices as readily as human beings are.

In 1914, while at our Indiana farm, my attention was arrested by hearing a Song Sparrow give a song which called to my mind the opening bars of a familiar Scotch ballad. Bird songs had been of particular interest to me and I wondered why I had never before noticed that similarity in a Song Sparrow song, and I grew more attentive. Then I realized that of all the Song Sparrows on this farm no two sang alike. This broadened into the realization that every place I went I heard a different song—always recognizable as a Song Sparrow, but never the same song.

The next summer when we returned to The Brooks, we were again greeted by the Scotch ballad of the previous year; the same bird was still there. This brought the thought that individual birds can be recognized by the song. The recurrence of this song was so regular that we looked forward each season, on our return, to being greeted by an old friend.

The vegetation near the house at The Brooks is attractive to Song Sparrows, with shrubbery near a small brook running at the foot of the door yard, consequently each year a Song Sparrow nests near by. The Scotch bird was in this locality three summers, then we heard it no more. Its successor stayed four years, the longest period of residence of one bird thus far. One individual song has now been repeated with us the last two summers.

This winter I went back to The Brooks on the seventh of February, a soft-aired, sunshinny February day when we look expectantly for Bluebirds. On the way out to the farm Song Sparrows were singing. The question arose whether they had stayed in the same locality or were they more northerly birds that had moved down for the winter. This led to wondering whether the Song Sparrow of last summer would be heard at The Brooks. As I stepped out into the sunshine of the south porch, to my pleasure and interest the same song of last summer rang out into the sunshine. By the individual song of this bird I learned it had stayed in the same locality through the winter. It had been in this particular section of this particular farm for two summers and this winter. By its song we learned this.

Each Song Sparrow has more than one song. In my notebook for August 23, 1917, is entered:

"This particular Song Sparrow has three different songs. One day he seemed to be giving a lesson to one of the young; he sang, the young one made a crude effort; this was heard several days; at the end of the week, the young had formed a song, but not like that of the mature bird. Whether it was a conscious effort to teach or whether the young was trying to imitate must be conjectured."

Different songs seem to be used for different conditions. This sparrow uses its best and most sprightly song for its day-break song. If it sings it later, it is in a slower tempo and less ringing. Only a hard storm causes a Song Sparrow to cease singing. After a severe storm has passed, it bursts out with its most vigorous song.

While these observations were in progress in Indiana Mr. A. E. Saunders was also observing variation in bird songs, but more scientifically, in Connecticut, publishing his observations in the *Auk* of April, 1924. He records one Song Sparrow singing June 19, 23, and 24, 1922, later October 14, in a certain locality, and writes the following:

"A bird may remain in its summer locality and sing from its headquarters in October, after the mating season and post-nuptial season are over."

Other birds he mentions particularly are the Field Sparrow, Meadowlark, and Wood Thrush. The Field Sparrow and Meadowlark have also been observed at The Brooks. Last summer one Field Sparrow had an ecstatic song of thrills on five different notes. Another one always gave an ascending scale, and never sang the descending scale described by Chapman. One Meadowlark at The Brooks sang often in a particular apple tree. Its song was so unlike the usual Meadowlark song that not until I saw it was I certain of its identity.

Of the male and female Robins nesting near the house the alarm notes were perceptibly different. The male's was deeper and richer; hers was thin and high-pitched, quite suggesting hysteria. The Baltimore Oriole did not once sing the song formerly familiar—so familiar that by whistling it I always received a response from the bird. These observations over several years lead me to the conclusion that it is not the species alone but the individual bird as well that may be recognized by the song, and that a careful listener may learn more from the bird's song than has yet been realized.

At present there is no satisfactory way of recording these bird songs so they may be studied by others. Mr. Saunders has carefully worked out a graphic method, while Wheeler and Nichols use quite different ones, but neither of them can be vocalized by any one else. The natural scale and rhythm of the bird is not the tempered scale of the piano nor the conventional rhythm of our written music. This is

an unworked field in which some musician naturalist should make a study.

That the different call-notes and songs are prompted by different emotions is another phase. That crows have mentally evolved a language is not tenable, but that different circumstances and conditions bring forth different pitch and tone and quality of "caw" is undeniable.

That the nesting impulse is the sole cause of song cannot be the case. Never have I heard a fuller, more varied cardinal song than the one heard on the seventh of last February. We find many birds singing in September after the nesting and molting are past. There are resident species that are heard on fine days through the winter.

Again I refer to my notebook, July 17, 1915:

> "I have been much amused this afternoon by a young Blue Jay. It apparently was trying to learn the rhythmical call of the Blue Jay. It could make only a ludicrous gurgling raucous effort, then with seeming impatience shouted 'Jay! Jay!', moved to another perch and tried again. A young Robin went through a similar performance one day, but it was not quite so amusing."

These efforts certainly had no connection with nesting.

All of these are points for investigation and discussion.

Impelled by curiosity we observe, then we apply the faculty of reason, from which we deduce. Then again we observe and compare our observations with others. So we learn.

Impelled by our social instincts we are led to talk about our learning with others, and the natural reaction is a further desire to study.

But there are three pitfalls. We do not observe closely, we do not deduce carefully, and we do not talk accurately. As an East Indian saying reads: "Many things we think we know, more things we are told we know, and but few things *we know*."

We have standardized our color-scheme in ornithology. We have named each part of a bird's anatomy, but we have devised no symbols to convey to our associates an adequate description of bird-call and vocalization, in general.

Three different methods of recording have been tried: the graph, the dotted and dashed line, and the standard musical notation. None of these gives us, completely, pitch, quality, rhythm, melody, or time—or provide for throat, nose, lip, teeth or head tones.

Cannot some of our younger ornithologists develop this undiscovered necessity? Perhaps a new system of musical notation may be necessary—possibly the Chinese, with its center "four-square," with

four inter-notes, or the Gregorian five-tone scale. Our seven whole-tone tempered piano scale will never do, for it is not true. A large number of other scales are available. Possibly a battery of instruments must be selected. I suggest a xylophone, high pitch; the banjo, the zither, the metal piccolo, and the bassoons, to represent both column production and vibratory production.

Let me quote, in closing, from Henry Oldys, (*Auk*, Jan., 1916):

> "Adequate appreciation is not given by either naturalists or musicians to the fact that a number of problems, not inferior in importance to any to which ornithologists are devoting their energies, require for their solution careful and exhaustive study of the utterances of birds by competent musicians."

I am indebted to Mr. J. W. Magann, of Oak Park, Illinois, for the following comments on the subject of this paper:

Since the work done to make a written record of bird songs has hardly been successful, why should we not obtain a musical record of their songs? To a very limited extent this has been done. During the past two years we have seen a remarkable development in phonographs. This has largely been due to developments in radio being applied to phonograph recording and reproducing processes. The phonograph has been electrified.

I believe that it would be very much worth while if some institution or association with adequate financial support would thoroughly investigate the possibilities of the latest developments in phonograph recording in relation to the recording of bird songs. The equipment necessary would probably consist of a microphone similar to that used by every radio station, a telephone line to a convenient shelter, and in the shelter a radio amplifier and an electrical recorder.

The procedure would be to first determine the usual perch of the bird when singing. While the bird was away, the microphone could be concealed with leaves, grass, etc., and the telephone line run to the shelter. When the bird returned and started to sing, the music could be amplified until of the proper volume to be recordable. From one shelter a large number of microphones might be scattered in places where birds were known to sing.

After these authentic master records have been made, it should be very easy to insert explanations and comments so that the records may be used for instruction purposes in the schools. It would not take much more imagination to see the possibilities of the Vitaphone, which combines the motion picture and the phonograph, for the ornithological education of the school children of the future.

Chicago, Illinois.

BIRDS OF EASTERN McKENZIE COUNTY, NORTH DAKOTA

BY ADRIAN LARSON

[Concluded from the WILSON BULLETIN, March, 1928, page 48]

CHIMNEY SWIFT. *Chaetura pelagica.* Rare. One was seen on September 8, 1916, and during the summer of 1923 a pair was seen in Charlson.

KINGBIRD. *Tyrannus tyrannus.* A very common summer resident, breeding. Every clump of trees seems to harbor a pair of Kingbirds during the summer. Average spring arrival, May 20 (nine years). Earliest spring arrival, May 12, 1915. Average fall departure, August 23 (ten years). Latest fall departure, September 13, 1917.

ARKANSAS KINGBIRD. *Tyrannus verticalis.* A common summer resident, breeding; less numerous, however, than *tyrannus.* Average spring arrival, May 18 (three years). Earliest spring arrival, May 10, 1919. Average fall departure, August 26 (two years). Latest fall departure, August 28, 1925.

SAY'S PHOEBE. *Sayornis sayus.* A common summer resident, breeding. This bird is common in the badlands, nesting in the crevices and on the stone ledges of the cliffs. It also frequents and nests about the old ranch houses. Through the summer it keeps up its persistent call of "*phoebe, phoebe,*" with occasional variation, but with tiresome monotony to one who is compelled to hear. Average spring arrival, April 24 (six years). Earliest spring arrival, April 14, 1921. Average fall departure, September 18 (three years). Latest fall departure, September 24, 1920.

TRAILL'S FLYCATCHER. *Empidonax trailli.* An abundant summer resident, nesting usually in growths of willows. Average spring arrival, May 24 (three years). Earliest spring arrival, May 21, 1921.

LEAST FLYCATCHER. *Empidonax minimus.* Common, but whether it breeds or not is uncertain. Average spring arrival, May 21 (two years).

SASKATCHEWAN HORNED LARK. *Otocoris alpestris enthymia.* I believe this bird can be considered the most common bird in the region. It nests early and late in the season.

HOYT'S HORNED LARK. *Otocoris alpestris hoyti.* This subspecies is occasionally found in the winter. February 24, 1926.

MAGPIE. *Pica pica hudsonia.* An abundant resident, breeding; not found far from timber or water, as a rule.

BLUEJAY. *Cyanocitta cristata.* I have never seen this bird here myself, but it has been reported by others, and I include it in the list

on that basis. There are plenty of oak trees near Charlson and near the buttes about twenty miles south of Charlson, and Bluejays should be found there. About forty or fifty miles south, in the Killdeer Mountains, Bluejays are common.

Raven. *Corvus corax principalis.* Rare. Recorded March 25, 1920, and November 9, 1920.

Western Crow. *Corvus brachyrhynchos hesperis.* A common transient and summer resident. It is occasionally seen in mild winters. Average spring arrival, March 22 (twelve years). Earliest spring arrival, March 7, 1926. Average fall departure, October 18 (six years). Latest fall departure, December 6, 1923.

Clarke's Nutcracker. *Nucifraga columbiana.* Accidental. One was seen on August 16, 1919.

Bobolink. *Dolichonyx oryzivorus.* A common summer resident of the prairies, breeding; it is partial to the meadows. Average spring arrival, May 23 (six years). Earliest spring arrival, May 13, 1913. Average fall departure, September 5 (four years). Latest fall departure, September 18, 1912.

Cowbird. *Molothrus ater ater.* A common summer resident, breeding. Average spring arrival, May 7 (eight years). Earliest spring arrival, May 3, 1918.

Yellow-headed Blackbird. *Xanthocephalus xanthocephalus.* A common summer resident, breeding. Average spring arrival, May 5 (seven years). Earliest spring arrival, April 30, 1921. Average fall departure, September 6 (three years). Latest fall departure, September 16, 1924.

Red-winged Blackbird. *Agelaius phoeniceus* subsp.? A common summer resident, breeding. Average spring arrival, April 14 (ten years). Earliest spring arrival, March 31, 1925. Latest fall departure, October 19, 1924.

Western Meadowlark. *Sturnella neglecta.* An abundant summer resident, breeding. Average spring arrival, March 29 (eleven years). Earliest spring arrival, March 18, 1921. Average fall departure, October 23 (ten years). Latest fall departure, November 2, 1917.

Baltimore Oriole. *Icterus galbula.* A tolerably common summer resident, breeding. It is more numerous in the cottonwood groves along the Missouri River. Average spring arrival, May 24 (five years). Earliest spring arrival, May 11, 1918. Only fall date, September 1, 1916.

Brewer's Blackbird. *Euphagus cyanocephalus.* A common summer resident, breeding. The Brewer's Blackbird, like the Rusty Blackbird, shows partiality to water, especially the prairie sloughs, during the fall migration. The nests of the Brewer's Blackbird which I have found were usually located in some briery tree, like the buffalo berry and wild plum. Average spring arrival, April 18 (nine years). Earliest spring arrival, April 12, 1925. Average fall departure, November 4 (eight years). Latest fall departure, December 6, 1923. The latest fall date varies from October 23, 1920, to December 6, 1923. I have heard others say that the bird sometimes remains throughout the winter.

Bronzed Grackle. *Quiscalus quiscala aeneus.* Rare. I saw it on June 2, 1920, and May 27, 1921. I do not know why the Bronzed Grackle is not found here; at Rice Lake, about sixty miles to the east, it is common, as it is also at Minot, about a hundred miles northeast.

English Sparrow. *Passer domesticus.* A common resident throughout this area. It was common in 1912, and doubtless became so much earlier.

Redpoll. *Acanthis linaria linaria.* A more or less regular winter visitor. Average fall arrival, November 17 (seven years). Earliest fall arrival, October 20, 1920. Latest fall arrival, January 6, 1914. Average spring departure, March 25 (eight years). Latest spring departure, April 21, 1917. Earliest spring departure, February 20, 1916.

Hoary Redpoll. *Acanthis hornemanni exilipes.* Rare. A small flock was noted at a feeding tray on February 2, 1917, and for a few days thereafter. Among other Redpolls the considerable amount of white on the Hoary Redpoll distinguished it from the common one.

Goldfinch. *Astragalinus tristis tristis.* A common summer resident wherever there are bushes, trees, or bull thistles, and breeding. Average spring arrival, May 25 (six years). Earliest spring arrival, May 17, 1925. Average fall departure, September 30 (four years). Latest fall departure, October 6, 1920.

Snow Bunting. *Plectrophenax nivalis nivalis.* Usually a regular winter visitor, but in some years it is rarely seen. In years of heavy snowfall these birds are exceedingly abundant, assembling in flocks of thousands at times. Their clear "chip" note may be heard sometimes during a blizzard throughout the night. Average fall arrival, November 15 (six years). Earliest fall arrival, October 18, 1917. Latest fall arrival, November 25, 1913. Average spring departure,

March 9 (ten years). Latest spring departure, April 30, 1921. Earliest spring departure, February 11, 1917.

Alaska Longspur. *Calcarius lapponicus alascensis.* A common transient, while a few are found during the winter. Specimens submitted to the U. S. Biological Survey were referred to the subspecies here listed. Average fall arrival, October 13 (thirteen years). Average spring departure, April 4 (six years). Latest spring departure, April 11, 1921. I have other dates on their arrival in the spring from the south, but they are too few to be of much value.

Chestnut-collared Longspur. *Calcarius ornatus.* A very common summer resident, nesting abundantly. It is one of our best songsters among the prairie sparrows, and prefers the natural prairies to the cultivated fields. Average spring arrival, April 10 (ten years). Earliest spring arrival, March 25, 1920. Average fall departure, September 24 (five years). Latest fall departure, October 14, 1912.

McCown's Longspur. *Rhynchophanes mccowni.* A summer resident, breeding, though far less common than the Chestnut-collared. Average spring arrival, April 18 (six years). Earliest spring arrival, April 9, 1917. No fall migration records.

Western Vesper Sparrow. *Pooecetes gramineus confinis.* With the possible exception of the Horned Lark this sparrow is the commonest bird to be found here during the summer, nesting abundantly. It is distributed quite evenly throughout the area, except in the heavily timbered parts. It is to be found commonly along the roads. The white outer tail feathers afford a conspicuous field mark, and their sweet song is in marked contrast to their dull plumage. Average spring arrival, April 24 (ten years). Earliest spring arrival, April 15, 1925. Latest spring arrival, April 30, 1918. Average fall departure, September 30 (six years). Latest fall departure, October 23, 1925.

Western Savannah Sparrow. *Passerculus sandwichensis alaudinus.* A very common summer resident, breeding. Earliest spring arrival, May 4, 1924. Migration data meager.

Baird's Sparrow. *Ammodramus bairdi.* A tolerably common summer resident, breeding. Average spring arrival, April 25 (two years). Latest fall departure, October 21, 1924.

Western Grasshopper Sparrow. *Ammodramus savannarum bimaculatus.* A tolerably common summer resident, breeding. It is often found on the grassy hillsides where there is a sparse growth of

silverberry and buck brush. Average spring arrival, May 17 (three years). Earliest spring arrival, May 11, 1921.

Western Henslow's Sparrow. *Passerherbulus henslowi occidentalis.* A tolerably common summer resident; it is usually to be found around marshes, and probably breeds. Date of spring arrival, May 20, 1924.

The Western Henslow's Sparrow, the Western Grasshopper Sparrow, Baird's Sparrow, and the Western Savannah Sparrow are all so much alike that it is difficult to secure accurate migration records which are more than guesswork. But it is safe to say that all four species are pretty well distributed throughout the area, the Henslow's being limited, of course, to the vicinity of the sloughs.

Nelson's Sparrow. *Passerherbulus nelsoni nelsoni.* A very rare bird, I think. On May 25, 1924, I observed one feeding along a willow-grown margin of a bayou of the Missouri River. At the first notice of it I took it to be a Palm Warbler, but upon closer inspection it proved to be a Nelson's Sparrow.

Western Lark Sparrow. *Chondestes grammacus strigatus.* This is another remarkable songster of the sparrow tribe, which frequents the badlands and the hot valleys. It will be found near sage brush. This sparrow is very common in some localities and entirely absent in others. Average spring arrival, May 18 (eight years). Earliest spring arrival, May 6, 1920. Average fall departure, August 27 (five years). Latest fall departure, September 9, 1924.

Harris's Sparrow. *Zonotrichia querula.* A tolerably common transient. Average spring arrival, May 9 (eight years). Earliest spring arrival, May 5, 1913. Latest spring arrival, May 12, 1920. Average spring departure, May 19 (three years). Latest spring departure, May 27, 1917. Average fall arrival, September 25 (four years). Earliest fall arrival, September 16, 1923. Average fall departure, October 16 (four years). Latest fall departure, October 29, 1919.

White-crowned Sparrow. *Zonotrichia leucophrys leucophrys.* A tolerably common transient. Average spring arrival, May 6 (eight years). Earliest spring arrival, May 2, 1913. Latest spring arrival, May 10, 1923. Average spring departure, May 15 (three years). Latest spring departure, May 17, 1913. Average fall arrival, September 23 (four years). Earliest fall arrival, September 16, 1916. Average fall departure, October 2 (four years). Latest fall departure, October 7, 1921.

Gambel's Sparrow. *Zonotrichia leucophrys gambeli.* A tolerably common transient, which is to be distinguished from *leucophrys* by the whitish lores. A specimen has been submitted to the U. S. Biological Survey. Average spring arrival, April 25 (two years). Earliest spring arrival, April 20, 1925. Average spring departure, May 7 (two years). Latest spring departure, May 10, 1920. During the fall of 1924 it was observed from September 14 to October 13.

White-throated Sparrow. *Zonotrichia albicollis.* A tolerably common transient, but less numerous than *querula, leucophrys* or *gambeli.* Average spring arrival, May 10 (four years). Earliest spring arrival, May 2, 1920. Average fall arrival, September 18 (three years). Earliest fall arrival, September 14, 1924. Latest fall departure recorded, October 13, 1924.

The young of *leucophrys, gambeli,* and *albicollis* in the fall present quite a problem in accurate field identification.

Western Tree Sparrow. *Spizella monticola ochracea.* A very common transient, but it does not winter here. Average spring arrival, March 20 (eleven years). Earliest spring arrival, February 27, 1921. Average spring departure, April 24 (nine years). Latest spring departure, May 6, 1924. Average fall arrival, September 30 (Seven years). Earliest fall arrival, September 21, 1919. Average fall departure, October 17 (six years). Latest fall departure, November 16, 1919.

Western Chipping Sparrow. *Spizella passerina arizonae.* A very common transient; I have found no evidence of its breeding in this area. Average spring arrival, May 12 (four years). Earliest spring arrival, May 4, 1924.

Clay-colored Sparrow. *Spizella pallida.* A very common summer resident, breeding; and frequenting the brushy prairie. Average spring arrival, May 10 (seven years). Earliest spring arrival, May 8, 1913. Latest spring arrival, May 16, 1917. Average fall departure, September 14 (eight years). Latest fall departure, October 4, 1924.

Western Field Sparrow. *Spizella pusilla arenacea.* Rare. I have found it in only one locality, namely, on a hillside close to the badland breaks, and in a sparse growth of buck brush, wild gooseberry bushes, etc. Here there were two pairs, and the males were singing lustily on every occasion that I could visit the place.

Slate-colored Junco. *Junco hyemalis hyemalis.* A very common transient. Average spring arrival, April 4 (nine years). Earliest spring arrival, March 21, 1918. Latest spring arrival, April 17, 1914.

Average spring departure, May 5 (six years). Latest spring departure, May 13, 1918. Earliest spring departure, April 24, 1921. Average fall arrival, September 27 (seven years). Earliest fall arrival, September 8, 1917. Latest fall arrival, October 30, 1919. Average fall departure, October 17 (six years). Latest fall departure, November 16, 1919. Earliest fall departure, September 25, 1912.

Montana Junco. *Junco hyemalis montanus.* It is sometimes seen in migrations, e. g., May 1, 1921.

Dakota Song Sparrow. *Melospiza melodia juddi.* A common summer resident, breeding. Average spring arrival, April 14 (eight years). Earliest spring arrival, March 28, 1918. Average fall departure, October 20 (five years). Latest fall departure, November 8, 1919.

Lincoln's Sparrow. *Melospiza lincolni lincolni.* A common transient. Average spring arrival, May 2 (four years). Earliest spring arrival, April 29, 1925. Average spring departure, May 21 (three years). Latest spring departure, May 30, 1924. The fall migration is from September 14 to 30 (1924).

Arctic Towhee. *Pipilo maculatus arcticus.* A very common summer resident, breeding; and is found almost wherever there is brush and timber. This bird can give a good many variations of its simple song. Average spring arrival, May 3 (ten years). Earliest spring arrival, April 24, 1913. Average fall departure, October 7 (four years). Latest fall departure, October 10, 1924.

Black-headed Grosbeak. *Hedymeles melanocephalus.* A tolerably common summer resident, breeding. Average spring arrival, May 26 (three years). No fall records.

Lazuli Bunting. *Passerina amoena.* An uncommon summer resident, which shows a partiality for willows. Average spring arrival, June 4 (two years). Latest departure, August 8, 1920.

Dickcissel. *Spiza americana.* A rare and irregular summer resident. It was common only in the year 1921.

Lark Bunting. *Calamospiza melanocorys.* An abundant summer resident, breeding abundantly. A bird of the native prairie and companion of the Chestnut-collared Longspur, and a beautiful singer. Average spring arrival, May 19 (ten years). Earliest spring arrival, May 13, 1915. Average fall departure, August 22 (three years). Latest fall departure, August 30, 1920.

Scarlet Tanager. *Piranga erythromelas.* Very rare. One was seen on May 24, 1921.

Purple Martin. *Progne subis subis.* Rare. A pair was seen in Charlson on May 27 and June 25, 1921.

Cliff Swallow. *Petrochelidon lunifrons lunifrons.* A tolerably common summer resident, breeding. Average spring arrival, May 22 (four years). Average fall departure, August 23 (two years).

Barn Swallow. *Hirundo erythrogaster.* A common summer resident, breeding. Average spring arrival, May 19 (nine years). Earliest spring arrival, May 9, 1919. Average fall departure, September 16 (seven years). Latest fall departure, September 25, 1925.

Tree Swallow. *Iridoprocne bicolor.* Rare. One was seen on August 24, 1925.

Bohemian Waxwing. *Bombycilla garrula.* An irregular winter visitor, exceedingly abundant in some years. During the years of abundance they are always to be found about the juniper trees in the badlands; they are also very fond of the red haws and buffalo berries. Average fall arrival, November 22 (five years). Earliest fall arrival, November 10, 1919. Average spring departure, March 12 (eight years). Latest spring departure, April 10, 1921. Earliest spring departure, February 16, 1917.

Cedar Waxwing. *Bombycilla cedrorum.* An uncommon summer resident, breeding. It usually nests in the cedars in the badlands. Earliest spring arrival, May 6, 1919.

Northern Shrike. *Lanius borealis.* An irregular winter visitor. Average fall arrival, October 29 (nine years). Earliest fall arrival, October 16, 1919. Average spring departure, March 15 (four years). Latest spring departure, March 23, 1914.

White-rumped Shrike. *Lanius ludovicianus excubitorides.* A tolerably common summer resident, breeding. It generally selects a tall, lone cottonwood for a nesting site. Average spring arrival, April 27 (five years). Earliest spring arrival, March 25, 1918. Average fall departure, October 3 (four years). Latest fall departure, October 27, 1912.

Red-eyed Vireo. *Vireosylva olivacea.* A common summer resident wherever there are trees, breeding. Average spring arrival, May

29 (four years). Earliest spring arrival, May 25, 1921. Latest fall departure, August 31, 1924.

Warbling Vireo. *Vireosylva gilva.* A tolerably common summer resident, breeding. Having taken no specimens I do not know whether the subspecies is *gilva* or *swainsoni.* Average spring arrival, June 1 (two years).

Black and White Warbler. *Mniotilta varia.* An uncommon but regular transient; a few may nest. Average spring arrival, May 13 (four years). Earliest spring arrival, May 6, 1921. August 29, 1920, is the only fall date.

Tennessee Warbler. *Vermivora peregrina.* An uncommon transient. Average spring arrival, May 21 (two years). Latest spring departure, May 30, 1921.

Orange-crowned Warbler. *Vermivora celata celata.* A common transient; may be considered the commonest warbler migrant. Average spring arrival, May 7 (two years). Fall dates, September 14-28 (1924).

Yellow Warbler. *Dendroica aestiva aestiva.* A very common summer resident, breeding. Average spring arrival, May 18 (eight years). Earliest spring arrival, May 13, 1917. Average fall departure, August 26 (four years). Latest fall departure, September 5, 1918.

Magnolia Warbler. *Dendroica magnolia.* An uncommon transient. Average spring arrival, May 27 (two years). Latest spring departure, May 30, 1924.

Myrtle Warbler. *Dendroica coronata.* A regular and common transient. Average spring arrival, May 1 (six years). Earliest spring arrival, April 21, 1921. Average spring departure, May 15 (six years). Latest spring departure, May 26, 1918. Average fall arrival, September 20 (four years). Earliest fall arrival, September 14, 1916. Average fall departure, October 8 (two years). Latest fall departure, October 11, 1913.

Black-poll Warbler. *Dendroica striata.* A common transient. Average spring arrival, May 18 (four years). Average spring departure, May 26 (four years). Latest spring departure, May 30, 1924.

Oven-bird. *Seiurus aurocapillus.* A tolerably common summer resident of the brushy coulees, breeding. Average spring arrival, May 27 (two years).

Grinnell's Water-Thrush. *Seiurus noveboracensis notabilis.* A common transient, possibly breeding. Average spring arrival, May 14 (four years). Earliest spring arrival, May 9, 1921.

Western Yellow-throat. *Geothlypis trichas occidentalis.* A common summer resident, breeding. Average spring arrival, May 24 (five years). Average fall departure, September 17 (two years). Latest fall departure, September 30, 1924.

Long-tailed Chat. *Icteria virens longicauda.* A common summer resident in the chaparral, breeding. Average spring arrival, May 26 (seven years). Earliest spring arrival, May 22, 1923. Average fall departure, September 3 (three years). Latest fall departure, September 15, 1924.

Redstart. *Setophaga ruticilla.* A common transient and less common summer resident, breeding. Average spring arrival, May 25 (two years).

Pipit. *Anthus rubescens.* A common transient. Average spring arrival, April 26 (three years). Average spring departure, May 4 (two years). Earliest fall arrival, September 24, 1925. Average fall departure, October 16 (two years).

Sprague's Pipit. *Anthus spraguei.* A rare summer resident. I found a dead specimen caught in some barbed wire. Latest fall departure, August 25, 1920.

Catbird. *Dumetella carolinensis.* A common summer resident, breeding. Average spring arrival, May 24 (six years). Earliest spring arrival, May 17, 1918. Average fall departure, September 12 (six years). Latest fall departure, September 18, 1912.

Brown Thrasher. *Toxostoma rufum.* A common summer resident, breeding. Average spring arrival, May 12 (nine years). Earliest spring arrival, May 9, 1920. Average fall departure, September 14 (five years). Latest fall departure, September 19, 1917.

Rock Wren. *Salpinctes obsoletus obsoletes.* A common summer resident in the badlands, breeding. Earliest spring arrival, May 10, 1920. Latest fall departure, September 19, 1917.

Western House Wren. *Troglodytes aedon parkmani.* A common summer resident, breeding. Average spring arrival, May 22 (seven years). Earliest spring arrival, May 12, 1920. Average fall departure, September 6 (five years). Latest fall departure, September 15, 1916.

Prairie Marsh Wren. *Telmatodytes palustris iliacus.* A common summer resident of the marshes, breeding. Latest date of fall departure, September 16, 1923.

Red-breasted Nuthatch. *Sitta canadensis.* A not common transient, possibly breeding. Earliest spring arrival, May 4, 1919.

Long-tailed Chickadee. *Penthestes atricapillus septentrionalis.* A common resident, breeding.

Ruby-crowned Kinglet. *Regulus calendula calendula.* An uncommon transient, though sometimes common. Earliest spring arrival, April 23, 1920. Latest spring departure, May 22, 1924. Fall dates, September 28-29 (1920).

Willow Thrush. *Hylocichla fuscescens salicicola.* An uncommon transient. May 18, 1924.

Gray-cheeked Thrush. *Hylocichla aliciae aliciae.* An uncommon transient. May 18 to June 8 (1924).

Olive-backed Thrush. *Hylocichla ustulata swainsoni.* A common transient. Average spring arrival, May 18 (two years). Average spring departure, June 1 (two years).

Hermit Thrush. *Hylocichla guttata pallasi.* A rare transient. One was seen on May 11, 1913.

Robin. *Planesticus migratorius migratorius.* A common summer resident, breeding. Average spring arrival, April 6 (nine years). Average fall departure, October 20 (eight years). Latest fall departure, November 2, 1917. Occasionally Robins are found throughout the winter among the junipers in the badlands; they are very fond of juniper berries, buffalo berries, and red haws. The Western Robin (*propinquus*) is sometimes seen, if the lack of white spots in the tail is a determining character.

Bluebird. *Sialia sialis sialis.* An uncommon summer resident, breeding. Average spring arrival, March 24 (two years). Latest fall departure, October 27, 1924.

Mountain Bluebird. *Sialia currucoides.* A common resident in the badlands, breeding. Average spring arrival, March 26 (five years).

Sioux Falls, South Dakota.

THE WILSON BULLETIN

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EDITORIAL

The annual meeting of the Wilson Orinthological Club will be held this fall at Ann Arbor, Michigan. The dates have not been fixed, but the Friday and Saturday following Thanksgiving Day are being considered. It is now expected that the Inland Bird Banding Association may meet at the same time and place.

In the last March issue the two full page plates in the body of Mr. Sawyer's article on the Courtship of Barrow's Golden-eye should have been interchanged. The one marked No. 2 should have been No. 3, and vice versa. On page 8, line 15, the figures referred to should have been 10-11, Plate 2 as corrected. On page 8, line 17, the figures referred to are 6-9 of Plate 2, as corrected. Such errors are vexing, and we are sorry.

The suggestion comes from Mr. Frank C. Pellett that an ornitholigical library be established by the Wilson Ornithological Club. The plan would be to place the collection of books in some large, centrally-located institution on terms to be mutually agreed upon. We are informed that the bee-keepers have established a similar library on bee culture at the University of Wisconsin. The books are gathered from the members by donation and bequest. Occasionally an entire private library may be thus contributed. The middle west has very few extensive collections of literature in the field of ornithology—either public or private; and perhaps none adequate for research.

It might even be possible to encourage the establishment of two or three such libraries; one main library, centrally located, and one or two subsidiary libraries to which duplicate material might be sent. The central and main collection might well be located in Chicago, or at the University of Illinois, Wisconsin, Iowa, or Michigan. There should be one in the south, at Nashville or St. Louis, for instance. And one should be established in the west, possibly at the University of Kansas or Nebraska.

Once a depository is selected, it would be expected that the members of the W. O. C. would do what they could to build up a library by donation. The books would probably become the property of the institution housing them. But, on the other hand, the collection could be designated by a name, and be subject to circulation among the members of the organization. At any rate, perhaps the ideas here suggested merit investigation.

Several of our readers have shown enough interest in the life list idea to send in their reports. These reports start out in rather large figures and are based on extensive travels. The totals thus far reported immediately exclude nearly all observers whose field work is limited to their own local regions. We do not wish to do this. We would like to see the local observers take an interest and pride in their total lists also. There can be no harm in a little competition.

Suppose, then, that we arbitrarily divide our life lists into two classes, which we may call General and Local. Let us define General Life Lists as those without any limitations as to time or space. One may combine into one list the results of one's work in as many localities as possible. One or two of these life lists have been reported in summary in our pages, and we will be glad to continue them.

A Local Life List is restricted in space, at least. It is limited to accommodate the observer who does not travel, but who does intensive field work at his home station. We believe it is worth while for the observer to keep his notebook records: and to know how many birds he has on his life list; and to take some pleasure in adding a new one from time to time—always with deliberation and scientific accuracy, of course.

In order to stimulate interest and to learn of each other's results, we propose a contest as to Local Life Lists. Let those who will, compile their lists and submit them. First, however, let us have suggestions as to the rules which should govern such a contest. How much of an area is to be allowed? Should it be a political area or an ecological area? Shall there be prizes, and who will offer them? If the matter is taken up we will hope to make a complete announcement in our next issue.

Let us also remember that this is play-work, but that it is enjoyable and instructive and stimulative, and can do no harm. If it does no more than encourage some of our luke-warm members to spend a little more time in the field in an effort to increase their life lists, the scheme will be justifiable.

GENERAL NOTES

Conducted by M. H. Swenk

Some Oregon Records.—The following records of birds taken at Scio, Oregon, may be of interest, and I am therefore placing them on record.

Yellow Rail (*Coturnicops noveboracensis*).—A male, taken February 1, 1900. The only record for the state.

Black Pigeon Hawk (*Falco columbarius suckleyi*).—A female, taken November 1, 1922.

Northern Spotted Owl (*Strix occidentlais caurina*).—A male, taken November 1, 1924. The female was seen but not secured.

Gray Gryfalcon (*Falco rusticolus*).—A male, May, 1925.—A. G. Prill, *Scio, Oregon.*

Who Banded This Bird?—Late in December, 1927, a local gunner came to my office one day with a hawk's leg, on which was an aluminum band. He said that a local mutual friend had sent him to me to find out what it was put there for, and by whom.

The dried foot and leg, up to the knee joint, proved to be that of the Marsh Hawk (*Circus hudsonius*). The man taking this bird had killed it sometime during November, 1927, while out hunting Mourning Doves, in Broward County, Florida. He did not remember the exact date. On the outside of the band, are the initials—"A. F. M., CoKato, Minn."; while on the inside of the seemingly homemade band is printed "Stalls white laundry soap."

Let us hear from any one knowing who banded this bird, or who might know some man in Minnesota by those initials.—Harold H. Bailey, *Miami, Fla.*

Another Bird "Life List."—Noting the editorial on this subject in the December number of the Wilson Bulletin, and the question as to "who has the longest life list," I will report in regard to mine. I have always been interested in keeping a list of the birds seen in life during my various travels, and I believe that I have quite a large list.

I have seen and identified in life, in North America, 528 species and 190 subspecies, making a total of 718 birds. The subspecies were either actually collected or were in localities where there could be no possible doubt as to their identity. Most of them were collected.

In addition to this I have found the nests, identifying eggs or young, of 410 species and subspecies.

I shall be interested to know what figures are presented by others on this subject.—A. C. Bent, *Taunton, Mass.*

The Arkansas Kingbird in Florida.—Records of the Arkansas Kingbird (*Tyrannus verticalis*) are not so common for Florida that publication of another one would seem to be amiss. On the afternoon of November 18, 1927, I took a friend out about sixteen miles west of Miami, Dade County, to show him some stub end canals, with the possibility of finding some alligators there for him, and some birds for me. Birds were, however, very scarce, and with the exception of the Killdeer and a few Great Blue Herons, nothing was seen. We did, however, find an old "gator" with some young, in each stub canal, but as it was growing dark, and he wanted the "gators" alive, nothing was shot. The next morning, November 19, my friend returned without me with a net for the capture of the young "gators," and a .22 calibre rifle in case he should see anything that might interest me.

That afternoon he called me up by phone, and informed me that he had a Crested Flycatcher for me, and that he would bring it to the office if I cared for it, but that it was badly shot up by the .22 calibre bullet. Imagine my surprise, to find on his arrival, that the bird was not a Crested Flycatcher but an Arkansas Kingbird. After working over an hour on the bird that night, I managed to make a very fair skin of it, and it is now in the B. C. N. H. On dissection, it proved to be an adult female, with breast feathers missing and with breast skin flabby, as though it had just lately been brooding. It was very fat. Just why this bird should have been in this condition, how far it was from its actual breeding habitat, and why it was down in Florida, I am at loss to hazard a guess.—Harold H. Bailey, *Miami, Fla.*

More Arkansas Kingbirds in Florida.—Since reporting the capture, on December 19, 1927, of *Tyrannus verticalis* in Florida, I have taken another specimen. This second specimen was taken at the outskirts of the city limits of Miami, on January 15, 1928.

While driving in from the "glades," I saw two birds perched on the telephone wires bordering the highway, and after passing them some hundred yards, I backed up and secured one, after both had descended into a newly burnt-over orchard. There were many migrant Robins feeding on the ground at the time, and the other Kingbird flew off with them when I shot..

The bird secured proved to be an adult female, in rather poor plumage, and is now number 3906 B. C. N. H.

The further report of a bird of this species having been seen on Sanibel Island, Florida, leads me to believe that the Arkansas Kingbird should now be classed as a rare winter migrant, instead of a straggler.—Harold H. Bailey. *Miami, Fla.*

Scarcity of the House Wren at McMillan, Michigan.—The House Wren (*Troglodytes aedon*) continues to be a very much discussed species, since in many parts of the country it has been found to destroy the nests and eggs of other species of birds. On this account, many persons are taking down the houses which they had erected purposely for the House Wren. In a past number of the Wilson Bulletin I gave a report of the House Wren and others nesting in my bird houses here in Luce County, near McMillan.

From May 19, 1925, to August 1, 1927, no one was at this place, and the birds using the houses had to "protect themselves." No English Sparrows had nested in any bird house up to that date (May 19, 1925) as they were kept trapped and destroyed. At the time of leaving in 1925, I made no change in the houses, there being some for the Purple Martins, Tree Swallows, House Wrens and Bluebirds. The first thing that I undertook on my return, on August 1, 1927, was to see if any great changes had occurred.

The English Sparrow had increased, but the Purple Martins, Tree Swallows and Bluebirds met with a great decrease in the number of families, and there were no House Wrens at all. It is certainly a good thing that I had some bird houses made purposely for the House Wren, or the English Sparrows would have had these filled up with nests, and therefore they would have had a much bigger army and more, or all, of the other birds would have been forced out. Nearly every house for Bluebirds or Tree Swallows, and some of the Purple Martin houses, had an English Sparrow's nest in it. But all of the houses erected for the House Wrens were entirely empty, showing that none were present during these years. I made no effort to destroy the House Wrens, and it has been my experience that the species nesting at the houses which I have up for their use are safer when the House Wren is present than they are with the English Sparrow. It is now four years since the House Wren used any of my houses. And during the time that I was away, the English Sparrows came and were in larger numbers than all the other species combined.—O. M. Bryens, *McMillan, Mich.*

A Curious Flight of Nighthawks.—On September 3, 1926, I witnessed a flight of Nighthawks which I regard as the most curious sight that I have seen in two score years of bird study.

I live on a farm in Greene County, Ohio, about midway between Columbus and Cincinnati. On that particular day I had spent much of the afternoon in the center of a strip of woods, watching the squirrels, but at about 3:30 P. M. I moved my position to the west margin of the woods, where I could rest on a large log and have a good view of the sky. South of my position there is another

strip of timber which meets the woods I was in, forming nearly a right angle, or a reversed L. I was looking across the open angle of the L and towards the south. I had no sooner taken this position than I saw four Nighthawks rising over the crest of the woods to the south and flying directly north. The four birds were in a line extending from east to west, with fifty or seventy-five yards separating one bird from the next. No sooner had these four birds disappeared, northward, than four more Nighthawks arose over the brow of the woods, in the same formation and following the first line. Then as these four disapperaed in the north, a third line came on.

I now sat up and took notice. Something unusual was happening. I looked off to the west, beyond the woods, and I beheld Nighthawks at irregular intervals as far as my sight would carry. Briefly, I watched these lines coming for half an hour, like a great invading army. Tiring at length of the sight, I concluded to go to the house. How long the birds continued to come after I ceased to observe them, or how long they had been coming before I noticed them, I cannot say. In the half hour that I watched, some 300 Nighthawks, approximately, had passed nearly over my head.

Had these birds been going southward, I would have supposed I was witnessing a great Nighthawk migration. But why north? On September 14, 1926, I saw a group of about two dozen Nighthawks, also flying northward. On September 16 a smaller flock of about fifteen was seen flying south. On September 17 and 18 a few were observed feeding in the afternoons, but on the 19th the sky was entirely cleared of Nighthawks, and none were seen later.—Thomas M. Earl, *Xenia, Ohio.*

The Abundance of Woodpeckers and Other Birds in Northeastern Louisiana.—Following the meeting of the Wilson Ornithological Club at Nashville, I spent five days in northeastern Louisiana, in a region that was overflowed last May. January 1 to 4 was the coldest period of that length that men who had lived there for many years could recall. Early morning temperatures were 14°, 14°, 13°, and 32° F. On January 5 the temperature rose from 18° to 45°. Every day was sunny. My host, Robert Oldham, thinks that land birds were more numerous than in any previous winter. Exceptions are Robins, Blackbirds and Mourning Doves. Large numbers of Mourning Doves were shot last winter for food. Some of the residents do not hesitate to shoot any kind of a bird. I saw one lad shoot at a Mockingbird, in spite of my protests. Forty Bob-whites were killed by two men in one day while I was there.

For miles in all directions from Mr. Oldham's home extends a hardwood forest in which lumbering on a large scale has been carried on for several years. Over much of this forest the fallen tree tops left by the timber cutters, together with the undergrowth, have been burned by forest fires, which killed a large part of the trees that had been left standing. There are likely more woodpeckers here than in any other equal area in the world. I do not know any other region in this country where so much hardwood was still standing until recent years. Here I used to see Ivory-billed Woodpeckers, but not for the past ten or twelve years, although a man told me that he saw one in the Bayou Mason swamp in 1926.

Of Pileated Woodpeckers Mr. Oldham and I think that a hundred are living within two miles of his house. The number of these great hewers of wood which I saw was about eight, with a possibility of some duplications, but I was outside only about twelve hours altogether. Of smaller woodpeckers we estimated one

to the acre, although this estimate may be quite too small or too large. In West Carroll Parish, where I was staying, there may be more than one hundred thousand of these birds. Of these, the Red-headed Woodpecker was apparently the most common; but, if it were not so conspicuous, it might be noticed not much oftener than the Red-bellied Woodpecker, which could be heard much of the time. Flickers, although less numerous, are as common as I have seen them anywhere. I noticed about nine Yellow-bellied Sapsuckers. Hairy and Downy Woodpeckers are less numerous. Mr. Oldham complained about the woodpeckers picking into the ends of the unripe ears of corn.

Blue Jays were rather common, and a few Crows were heard. Of Meadowlarks I saw nearly a hundred in one field; of blackbirds about a thousand in one flock flying to roost, and on other days smaller flocks, perhaps made up of part of the one large flock. In these flocks all that I could see plainly were Bronzed Grackles. I saw only one Red-winged Blackbird this winter, but about forty were seen when I visited the same district three years ago. I did not notice any Rusty Grackles on my recent visit.

If I had had field glasses, I could have identified more sparrows. Large flocks of White-throated Sparrows were seen, altogether probably five hundred; of Slate-colored Juncos, three or four hundred; Cardinals, about 30; Towhees, about 12; Vesper Sparrows, 3; Lincoln's Sparrow, 1; and Field Sparrow, 1. I saw a dozen or more Field Sparrows on January 2, 1925.

Other birds, with approximate numbers seen and heard, were: Mallard, one flock of about 23, January 5; Red-shouldered Hawk, 3; Red-tailed Hawk, 2; Sparrow Hawk, 4; Barred Owl, 2; Turkey Buzzard, a few; Black Vulture (a flock of 15 before I arrived); Killdeer, 12; Phoebe, 1, (three years ago, 11); Migrant Shrike, 2; Myrtle Warbler, 1, (three years ago I saw in the same district about 30 Myrtle Warblers); Mockingbird, 10; Brown Thrasher, 8; Carolina Wren, 5; Bewick's Wren, 2; Tufted Titmouse, 10; Carolina Chickadee, 10; White-breasted Nuthatch, 1; Ruby-crowned Kinglet, 6; Hermit Thrush, 16; Robin, 4; Bluebird, 14.—E. L. Moseley, *Bowling Green, Ohio.*

Ground-nesting of the White Ibis.—In Mr. Arthur C. Bent's splendid book on the Marsh Birds, he mentions nothing about White Ibis nesting on the ground. It seems strange that with all his extensive excursions and numerous notes on this species that this habit was not noted by someone. However, if it has not been noted, such is what keeps ornithologists constantly seeking for further knowledge, and indicates that the ground-nesting habit must be rare among this species.

On April 27, 1922, Fred Walker and the author visited a small colony of White Ibis, which were nesting in a small clump of bay trees, covering perhaps a quarter of an acre, situated in a small grass pond, surrounded by pine and oak timber, on what could be described as flat-woods land, in the western part of Orange County, Florida. There was an occupied farm house 400 yards from the colony, and a sandy road fairly well traveled between the house and the pond, and brooding birds could plainly be seen against the green bay leaves. There were three small islands, and the birds used two of them. Green, Louisiana, Little Blue and several Ward's Herons, also the Snowy Egret and Water Turkey, were nesting in considerable numbers, with nests containing eggs in all stages of incubation, and many young.

Upon approaching the Ibises they rose with gruntal noises and circled around over the nest-clump. When we entered it they flew to a tall dead pine tree on the shore and sat silently watching. Occasionally a few came circling around while we were examining the nests. There were about forty or fifty pairs breeding, and all were in the *full adult* plumage. The nests were placed on the slender branches, or against the trunk of the tree. Some held only one nest and others four or five, from ten feet to twenty-five feet above the ground.

Four or five nests were made of green bay twigs with leaves intact, and a few dead twigs, *placed upon the ground*, among roots at the bases of trees. Both islands harbored ground nests. I have sets now in my collection taken from this colony that were from these ground-nests. None of the nests held young, but some of the eggs were incubated about two weks. From one fresh egg to three were found, the latter being the largest number.

It has always been a mystery to me why such a large bird builds so small a nest. Some nests are no larger than the hand of a large man in width, and with scarcely any depression. Although a few nests are quite appropriate and approach the size of an ordinary Little Blue Heron's nest, they can be told by their compactness, caused by layers of leafly twigs broken off living trees.

I was told by Mr. Redding, my guide, an old alligator hunter, of a place on the St. John's River Marshes, near Lake Washington, Brevard County, Florida, where the birds nested in an immense colony of several thousand birds, in the saw-grass and on the ground. This colony bred there in 1924. Mr. Redding stated that they arrived in large flocks and broke down the saw-grass with their weight until it appeared like a steam roller had run over the place for several acres in area. Here they built their nests upon the matted saw-grass, and among the saw-grass that remained upright. I myself have never been able to go to this place, but feel perfectly justified in accepting his statement, as he was well acquainted with their usual habits of tree nesting, and had no object in telling me anything but facts. I have visited several other breeding places of the White Ibis, but these are the only two instances where I found or heard of them making ground-nests.

Mr. Bent mentions the fact that he has not found White Ibis nesting on islands in salt water and that they resort to fresh water to nest. It might be well for me to mention a colony found on an island in Lake Worth two miles south of Palm Beach, on March 28, 1927. This is quite salty and the neck of land between the colony and the Atlantic Ocean was not over a half mile. On this date the birds were just beginning to nest; only a few had laid sets of three, and all were fresh. Other species nesting were hundreds of Black-crowned Night Herons with young fully feathered, Louisiana, Little Blue and Green Herons, and a few Snowy Egrets. The island was within 200 yards of a number of fine houses, and motor boats passed in numbers daily quite close. On the day I was there a noisy hydroplane passed over the island. There were no ibis nests found upon the ground, but they were built close together in vine-covered trees, in Mangroves, and three were found built against the trunk of a palm tree supported by the dead cabbage "boots" which had broken off and left six or eight inch stubs standing at an angle of 45 degrees.

In all the White Ibis colonies that I have seen I have never observed any but full-plumaged birds about, and I do not believe that they nest until they are fully matured.—Donald J. Nicholson, *Orlando, Fla.*

ORNITHOLOGICAL LITERATURE

Birds of Massachusetts and Other New England States. By Edward Howe Forbush. Part II, Land Birds from Bob-whites to Grackles. Issued by authority of the [Massachusetts] Legislature, 1927, and distributed by the Secretary of the Commonwealth (Room 118, State House, Boston). Pp. i-l+1-461. Col. Pls., 28; halftone figs., 33; maps, 18; text figs., 34. Price $5.00.

This volume continues the work begun two years ago under the same auspices, and which was reviewed in the Wilson Bulletin at the time (XXXVIII. 1926, pp. 60-61). The present volume begins with an "introduction" which discusses the topography, climate, faunal areas, changes in bird life and causes, enemies of birds, etc., and which, with the preliminary pages covers the first fifty pages. The text proper treats the gallinaceous birds, pigeons and doves, birds of prey, cuckoos, kingfishers, woodpeckers, goatsuckers, swifts, hummingbirds, and passerine birds up to and including the blackbird family. Thus are included 21 families and 106 species. The order of treatment and nomenclature agree with the official A. O. U. Check-list. The account of the Passenger Pigeon is especially full and of general interest. The section on the Heath Hen is likewise of interest. The few outline maps of the state showing distribution of local records of certain species are much appreciated by the busy reader.

While the text of the work will engage the full attention of the New England bird student, the outsider is likely to be especially attracted by the colored plates. The twenty-nine colored plates, most of which illustrate several species, are all by the late Louis Agassiz Fuertes; and they probably represent the last of his work to be published. As we turn from plate to plate, observing especially the perfection with which the birds are placed in posture, we find ourselves at first overlooking the skill with which the background and accessories are handled. For instance, as we look at Plate 50 we see the two pairs of Three-toed Woodpeckers, admirably done; but, with continued examination, our attention centers on the dead tree trunks, with their wonderful detail of light reflection. On Plate 54 the wings of the hummingbird are drawn indistinctly, just as they are always seen in photographs, which leads us to wonder whether a sharp photograph of the hummingbird's wings in action has ever been made. The artist evidently admired the coloring of the Blue Jay, for he made two figures of it (Plate 58). The plate showing the color contrast between the Horned Lark and the Prairie Horned Lark is of much interest (Plate 57); likewise the comparison on one plate of the Purple Grackle and the Bronzed Grackle.

Of all the plates, however, our choice is Plate 46, showing the Great Gray, the Great Horned, the Barred, and the Snowy Owls. There is something about it which is striking and fascinating. It is difficult to analyze one's reactions to this picture. It contains four strong and arresting figures, each with its own setting. Yet each background blends perfectly with the others. The whole is bold and incisive, clear and correct. Not only is this one our choice of the plates in this volume, but we can not recall any other plate of bird portraits by any artist that exhibits the artistry shown in this one, in our own humble opinion, of course. Our particular volume now falls open at this plate.

The present work is not a state list, nor is it continental in scope; nevertheless, we believe its merits warrant comparison in the latter class. And we are prone to regard it, when completed, as one of the masterpieces in American

ornithological literature. We understand that Volume I is out of print, and selling at a premium, although 5000 copies were printed. Of volume II, 7500 copies were printed, of which 6000 have already been sold. We trust that all who may desire a copy will be able to secure one. It is announced that Volume III will appear before the close of the present year.—T. C. S.

Life Histories of North American Shore Birds. Order Limicolae (Part I). By Arthur Cleveland Bent. Bull. 142, U. S. National Museum. Washington, 1927. Pp. i-ix+1-420. Pls. 55. Price, 85 cents.

This title makes the seventh in the series, and includes three families, viz., Phalaropodidae, Recurvirostridae, and Scolopacidae (in part), with forty-one species. The author uses seven nomenclatoral changes, and includes three forms new to North America, which have recently been discovered on the Alaskan coast.

This volume contains a marked typographical improvement over its predecessors in using the running head on the recto page to indicate the species which is treated on that page; this is a simple time-saving device which will surely be appreciated by the users of the book.

Dr. Charles W. Townsend has prepared the accounts of the Least and Semipalmated Sandpipers, while six European species found as stragglers in this country are treated by Mr. F. C. R. Jourdain. Mr. F. C. Lincoln has assembled the distributional data, as in the previous number.

In our review of the preceding volume in the series we made some criticism of the treatment of distribution. Our remarks were due in part to a misunderstanding of the method of naming localities in such a manner as to form an enclosed area. It was not, and is not now, our desire to comment on the accuracy with which this method was, and is, used, although we still believe it would be difficult to discover this method in the text unaided—simply for the reason that localities are mentioned which lie within outer ones mentioned. This is, however, of very secondary importance, and we would not bring it up anew. Our only point of criticism, as now restated, is that the method employed does not lend itself readily to visualization. We are inclined to believe, still, that this point is well founded, though it may be more or less irrelevant, because it may be taken for granted that the later volumes will follow the style of the earlier ones. And since we can not have a map of distribution, we are glad to have the verbal detail.

In passing we may remark on the great amount of labor which has necessarily been expended in selecting the best contributions of other authors upon the various habits of each species; many such selections are from unpublished manuscripts. The author's own observations are extensive. The student will not overlook the value of the comprehensive bibliography. It is doubtful if any other ornithological work is in greater demand than this series by Mr. Bent, and the constant call for the first volume in the series (Bull. 107, on the Diving Birds) is evidence of this.—T. C. S.

Birds of the Pacific States. By Ralph Hoffman. Houghton, Mifflin Company. New York. 1927. Pp. i-xix+1-353. Price, $5.00.

Mr. Hoffman's book is a descriptive catalogue of the birds of the Pacific coast, and treats nearly 400 species, while the paragraphs on "distribution" treat the subspecies distinctly. The book has the appearance of thorough preparation, and we may suppose that it will be accepted as an authoritative text on the birds

of the western coast. The judicious use of type faces facilitates the finding of particular material. The descriptions are prepared to be of particular help in field identification. Distribution is given separately for each of the three Pacific coast states. The illustrations are all by Major Allan Brooks, including ten colored plates showing several birds each, and many text figures. The illustrations are of more than ordinary beauty and poise.—T. C. S.

The Birds of Pymatuning Swamp and Conneaut Lake, Crawford County, Pennsylvania. By George Miksch Sutton. Annals Carnegie Museum, XVIII, pp. 19-239. Pittsburg, 1928.

"There is about every wooded swamp or open marsh an alluring mystery." With these opening words the author arouses our immediate attention and interest, because our experience tells us that it is so. Pymatuning Swamp lies in Crawford County in western Pennsylvania. The swamp covers about 10,400 acres, in what was once a preglacial valley draining into Lake Erie. The outlet became closed by morainic deposits, and the drainage was deflected southward, and into the Mississippi system. The old valley has been filled up by the growth of vegetation, and it is now in the bog stage. The densely forested swampland presents a typical wilderness in which the wild life remains practically undisturbed by man.

In discussing the interactions among the animals the House Wren is reported as abundant (though observers did not find it present at all twenty-five years before), and "is probably a mild enemy of its neighbors, for it is known to prowl about, destroying the eggs or nests of other birds."

The author's visits to the region began in 1922, and in each succeeding year, at different seasons, some time was spent there. Two hundred and forty-four species of birds are listed as occurring within the area treated. The classification follows the order in the A. O. U. Check-list, but the nomenclature varies from it in many instances. We have no doubt that these unofficial changes are sound, and may some day be officially accepted. But there is still a chance that some may not be. Possibly the A. O. U. Committee is functioning too slowly. At any rate authors appear to be unwilling to wait for the new check-list.

Besides a topographic map of the region, the volume contains eight plates in black and white and one in color. The frontispiece is a beautiful four-color plate, from a drawing by the author, depicting the male Northern Pileated Woodpecker, which is becoming rare in this region. This report is based upon a painstaking and exhaustive field study of the region, and makes a valuable addition to the avifauna of the state.—T. C. S.

Animal Life of the Carlsbad Cavern. By Vernon Bailey. Williams & Wilkins Company, Baltimore. 1928. Pp. 1-195. Price, $3.00.

This volume is issued as Number 3 in a series of monographs on American mammals. Our interest is attracted by a chapter on the birds of the region. The Carlsbad Cavern is in the southeastern corner of New Mexico—in the Pecos Valley. The largest single room of the cavern is said to be 450 feet wide and 250 feet high, in places, while there are other large rooms. A little over four years ago the cavern was made a national monument. Important chapters are included on the following subjects: description of the cavern, neighboring life zones, conspicuous vegetation, mammals, birds, and reptiles of the region. Roughly counted, about eighty species of birds are mentioned, most of which are characteristic of the desert country. It is a non-technical and interesting book about an interesting region.—T. C. S.

Birds and Mammals Observed by Lewis and Clark in North Dakota. By Russel Reid and Clell G. Gannon. Published privately, Grand Forks, 1927. Pp. 1-24.

The authors here give us a list of the birds and mammals recorded by Lewis and Clark within the area now comprised within the state of North Dakota, and identify these species in terms of modern nomenclature. The work is well done, and is a useful piece of compilation, not only for North Dakotans but others as well. A somewhat similar piece of work was done some years ago by Professor Shimek and entitled, "Early Iowa Locality Records" (Proc. Ia. Acad. Sci. XXII, 1915, pp. 105-119); and also for South Dakota by Professor W. H. Powers (Proc. So. Dak. Acad. Sci., IX, 1924, pp. 16-33). Professor W. H. Over has also published a similar review of the records of birds and mammals observed in the Dakota Territory by Audubon in 1843 (Proc. So. Dak. Acad. Sci, VII, 1922, pp. 41-55). These correlations between early explorations and recent conditions become valuable and necessary as time passes.—T. C. S.

Our Migrant Shorebirds in Southern South America. By Alexander Wetmore. Tech. Bull. 26, U. S. Dept. Agric. Washington, October, 1927. Pp. 1-24. Price, 5 cents.

This bulletin is a survey of the status in South America of the snipes, sandpipers, and plovers which breed in North America and migrate south of the equator in winter. The report is based upon studies made by the author in Argentina, Chili, Paraguay, and Uruguay from May 29, 1920 to May 19, 1921, or one year.—T. C. S.

The Magpie in Relation to Agriculture. By E. R. Kalmbach. Tech. Bull. 24, U. S .Dept. Agric. Washington, October, 1927. Pp. 1-29. Price, 10 cents. Topics discussed are, distribution, life-history, food, and control methods. It is found that the Magpie possesses both harmful and beneficial habits. The evidence shows that a wholesale destruction of the Magpie is unwarranted. Under the head of control measures, full instructions are given for killing these birds by poisoned bait. In one local campaign in Oregon it was "conservatively estimated that 5,000 Magpies were killed." A full-page drawing of the Magpie and a map showing its distribution, with several other cuts, enhance the bulletin.—T. C. S.

General Ornithology Laboratory Notebook. By A. A. Allen, L. A. Fuertes. and M. D. Pirnie. Published by the Comstock Publishing Company, Ithaca. N. Y. Price, $4.00 ($3.00).

This is a guide for the instruction of beginning students in laboratory and field ornithology. In a brief introduction the authors offer an argument for the use of the laboratory method in the teaching of elementary ornithology; if such a practice needs defence, it is well given here. Doubtless most courses in ornithology contain some laboratory work, as well as field training, and class room instruction. To what extent each method is used will vary, perhaps, in every course.

It seems that this Cornell notebook might readily be adapted to nearly any situation. It provides for the study of the external anatomy of the bird, and the skeleton; complete analytical keys for the genera and families of North American birds; a page with spaces for listing twenty-seven bird skins identified

to order and family; a page with twenty-six spaces for listing skins identified to genus and species (we believe that about four of these sheets should be included); a list of the orders and families of North American birds, according to the new classification, with spaces for listing examples of each; a printed and illustrated copy of Dr. Allen's key for identification of birds' nests (which has been previously published, but which is here made readily available); a list of birds found in central New York (the teacher may substitute his own local list); a number of ruled pages for the student's migration records (which should have contained directions for use); and finally, 125 pages on which to record the facts of distribution and life history. These last sheets contain outline maps of the western hemisphere and an outline figure of the species to be treated. And if the student fills out half of the information for half of these sheets, he has had a pretty fair elementary training in the subject.

A course in ornithology is rather an expensive one for the average student. By the time he pays his laboratory fee, buys a Handbook and a field glass, and figures in some railroad fare for field excursions, the teacher may be a little reluctant to add an expensive notebook. Nevertheless, this notebook is a good one, doubtless the best extant, and it will be a great help to many teachers who have not taken time to work out so complete an outline of work; and in behalf of such teachers the authors may be thanked for making their work generally available.—T. C. S.

Short Papers on Ohio Birds. By Various Members of the Wheaton Club. Ohio State Museum Bulletin, Vol. I. No. 1, April, 1927. Pp. 1-79. Price, $1.00.

A new publication medium is thus established by the Ohio Archaeological and Historical Society. This initial number contains seventeen papers on the bird life of central Ohio, two of which are, unfortunately, anonymous. A paper by Mr. E. S. Thomas reports interesting observations on the nest life of the Black Vulture. Other papers describe the fish eating habit of ducks, Ohio nesting of Henslow's Sparrow, Snowy Owl records in Ohio, etc., etc. The creditable showing in this publication indicates a gratifying local activity in the study of bird life.—T. C. S.

The Nature Almanac: A Handbook of Nature Education. Edited by Arthur Newton Pack and E. Laurence Palmer. Published by the American Nature Association. Washington, D. C. 1927. Pp. i-viii+1-312. Price, $1.00.

The secondary title would be more indicative of the subject matter. The "nature calendar" covers only two dozen pages, but is much condensed and includes a quantity of information. The following pages contain a comprehensive catalogue of organizations concerned more or less in promoting nature study, with some description of the work of each; a catalogue, by states, of the various activities in nature study, together with a mention of many of the local leaders in such work; a surprisingly long list of nature study teachers, and the institutions with which they are connected. These catalogues represent a considerable amount of original compilation. "Nature study" seems to be a movement which has acquired a momentum, and it should help to produce a generation of nature lovers and conservationists, an enlightened race with better appreciation and support of scientific work. The book in hand gives us a glimpse of the progress toward this end. About two years ago the Doubleday, Page & Company published a "Nature Program" of about 180 pages, which reports the chief changes in nature month by month.—T. C. S.

Dakota Birds. By Loren G. Atherton and Nora M. Atherton. Published by J. Fred Olander Company, Pierre, S. D. 1925. Pp. 1-238. Figs. 39, 12 colored plates. Price, $2.00.

This book, though published two years ago, has just come to our attention. It is strictly a home product—on Dakota birds, by Dakota authors, published by Dakota printers. Many of the common birds of South Dakota are appropriately discussed in a way to interest beginners. The biographies are informal and follow no uniform mode, each specific account presenting the outstanding habits or characters. The water birds and the birds of prey are not treated; but, beginning with the woodpeckers, the families of land birds are included. The book contains a number of plates, in both black and color, by the junior author.—T. C. S.

A Study of the Economic Status of the Common Woodpeckers in Relation to Oregon Horticulture. By Johnson Andrew Neff. Privately printed, Marionville, Missouri, 1928. Pp. i-viii+1-96. Tables, 11; graphs, 6; plates, 8. Price, $1.50.

Mr. Neff here gives us an excellent survey of the economic relations of the woodpeckers which are found in the orchards of the northwest. For the purposes of the discussion the author divides these birds into six groups, viz., Hairy Woodpecker Group, Downy Woodpecker Group, the Sapsuckers, the California Woodpecker, the Lewis Woodpecker, and the Flicker Group. For each of these groups there is a concise resume of the general knowledge of the forms, the local distribution, and the habits. Following this discussion the author presents his own original observations and data. The conclusions are based upon the examination of stomach contents, upon field study by the author, and upon testimony of farmers and orchardists. The report is a valuable contribution to our knowledge of these birds, and will need to be consulted by all economic ornithologists, and by any students who are especially interested in the Picidae.—T. C. S.

Returns from Banded Birds 1923 to 1926. By Frederick C. Lincoln. Tech. Bull. 32, U. S. Dept. Agric. Washington, December, 1927. Pp. 1-96. Price, 20 cents.

This bulletin is a mass of records of returns of many species of birds which had been previously banded. The tables show the banding station, date, locality of return (except where the word "same" is used, leaving an uncertainty of meaning). During the two and a half years covered by the report 234,692 birds have been banded in North America, from which 10,338 returns have been secured.—T. C. S.

A Year's Program for Bird Protection in Pennsylvania. By George Miksch Sutton. Bull. 9, Board of Game Commissioners of the Commonwealth of Pennsylvania. [1928]. Pp. 1-50. Thirty-six figures. Free.

The cover of this pamphlet is adorned with a beautiful figure of the Cardinal in color, by Dr. Sutton. Two of Dr. Sutton's drawings, of the Screech Owl and of the Goshawk, are reproduced in the pages. The text is, to a large extent at least, a reprinting of Bulletin No. 7, which was issued in 1925. This attractive bulletin contains a wealth of information, and it is hoped that it will have a wide distribution. We would suggest that the bulletin might well be dated.—T. C. S.

The Snakes of Iowa. By J. E. Guthrie. Bull. 239, Agric. Exp. Station, Ames, Iowa. September, 1926. Pp. 147-192. Twenty-one figures.

We trust we may be pardoned for including a title on this subject in this department. The bulletin is so well organized, and appears to be so useful an aid in identifying the common snakes of the middle west, that we thought some of our readers would be glad to know of it.—T. C. S.

Outdoor America for January, 1928, contains an article by George Miksch Sutton entitled, "A Fair Deal for the Hawks and Owls." This is an unbiased and sane educational discussion of the pros and cons of these birds. Dr. Sutton is a new leader in the revolt against protecting birds on purely economic grounds: he believes that birds should be allowed to live as well for their beauty. At the same time he recognizes that there are bad birds, which must be restrained or controlled, not exterminated necessarily. In noting this judicial appraisal of the birds of prey by one of Pennsylvania's game officials, we reflect upon the advance in viewpoint over four decades ago, when a Pennsylvania legislature placed the famous "scalp act" on the books. In the article here mentioned we find a reproduction of the painting of the Goshawk which Dr. Sutton made for the Wilson Bulletin about two years ago.

In Professor E. H. Strickland, of the University of Alberta, we find a skeptic as to the importance of birds in the control of insect pests. He has published ar article on "Can Birds Hold Injurious Insects in Check?", in the *Scientific Monthly* for January, 1928. He says that, "Extravagant claims are made regarding the financial debt we owe the birds in their role of saving the crops from complete destruction by insects." He believes that birds are a factor in producing the annual mortality of 99.3 per cent among such insects, but that there are other factors, such as parasitic insects, local food supply, direct effect of climate, etc. Then after a lengthy and instructive argument he states his conclusion thus, "that the annual destruction of plant-feeding insects by birds has no appreciable effect upon their ultimate abundance.'

The January-February number of the *Condor*, much enlarged, is devoted to a biographical sketch, by Harry Harris, of Robert Ridgway, the "dean of American ornithologists." Besides being very profuse in illustrations, it includes an extensive, probably complete, bibliography of Mr. Ridgway's writings—540 titles. This is a notable and welcome contribution to American biography, for the publication of which the Cooper Ornithological Club deserves the congratulations and gratitude of all ornithologists.

The *Cardinal* for January, 1928 (II, No. 3), is devoted to the biology of Cook Forest, in northwestern Pennsylvania. A colored frontispiece by George Miksch Sutton shows a pair of Canada Warblers, with a background of rhododendron blossoms. There are articles on the flowers, birds, mammals, and reptiles of the region.

Dr. E. W. Nelson has a profusely illustrated article on bird banding in the *National Geographic Magazine* for January, 1928. Among the pictures are snap shot portraits of many of the leading banders. Separates of this article have

been distributed by the Biological Survey through the courtesy of Mr. S. Prentiss Baldwin.

We may again refer to the *Nature Notes from Yellowstone Park,* which continues to appear at monthly intervals. This mimeographed periodical is edited by Mr. E. J. Sawyer, Park Naturalist, and published in the office of the Superintendent of the Park. We think that it may be obtained by those who are interested in the natural history of the Park. It contains notes on the birds, mammals, flowers, geysers, etc., for all seasons of the year. The issue for September, 1927, contained a partial census of the wildfowl in the Park; these figures included 261 Barrow's Golden-eyes for the region around Yellowstone Lake alone.

American Game for January, 1928, contains an article on the "Food, nesting and decrease studies of the Bob White," by Herbert L. Stoddard. The Quail Investigation in the South is now in its fourth year, though originally planned for three years. The present article is a resume of recent results of these studies.

Professor A. C. McIntosh has written an article on the "Biological Features of Cascade Valley and Vicinity" (published in *The Black Hills Engineer*, January, 1928, pp. 68-83), in which he gives an account of the wild flowers, birds, lower vertebrates, and insects of this locality in the Black Hills of South Dakota.

The State of Pennsylvania has issued a neat little booklet entitled "How to Know the Trees and Shrubs of Pennsylvania, Native and Introduced." By Geo. S. Perry. Published over the imprint of the State Department of Forests and Waters, Harrisburg, 1926.

We are indebted to Mr. Harry Harris for a copy of the illustrated leaflet announcing the exhibition of the work of Maj. Allan Brooks, held in connection with the third annual meeting of the Cooper Ornithological Club, May 4-6, at San Diego, California.

Some of our readers may be interested to know that the fourth, and much enlarged, edition of "American Men of Science," has recently been issued. This book, of over eleven hundred pages, contains biographies of 13,500 American scientific men and women. It is published by the Science Press, Grand Central Terminal, New York, and is sold at ten dollars.

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Ryder, Mrs. Robert O., 1041 Franklin Ave., Columbus, Ohio.....1917
Saunders, W. E., 352 Clarence St., London, Ont., Canada.....1902
Schaefer, Oscar Frederick, 724 Woodbine Ave., Rochester, N. Y.....1921
Shearer, Dr. Amon Robert, Mount Belvieu, Chambers Co., Texas 1893
Sherman, Althea R., National, via McGregor, Iowa.....1910

†Rejoined.

Simonds, Joseph, 116 W. Jackson Blvd., Chicago, Ill.....1928
Stephens, T. C., Morningside College, Sioux City, Iowa.....1911
Stoddard, H. L.. Beachton, Grady Co., Ga.....1917
Sutton, George Miksch, State Ornithologist, Harrisburg, Pa.....1920
Swenk, Myron H., 1410 N. 37th St., Lincoln, Nebr.....1914
Taylor, Mrs. H. J., 2813 Channing Way, Berkeley, Calif.....1916
Thayer, John Eliot, George Hill Road, Box 98, Lancaster, Mass.....1903
Uhrig, Mrs. A. B., Oconomowoc, Wisc.....1926
Von Lengerke, Justus, 257 Highland Ave., Orange, N. J.....1926
Wallace, Chas. R., 69 Columbus Ave., Delaware, Ohio.....1916
Whitney, Thomas Hayes, Atlantic, Iowa.....1916
Willard, F. C., Farmingdale, Long Island, N. Y.....1924
Wing, Leonard W., R. F. D. 3, Jackson, Mich.....1924
Young, Colonel John P., Renwick Drive, Ithaca, N. Y.....1913

Active Members

Adams, Mrs. Amy M., 6400 Kenwood Ave., Chicago, Ill.....1927
Allen, Dr. Arthur A., McGraw Hall, Cornell Univ., Ithaca, N. Y.....1914
Anderson, Edwin C., R. R. 4, Dell Rapids, So. Dak.....1921
Armstrong, Edward Elton, 2249 Calumet Ave., Chicago, Ill.....†1921
Ayres, Jr., Douglas, 111 Canah St., Fort Plain, N. Y.....1924
Bailey, Alfred M.. Chicago Academy of Science, Chicago, Ill.....1928
Bailey, Mrs. Florence Merriam, 1834 Kalorama Road, Washington, D. C.....1911
Bailey, Mrs. Mary L., 2109 Nebraska St., Sioux City, Iowa.....1918
Baird, Robert L., 279 Oak St., Oberlin, Ohio.....1902
Bartsch, Dr. Paul, U. S. National Museum, Washington, D. C.....1894
Bellah, L. P., Union Station, Nashville, Tenn.....1926
Bennett, Walter W., 1629 W. Palmer Ave., Sioux City, Iowa.....†1925
Bergtold, Dr. William H., 1159 Race, Denver, Colo.....1916
Black, J. D., Winslow, Ark.....1925
Bowdish, B. S., Demarest, N. J.....1924
Bowman, Paul W., Geo. Washington Univ., Washington, D. C.....1927
Brunn, Chas. A., 421 Commerce Bldg., Kansas City, Mo.....1921
Bryens, Oscar McKinley, McMillan, Luce Co., Mich.....1924
Burdick, Dr. George M., Box 176, Milton, Wisc.....1921
Burgess, Mrs. E. A., 2826 Nebraska St., Sioux City, Iowa.....1925
Burke, W. L., 505 East 6th St., Vinton, Iowa.....1927
Burleigh, Prof. Thos. D., Division of Forestry, Univ. of Ga., Athens, Ga.....1923
Burleigh, Dr. W. J., 53 Aberdeen Place, St. Louis, Mo.....1927
Burns, Frank L., Berwyn, Pa.....Founder
Burtch, Verdi, Branchport, N. Y.....†1924
Butler, Dr. Amos W., 52 Downey Ave., Indianapolis, Ind.....1911
Butler, Rev. L. Ermil, Bidwell, Ohio.....1926
Cahn, Dr. Alvin R., 902 W. Nevada St., Urbana, Ill.....1917
Calhoun, George R., State Commissioner Fish and Game, Nashville, Tenn.....1928
Camp, R. D., Box 495, Brownsville, Texas.....1924
Carrol, J. J, Box 356, Houston, Texas.....1926
Cavaness, Sallie E., 600 North Main, Monticello, Ark.....1923
Chapman, Dr. Frank M., Amer. Mus. Nat. Hist., 77th and C. P. W. New York, N. Y.....1910
Clay, Miss Marcia B., Bristolville, Ohio.....1925
Cobb, Rev. P. L., 1703 Primrose Ave., Nashville, Tenn.....1924
Coffey, Ben, 321 21st Street, N, Nashville, Tenn.....1927
Cole, Dr. Leon J., Agr.-Chem. Bldg., Madison, Wisc.....1921
Commons, Frank W., 608 Chamber of Commerce, Minneapolis, Minn.....1923
Cook, G. M., 27 Tod Lane, Youngstown, Ohio.....1923
Cook, Mrs. Helen Newman, 210 Longwood Rd., Roland Park, Baltimore, Md...1927
Coryell, Sherman, 1500 Hood Ave., Chicago, Ill. 1921
Coursen, C. Blair, 761 East 69 Place, Chicago, Ill.....1927
Danforth, Stuart T., College of Agriculture, Mayaguez, Porto Rico.....1925

Darling, A. B., 4105 Country Club Blvd., Sioux City, Iowa....1925
Dean, Robert Henry, 720 Quintard Ave., Anniston, Ala....1921
Deane, Ruthven, 1222 N. State, Chicago, Ill....1910
Deane, Walter, 29 Brewster St, Cambridge, Mass....1903
DeLury, Dr. Ralph E., Dominion Observatory, Ottawa, Ontario, Canada....1921
Dickey, Donald R., 514 Lester Ave., Pasadena, Calif....1912
Dickinson, Joseph Edward, 409 N. Horsman St., Rockford, Ill....1923
Donaghho, Walter, Box 532, Parkersburg, W. Va....1920
Doolittle, E. A., Box 44, Painesville, Ohio....1925
Dorsey, George A., 324 W. John Wesley Ave., College Park, Ga....1927
Dunkelberger, Harry W., P. O. Box 6, Flourtown, Montgomery Co., Pa....1922
Dunlap, M. Sigsbee, 1451 Hampshire St., Quincy, Ill....1926
Dwight, Dr. Jonathan, 43 West 70th St., New York, N. Y....1905
Earl, Thomas Mason, R. D. No. 2, Xenia, Ohio....1921
Eddy, Samuel, Vivarium Bldg., Cor. Wright and Healey, Champaign, Ill....1925
Ehinger, Dr. C. E., 730 Grand Ave., Keokuk, Iowa....1926
Eifrig, Prof. C. W. G., 1029 Monroe Ave., Oak Park, Ill....1907
Ekblaw, George E., 233 West Orleans, Paxton, Ill....1914
Ekblaw, W. Elmer, Box 431, North Crafton, Mass....1910
Erichsen, W. J., 2311 Barnard St., Savannah, Ga....1921
Fargo, W. G., 506 Union St., Jackson, Mich....1923
Fetter, Dorothy, Winthrop College, Rock Hill, S. C....1927
Fields, E. A., 1711 Douglas St., Sioux City, Iowa....1925
Fifield, Lewis E., 14 Beekman St., Plattsburg, N. Y....1923
Figgins, J. D., Colo. Mus. Nat. Hist., Denver, Colo....1926
Fleming, James Henry, 267 Rusholme Road, Toronto, 4 Ontario, Canada....1906
Floyd, Joseph L., 1009-11 Geo. D. Harter Bank Bldg., Canton, Ohio....1903
Ford, Edward Russell, 317 Washington St., S. E., Grand Rapids, Mich....1914
Gabrielson, Ira N., 515 Post Office Bldg., Portland, Ore....1913
Gault, Benjamin T., 424 S. Main St., Glen Ellyn, Ill....1895
Gilliam, R. A., 1123 Cedar Hill Ave., Station A., Dallas, Texas....1924
Gleason, Mrs. Louisa R., 700 Madison Ave., S. E., Grand Rapids, Mich....1921
Gloyd, Howard K., Dept. of Zool., Kans. State Agric. Col., Manhattan, Kans....1925
Goddard, Henry N., Western State Normal School, Kalamazoo, Mich....1926
Gowans, Ethel, 308 S. Lincoln St., Kent, Ohio....1924
Gregory, Stephen S., Jr., Box N., Winnetka, Ill....1922
Grinnell, Dr. Joseph, Mus. of Vert. Zool., Univ. of Calif., Berkeley, Calif....1914
Griscom, Ludlow, Museum of Comparative Zoology, Cambridge, Mass....1926
Guest, Marjorie Lee, State Hospital, Box 476, Jamestown, No. Dak....1924
Guthrie, Prof. Joseph E., 319 Lynn Ave., Ames, Iowa....1922
Haecker, H. H., Logan School, Raymond, So. Dak....1926
Handley, Chas. O., 308 N. Broad St., Thomasville, Ga....1926
Hankinson, Prof. T. L., 96 Oakwood Ave., Ypsilanti, Mich....1911
Harris, Harry, 5234 Hermosa Ave., Eagle Rock, Calif....1924
Haultain, Charles Frederick, Port Hope, Ontario, Canada....1924
Hayward, W. J., 2919 Jackson St., Sioux City, Iowa....1913
Henderson, Archibald D., Belvedere, Alberta, Canada....1922
Henderson, Prof. Junius, 1305 Euclid Ave., Boulder, Colo....1903
Henninger, Rev. W. F., Manchester, Mich....1902
Herrick, Dr. F .H., Biol. Laboratory, Western Reserve Univ., Cleveland, Ohio..1916
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Hine, Prof. James S., Ohio State University, Columbus, Ohio....1910
Hinshaw, Thomas D., 1908 Scottwood Ave., Ann Arbor, Mich....1926
Hoffman, E. C., 740 W. Superior Ave., Cleveland, Ohio....1925
Holcombe, C. E., 2917 Ezra Ave., Zion, Ill....1927
Holt, Ernest G., Carnegie Museum, Pittsburgh, Pa....1926
Honywill, Albert W., Jr., 17400 Wildemere Ave., Detroit, Mich....1920
Horsky, L. O., Mailing Division, P. O., Harney Station, Omaha, Nebr....1924
Howell, Arthur Holmes, 2919 S. Dakota Ave., Washington, D. C....1921
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Hunt, J. Steger, 605 E. 5th St., Tuscumbia, Ala....1926

Johns, Dr E. W., College Hospital, Ames, Iowa.....†1925
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Kahmann, Karl W., 2513-15 Lincoln Ave., Chicago, Ill.....1914
Kee, Hunter, 36 9th Ave., Marlinton, W. Va.....1922
Keyes, Prof. Charles R., Cornell College, Lock Box J., Mount Vernon, Iowa.....1925
Kirn, Albert J., Box 157, Somerset, Texas.....1918
Kretzmann, Dr. Paul E., 801 DeMun Ave., St. Louis, Mo.....1924
Lambert, Earl Logan, 237 N. 1st St., Carthage, Ill.....1922
Lancaster, Esther A., Route 3, Hutchinson, Kans.....1927
Lange, Richard C., 319 West Side Ave., Webster Groves, Mo.....1925
Larrabee, Prof. Austin P., Yankton College, Yankton, So. Dak.....1921
Laskey, Mrs. F. C., R. R. No. 9, Graybar Lane, Nashville, Tenn.....1928
Law, J. Eugene, Box 247, Altadena, Calif.....1911
Lee, Dr. George Frederick, Florence, S. C.....1926
Leffingwell, Dana J., Aurora-on-Cayuga, N. Y.....1926
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Lewy, Dr. Alfred, 2015 East 72nd Place, Windsor Park Sta., Chicago, Ill.....1916
Lindsey, E. A., Tennessee-Hermitage National Bank, Nashville, Tenn.....1924
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Longstreet, Rubert James, Daytona Beach, Fla.....1924
Loring, J. Alden, Owego, Tioga Co., N. Y.....1926
Lowe, John N., Northern State Normal School, Marquette, Mich.....1927
Luther, Geo. W., DeTour, Mich.....1926
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Lyon, Mary C., 811 N. Sheridan Road, Waukegan, Ill.....1925
McAtee, W. L., Biol. Survey, U. S. Dept. of Agric., Washington, D. C.....†1921
McGregor, Richard C., Bureau of Science, Manila, P. I.....1919
McNeil, Dr. Charles A., 111 W. 4th St., Sedalia, Mo.....1922
Madison, Allan A., Box 182, Flaxton, No. Dak.....1927
Magann, J. Wilbur, 156 N. Oak Park Ave., Oak Park, Ill.....1927
Main, John S., 610 State St., Madison, Wisc.....1921
Malcomson, Richard O., 1114 W. Illinois St., Urbana, Ill.....†1926
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Mayfield, Dr. George R., Vanderbilt Univ., Nashville, Tenn.....1917
Mayfield, Mrs. George R., Vanderbilt Univ., Nashville, Tenn.....1921
Metcalf, Dr. Franklin P., Fukien Christian Univ., Foochow, China.....1919
Metcalf, Prof. Zeno P., State College, West Raleigh, N. C.....1909
Middleton, Raymond J., Marshall St. and Whitehall Road, Norristown Delivery, Jeffersonville, Pa.....1922
Millard, Mrs. F. A., 1032 N. 4th St., Burlington, Iowa.....1926
Minich, Edward C., 1047 Fairview Ave., Youngstown, Ohio.....1923
Mitchell, Catharine Adams, 144 Fairbank Road, Riverside, Ill.....1915
Moore, Arthur D., 712 Phoenix St., South Haven, Mich.....1922
Moore, Mrs. Nettie Purdy, R. F. D. 1, Plymouth, Mich.....1925
Morris, C. H., McConnelsville, Ohio.....1911
Morse, Harry G., Huron, Ohio.....1923
Morse, Margarette E., Viroqua, Wisc.....1922
Moseley, Prof. Edwin L., State Normal College, Bowling Green, Ohio.....1921
Mounts, Mrs. Beryl T., Ballard Normal School, Macon, Ga.....1923
Neff, Johnson A., Marionville, Mo.....1921
Nice, Mrs. Margaret M., 156 W. Patterson Ave., Columbus, Ohio.....1921
Nicholson, Nevin G., 215 N. W. Third St., Ft. Lauderdale, Fla.....1923
Norris, Joseph P., Jr., 2122 Pine St., Philadelphia, Pa.....1911
Northrup, Elizabeth A., 436 Warren Ave., Youngstown, Ohio.....1920
Oberholser, Dr. Harry Church, 2805 18th St., N. W., Washington, D. C.....1894
Ohern, D. W., 515 W. 14th St., Oklahoma City, Okla.....1921
Ortega, James L., Costa Mesa, Calif.....1924

Palas, A. J., 663 49th St., Des Moines, Iowa....1923
Palmer, Dr. T. S., 1939 Biltmore St., N. W., Washington, D. C....1914
Pemberton, John R., 525 N. Palm Drive, Beverly Hills, Calif....1922
Pennington, Leigh H., N. Y. State College of Forestry, Syracuse Univ., Syracuse, N. Y....1921
Pennock, Charles J., Kennett Square, Chester Co., Pa....1920
Phillips, Dr. John H., 2117 Blair Blvd., Nashville, Tenn....1921
Pindar, Dr. L. Otley, Versailles, Ky....Founder
Plapp, Doris Anne, 4140 N. Keeler Ave., Chicago, Ill....1927
Plath, Karl, 2847 Giddings St., Ravenswood Sta., Chicago, Ill....1916
Pough, Richard H., 4 Lennox Place, St. Louis, Mo....1924
Praeger, Prof. Wm. E., 2 College Grove, Kalamazoo, Mich....1916
Prill, Dr. Albert G., Main St., Scio, Ore....1892
Quillam, Prof. Marvin C., Wesleyan College, Macon, Ga....1927
Reed, Mrs. C. I., 2635 Reagan St., Dallas, Texas....1924
Reid, Mrs. Bessie, c/o Gulf Refinery, Port Arthur, Texas....1921
Reid, Russell, 911 Sixth St., Bismark, No. Dak....1920
Richardson, W. D., 4215 Prairie Ave., Chicago, Ill....1918
Riley, Joseph H., U. S. National Museum, Washington, D. C....1914
Roads, Katie M., 463 Vine St., Hillsboro, Ohio....1914
Robins, James A., c-o The Robins School, McKenzie, Tenn....1927
Robinson, Prof. J. M., Ala. Polytech. Inst., Auburn, Ala....1923
Rodock, Roy E., Lewistown State Normal School, Lewistown, Idaho....1928
Rosen, Walter M., Ogden, Iowa....1923
Ross, Marjorie R., Dept. of Nature Study, Penn. State College, State College, Pa. 1921
Rust, Henry J., Box 683, Coeur d'Alene, Idaho....1921
Satterthwait, Elizabeth A., "Cloviris," 118 Waverly Pl., Webster Groves, Mo....1925
Saur, Belden, 2157 Slane Ave., Norwood, Ohio....1923
Schantz, O. M., 3219 Maple Ave., Berwyn, Ill....1903
Schorger, A. W., 2021 Kendall Ave., Madison, Wisc....1927
Silliman, Oscar P., Alisal and Riker Sts., Salinas, Calif. 1914
Silloway, P. M., Principal of School, Geyser, Montana....1927
Skinner, M. P., 44 Broadhead Ave., Jamestown, N. Y....1926
Smith, Prof. Frank, 79 Lafayette St., Hillsdale, Mich....1910
Smith, Prof. Jesse L., 141 S. 2nd St., Highland Park, Ill....1925
Smith, Malcolm M., 309 Main St., Negaunee, Mich....1927
Spiker, Chas. J., New Hampton, Iowa....1916
Spofford, Walter R., Highland Road, Berlin, Mass....1926
Stack, Prof. Joseph W., Dept. of Zool., Mich. State College, East Lansing, Mich....1925
Stewart, Mrs. Clare T., 3475 Morrison Place, Cincinnati, Ohio....1923
Stickney, Gardner P., 864 Summit Ave., Milwaukee, Wisc....1922
Stoner, Dr. Dayton, 603 Summit Ave., Iowa City, Iowa....1917
Strong, Prof. R. M., 5840 Stoney Island Ave., Chicago, Ill....Founder
Strong, Wm. Abner, Warm Springs, Calif....1921
Staurt, Anne, 1905 D St., Lincoln, Nebr....1924
Stucker, Gus, 108 Bellaire Ave., Springfield, Ohio....1923
Swarth, Harry S., 2800 Prince St., Berkeley, Calif....1910
Taylor, Prof. Warner, 219 Clifford Court, Madison, Wisc....1917
Thomas, Edward S., 1116 Madison Ave., Columbus, Ohio....1921
Thomas, H. H., 1124 E. Main St., Pomeroy, Ohio....1924
Tinker, Almerin David, 519 Oswego St., Ann Arbor, Mich....1909
Todd, W. E. Clyde, Carnegie Museum, Pittsburgh, Pa....1911
Townsend, Dr. C. W., Ipswich, Mass....1916
Travis, Florence G., 1458 Mars Ave., Lakewood, Ohio....1921
Tyler, Dr. Winsor M., 112 Pinckney St., Boston, Mass....1914
Van Tyne, Josselyn, 1942 Cambridge Road, Ann Arbor, Mich....1922
Vlasnik, Mollie, 814 Nebraska St., Wayne, Nebr....1927
Warren, Edward R., 1511 Wood Ave., Colorado Springs, Colo....1911
Wertz, Vara M., 101 8th Ave., Juniata, Pa....1928

Wetmore, Dr. Alexander, U. S. Nat. Mus., Washington, D. C.....1903
Wheeler, Rev. H. E., Ala. Mus. of Nat. Hist., University, Ala.....†1924
White, Betty, Teachers College, Greenville, S. C.....1928
White, Francis Beach, St. Paul's School, Concord, N. H.....1926
Wilson, Burtis H., 5512 Indiana Ave., Apt. 3, Chicago, Ill.....1903
Wilson, Frank Norman, 804 Lawrence St., Ann Arbor, Mich.....1924
Wilson, Prof. Gordon, 1434 Chestnut St., Bowling Green, Ky.....1920
Winter, Nevin O., 805 Spilzer Bldg., Toledo, Ohio.....1921
Wolcott, Dr. Robert H., Univ. of Nebr., Lincoln, Nebr.....1924
Worthington, William A., Annville, Ky.....1924
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Yoder, William H., Jr., 4510 N. Carlisle St., Philadelphia, Pa.....1926
Youngworth, William, 3119 E. 2nd St., Sioux City, Iowa.....1927

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Abbey, G. F., Cottonwood, Minn.....1924
Adams, Benjamin, Wethersfield, Conn.....1920
Adkins, T. R., 309 Aztec Bldg., San Antonio, Texas.....1926
Allen, A. F., 714 34th St., Sioux City, Iowa.....1925
Allert, Oscar P., R. R. 1, McGregor, Iowa.....1923
Allison, C. W., Box 968, St. Louis, Mo.....1926
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Bachrach, Mrs. Benjamin, 1555 West Macon St., Decatur, Ill.....1926
Baerg, William J., Univ. of Ark., Fayetteville, Ark.....1924
Bailey, H. B., Box 112, Newport News, Va.....1914
Baldwin, Mrs. Harry L., 7136 Ridgeland Ave., 1st Apt., Chicago, Ill.....1926
Ball, William H., 1233 Irving St., N. W., Washington, D. C.....1924
Barber, Bertram A., 350 West St., Hillsdale, Mich.....1923
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Batchelder, C. F., Peterborough, N. H.....
Bates, Rev. John M., Red Cloud, Nebr.....
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Beal, Clarence M., 184 Stowe St., Jamestown, N. Y.....1924
Beard, Miss Mary, 406 East 5th Ave., Knoxville, Tenn.....1928
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Benedict, Prof. Harris M., Univ. of Cincinnati, Cincinnati, Ohio.....1925
Benedict, Mrs. Howard Smith, 1283 West Lake Ave., Lakewood, Ohio.....1926
Bennett, Rev. George, Iowa City, Iowa.....1914
Bergmann, Miss Amy F., 1302 Julia Ave., Louisville, Ky.....1924
Berryman, Benjamin F., 221 E. Chicago St., Elgin, Ill.....1926
Birge, Miss Willie I., College of Industrial Arts, Denton, Texas.....1925
Bolen, Homer R., State Teachers College, Cape Girardeau, Mo.....1928
Bolt, Benj. F., 225 E. 46th St., Kansas City, Mo.....1916
Bonesteel, V. C., American National Bank, Aurora, Ill.....1925
Bordner, Mrs. Robert L., Lamont, Iowa.....1925
Borror, Donald J., 149 W. Park St., Westerville, Ohio.....1927
Boulton, Wolfrid Rudyard, Jr., Carnegie Museum, Pittsburgh, Pa.....1922
Bradt, Glenn W., Zool. Dept., Mich. State College, East Lansing, Mich.....1926
Brady, Dr. John A., St. Augustine College, Lakewood, Ohio.....1925
Braly, John Clark, 501 Burnside St., Portland, Ore.....1927
Brasher, Rex, Chickadee Valley, Kent, Conn.....1926
Bretsch, Clarence, 690 Broadway, Gary, Ind.....1925
Brodkorb, Pierce, 711 Judson Ave., Evanston, Ill.....1926
Brooks, Maurice, French Creek, W. Va.....1926
Broomhall, W. H., Stockport, Ohio.....1926
Buchner, Mrs. E. M., 2453 N. Central Park Ave., Chicago, Ill.....1914
Buck, Henry R., 60 Prospect St., Hartford, Conn.....1911
Burket, Dr. Ivan R., Ashland, Kans.....1926

Burkhard, Fred, Accident, Md.....1922
Burnett, Prof. W. L., State Agric. College, Fort Collins, Colo.....1926
Burton, Rev. Wm. W., Alliance, Ohio.....1913
Campbell, Louis W., 304 Fearing Blvd., Toledo, Ohio.....1926
Carlson, Prof. Carl O., Dept. of Biol., Doane College, Crete, Nebr.....1923
Chamberlain, Chauncey W., Hotel Hemenway, Boston, Mass.....1921
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Chilcott, Mrs. E. F., Woodward, Okla.....1923
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Cocke, Harriet T., Box 144, Abingdon, Va.....1926
Cole, Arthur W., 735 N. Main, West LaFayette, Ind.....1926
Compton, Lawrence V., Mus. of Birds & Mammals, Univ. of Kans. Lawrence, Kans.....1923
Cook, Fannye A., Crystal Springs, Miss.....1925
Coulter, Stanley G., Purdue Univ., LaFayette, Ind.....1916
Craig, Glenn C., 570 Trade St., Florence, Ala.....1924
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Davis, Russell S., Maple Lawn Stock Farm, Clayton, Ill.....1926
Davis, Tony, Marshall, Mo.....1927
Dellinger, Samuel C., 339 Gregg St., Fayetteville, Ark.....1926
De Mille, John B., 559 W. 183rd St., New York, N. Y.....1924
Dille, Fred M., Niobrara Reserve, Valentine, Nebr.....1912
Dingle, Edward von Siebold, Huger, S. C.....1925
Dodson, Joseph H., Kankakee, Ill.....1914
Doudna, Wilbur, Ottawa University, Ottawa, Kansas.....1926
Duncan, Mrs. Sanford, 207 Union St., Nashville, Tenn.....1921
Dunlap, Mrs. Nellie M., 209 W. Main St., Waukesha, Wisc.....1922
Durst, Richard E., R. F. D. No. 2, Willard, Ohio.....1927
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Eastman, Mrs. E. P., 719 Columbia St., Burlington, Iowa.....1926
Eastman, Fred, 2628 Dodge St., Omaha, Nebr.....1925
Edwards, Mrs. W. H., Fairhope, Ala.....1925
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Eiffert, Paul, R. F. D. No. 6, St. Cloud, Minn.....1927
Elrod, Mrs. Walter DeWitt, Box 103, Okmulgee, Okla.....1923
Elwell, Mrs. Frank, 509 Moores River Drive, Lansing, Mich.....1926
Emerson, William O., "Palm Cottage," Hayward, Calif.....1922
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Erwin, Mrs. Marjorie B., Williamsburg, Iowa.....1926
Evans, Virgil, Norwich, Ohio.....1926
Everett, E. A., Waseca, Minn.....1926
Evins, Samuel N., 38 E. 14th St., Atlanta, Ga.....1922
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Feser, Mrs. A. L., 840 W. 66th St., Chicago, Ill.....1926
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Fisher, Dr. G. Clyde, Am. Mus. of Nat. Hist., New York, N. Y.....1925
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Foft, Samuel F., Lock Box 186, Waukee, Iowa.....1916
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Freidrich, George W., 3029 Belmont Ave., Chicago, Ill.....1914
Fryklund, P. O., Roseau, Roseau Co., Minn.....1926

Fuchs, E. H., Alma, Mo.....1922
Funk, Mrs. Nettie S., 649 Harwood Drive, Des Moines, Iowa.....1925
Funkhouser, Prof. William D., Dept. of Zool., Univ., of Ky., Lexington, Ky.....1918
Geist, Robert M., 811 Euclaire Ave., Columbus, Ohio.....1923
Getty, Mrs. B. M., 621 So. Minnesota Ave., Sioux Falls, So. Dak.....1925
Glover, Robt. B., Milton College, Milton, Wisc.....1926
Good, Henry G., Ala. Polytech. Inst., Auburn, Ala.....1926
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Grafton, James, Bristolville, Ohio.....1928
Grange, Wallace B., Ladysmith, Wisc.....
Grant, Martin Lee, Ass't. in Botany, Univ. of Minn., Minneapolis, Minn.....1926
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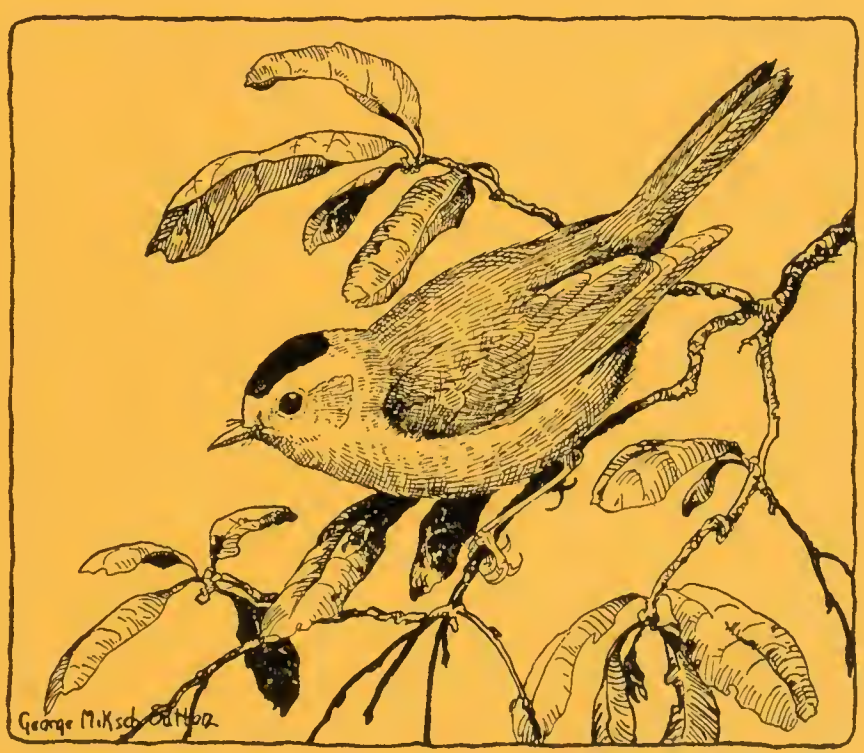

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New subscriptions, changes of address, and applications for membership should be addressed to the Secretary. Personal items, news of events in the scientific world, and other notes suitable for our "Notes Here and There" department may also be addressed to the Secretary.

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Canada Geese in Yellowstone Park

By George Miksch Sutton

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THE CANADA GOOSE IN YELLOWSTONE NATIONAL PARK

BY M. P. SKINNER

WITH FRONTISPIECE BY GEORGE MIKSCH SUTTON

Dr. C. Hart Merriam, serving as ornithologist of the Snake River division of Hayden's Geological Survey of Montana, Idaho, Wyoming and Utah, mentions Canada Geese (*Branta canadensis canadensis*). A few were seen in August of 1872 in the Firehole Basin of the Yellowstone National Park. This was the first definite record of this species there; later, almost every scientist and visitor interested in birds, noted geese. P. W. Norris, then superintendent of the Park, reported in 1881 that these geese were abundant and that they "hatched their young in vast numbers," especially at the south end of Yellowstone Lake. In 1898, Capt. James B. Erwin, then acting superintendent, thought probable that some Canada Geese remained in the Park all winter. Dan Beard wrote in 1901 of their extreme tameness. In spite of these early notices that Canada Geese were present, no prolonged or more definite studies of their lives have ever been made. Including every reference that I can find on this bird in the Yellowstone Park, all the material published before this, including two pages written by myself, would cover only about three pages of the WILSON BULLETIN. Most of this material is widely scattered, consisting, as it usually does, of but a mere mention, or not more than two or three sentences together in any one place.

The Yellowstone National Park is a high, mountainous area about sixty-two miles north and south, by fifty-five miles east and west. Included in this area are hills and valleys, broad plateaus, and mountains extending up to 11,125 feet above sea-level. Being elevated, even its lowest altitude is over 5300 feet (or just a little over a mile) above sea-level. Not only is it diversified in altitude, but its features are varied. They include open, grassy meadows; rugged, rocky hills; desert areas covered only by sage-brush; delightful valleys and hills whose carpet of green grass and herbage is dotted here and there by groves of trees; and rolling hills and plateaus covered by

dark, somber, coniferous forests stretching away as far as the eye can see.

The lowest elevations are treeless, except along the larger streams. Perhaps a little of this area is in the Upper Sonoran Zone. Possibly Canada Geese do not nest, because there are no suitable places, in the Upper Sonoran Zone inside the Park, but other Canadas nest below the Park in what is unquestionably Sonoran. Inside Yellowstone Park, some Canada Geese breed in the Transition Zone, but many more have their nests in the much larger Canadian Zone. Presumably the great number of ponds, marshes, and lakes in the Canadian Zone attracts many geese there that might otherwise nest lower, in the Transition. I have never found a Canada Goose nest in the Hudsonian Zone in the Park, but there are really very few suitable localities there.

Such an elevated region as the Park, naturally attracts and catches moisture that falls as rain and snow and sinks into the ground, or flows off in a myriad of small streams eventually uniting into several larger rivers that rush away in all directions. The Madison River dashes west until it swings to the north to form the head of the Missouri River; the Yellowstone River runs north through the Park until it changes its course to northeast and later becomes the main tributary of the Missouri River; various mountain streams flow east to fall into, and largely make up, the Bighorn River; and the Snake River surges south and later swings west and north to become a big part of the mighty Columbia River. In fact, the elevated Yellowstone region is the fountain head of many important rivers of the United States. In addition to those already mentioned, another large river (the Colorado) rises a few miles south of the man-made southern boundary and flows south into the head of the Gulf of California.

What wonder, then, that this generous rainfall not only causes an elaborate, interlacing system of running streams, but also forms a multitude of small ponds and larger lakes! Of these, Yellowstone Lake is the largest, covering an area of 140 square miles. If this Lake had a compact, regular shape, its shoreline would be only about forty miles in length. But it is actually so irregular, and has so many islands, inlets and sheltered bays, that its shoreline is really more than one hundred miles in length. Those islands, crooked inlets, and cloistered, sheltered bays are beloved by the Canada Geese and probably afford the reason that so many of these birds live there.

But this big lake is not the preferred home of most of the Yellowstone geese. By far the larger proportion live on other, and smaller,

members of the intricate surface-water system. Scattered throughout this well-watered wilderness of thousands of square miles, the Canada Geese find many small, secluded lakes and water courses near which they like to nest and raise their youngsters. They are found almost everywhere in the Park where there is water; on marshes, sloughs, ponds, lakes, streams, and meadows. They are fond of resting, both day and night, on the sand and gravel bars, the points, and the beaches of Yellowstone Lake and the larger rivers; and also on the mud bars, points, and flats extending down into the water until they may be actually covered. On cold days the geese seek shelter under protecting banks, or bask in the comparatively hot sunrays of these high altitudes, on gravel and sand bars, often going to sleep while doing so.

These big birds really seem to like to be with their fellows, and when the work of raising their young is over, they are almost always in small flocks. Usually these are family parties, but quite frequently these smaller groups unite into larger flocks. Canada Geese never fail to astonish the visitors to the Park, especially those that already know them. Elsewhere, geese are considered the essence of wildness; in the Yellowstone, under absolute protection, they are the most readily tamed of all birds. Elsewhere, shot at and harried until they are the wildest and wariest of birds; here, they are tame and fearless to a truly astonishing degree. It really seems as if the wisdom and sagacity that makes them so difficult to outwit where man is their enemy, leads them to realize the quickest, that here in the Yellowstone, man protects them and wants to make friends with them. Certainly, they are tamer than most of the ducks. In a way, this only bears out similar observations elsewhere. For, wherever we give birds, or other animals, a chance to be friendly with us, they always take advantage of it. And always, it is the wisest and the wariest that realize quickest where there is sanctuary for them.

Still, with all their trusting, friendly ways, these Park Canada Geese do not want man to become too familiar with them. They do not mistrust bird-lovers, but, on the other hand, they do not like to be pursued. When a pursuer is in a boat, the geese are apt to fly away, or go ashore, when too closely approached: but if the disturber is on shore, they fly out on the water, or often cross the water and climb the opposite bank. When they decide to escape by stream, geese are wise enough to let the current carry them downstream, instead of attempting to escape by swimming upstream, and losing time battling the current, as so many ducks are apt to do.

When Canada Geese are really alarmed, they begin their loud, clarion cries, warning all others within hearing and finally flying swiftly away, honking loudly as they go. In fact they keep up their alarum until they are satisfied that all is again safe. When they come in to alight, they often fly to and fro to see if their intended landing place is free of enemies. If alighting on a small pond or lake, they may circle again and again over it until they have given their sharp eyes ample time to survey the waters and the shore below.

Sometimes, Canada Geese, especially if they think they have been unobserved, try to escape discovery by lying low with head and neck outstretched upon the ground or along the surface of the water. If on a stony beach, the birds look like dull gray cobble stones and the deception is perfect; if upon the water, the birds look like dead bodies idly rocking on the waves; but if they are on green grass, the geese's acuteness plays them false, for their color is then contrasted with the green and they are very conspicuous. They will sometimes crouch in this way for an hour, never moving more than perhaps an eyelid until the intruder is a hundred yards away. Then the heads are slowly lifted, followed by the necks, and finally the birds rise to their feet again. I have even seen some Canada Geese carry this farther by swimming the Yellowstone River with heads and necks outstretched along the surface; and again I have seen them try to sneak off through the grass in the same way. These subterfuges are used more in the spring than in summer, but are practiced sometimes in September and October. Quite often a brooding bird on her nest, will seek to escape being seen by stretching her head and neck down along the sides of the nest, and, when she does so, she gives herself a most un-goose-like appearance.

Canada Geese are often seen with other birds such as: Mallards (*Anas platyrhynchos*), Green-winged Teal (*Nettion carolinense*), Cinnamon Teal (*Querquedula cyanoptera*), Baldpates (*Mareca americana*), Pintails (*Dafila acuta tzitzihoa*), Canvas-backs (*Marila valisineria*), Redheads (*Marila americana*), Barrow's Golden-eyes (*Glaucionetta islandica*), Mergansers (*Mergus americanus*), Whistling Swans (*Cygnus columbianus*), Grebes (*Colymbus nigricollis californicus* and *Colymbus auritus*), Coots (*Fulica americana*), White Pelicans (*Pelecanus erythrorhynchos*), and California Gulls (*Larus californicus*). The geese and most of the ducks really appear to like to be with each other more than the ducks do with other species of ducks. I know I have often observed these geese with many different species of ducks on days when it was impossible to find two or more species

of ducks together. The association of geese with grebes, coots, pelicans and gulls seems characterized more by indifference and tolerance on the part of the geese toward these other birds, probably present because of a liking for similar food, or similar habitat.

These big Canada Geese are so wary and difficult to catch that they outwit most of their enemies. Because outwitting them is such a task, the bears and most other of the carnivorous animals let the adult geese alone. But coyotes, mink and skunks get a few of the goslings at times. Geese, even young ones, show no fear of even the

Canada Geese on the Yellowstone River

biggest of the hawks flying over, or near them. I have seen the great Golden Eagles swoop at geese, but never saw them catch or kill one. Even the coyotes, wisest of all mammals, seldom undertake the task of catching an adult goose, much as they would like good, fat ones. And yet, I was once very much amused to see a coyote try to stalk a small flock of full-grown birds. He must have been either very young, or else somewhat simple-minded. The geese were perfectly aware of what was going on, and might well have chuckled to themselves as each long, cautious crawl of the coyote found them just a little farther away and entirely too far from cover to warrant a rush. But the coyote was persistent and the geese apparently had nothing better to do than to amuse him. Two or three hours passed in labo-

rious efforts, and perhaps much canine swearing, that were all equally unfruitful. At last, patience gave way in one mad rush across the beach, only to have the exasperatingly calm geese enter the river and swim away about two jumps ahead.

They fly well, but being heavy birds, Canada Geese are compelled to rise against the wind. On the land, they run a few steps before they can rise: on the water, they kick the water behind them for the first few wing strokes; but on a bank, they can jump out and down to obtain the necessary starting speed. Although the start seems so laborious, once the geese are in the air, their flight is strong and powerful. As a rule, they fly some distance above the surface of the land or water, but occasionally I have seen them flying across the broad expanse of Yellowstone Lake, just skimming the water.

"Honking" by Canada Geese may denote alarm, greeting, or anxious seeking of a mate. It may even seem at times like the mere sociable calling of one bird to another. According to the mood of the hearer, Canada Geese may be either very noisy or sweetly musical. When the hearer is tired, the honking of an old gander awakening down on the meadow at three o'clock dawn, is just plain "noise"; but when the honking is of distant, migrating birds at the end of a long and dreary winter, it is a "welcome, musical, harbinger of spring". Once, when I was battling in a small boat on Yellowstone Lake with a fierce snow squall that threatened to engulf me, I thought the honking of the geese revealing my previously unseen landing place, the finest, as well as the most welcome, of musical sounds.

While the great majority of Yellowstone geese spend only the summer there, quite a few remain all winter upon waters kept open by swift current, and even more upon the waters freed from ice by hot water from the hot springs and geysers. It seems very wonderful, where the temperature of the air often goes far below zero, that there should be natural hot water enough to keep even such large streams as the Madison, Snake, and Yellowstone Rivers free from ice. But such is actually the case, and many Canada Geese remain all winter to take advantage of these open waters. There are even a number of meadows so underlaid by warm springs that the snow is melted, and even a little green grass grows there all winter, to be greedily devoured by the geese that relish the unexpected, because unseasonable, treat! The migrating birds commence to arrive in April with the first thawing of the snow, increase rapidly in numbers until May fifteenth, and then gradually decrease during the next thirty days. During the time they are present the meadows are alive with Canada

Geese and the air resounds with their silvery "honk-ah-honk". Then those geese that go north, depart, and only the birds that breed in the Park remain behind. But even so, Canada Geese are fairly numerous throughout the summer, for probably as many as four hundred pairs nest each year within the limits of the Yellowstone National Park. The return migration from the north begins to arrive very regularly about September tenth, reaches its height forty days later, about the time the smaller lakes freeze, and then declines. The winter residential number of Canada Geese is about two hundred, although varying widely in different years.

Canada Geese Picking Gravel on the Yellowstone River

The Canada Geese that arrive in spring, often get there so early that few of the ponds are open. Indeed, I have actually seen geese on the frozen surfaces seemingly waiting for them to open! Before the ice, itself, melts, the snow water comes rushing down on the still frozen ponds and gives the earliest wildfowl a bit of their chosen element. They do not stay long on these first waters, but move to the next to open, and repeat, so that they are most numerous on ponds where water is just appearing. It is interesting to see the geese climb up on the rotting ice. Generally they fly, but occasionally one *swims up* by forcing itself forward over the breaking, mushy edges until its breast finally slides up on the still firm part of the ice. After the

mating season that follows, is over, the pairs scatter to their chosen homes. In September the geese begin gathering again on the larger waters, to remain until the gradual advance of heavy frost drives them south once more.

Canada Geese eat a variety of foods and, naturally, have a variety of ways of getting it. In April, the streams and ponds swollen by melting snow are covered with many delectable seeds and early insects. In May, the meadows furnish a rich feast of fresh grass and grasshoppers. Here, the geese, both adult and young, stay all day at first, but later come every evening to feed, and then leave after dark, for they prefer to seek the safety of open water for the night. Geese are great eaters of grasses and of the roots of grasses. In fact, grass is one of their chief articles of diet when it is to be had green, but they also eat many seeds and much small grain. They can exist on a vegetable diet, but in summer, they eat a great many insects also, as well as other animal food (I have even found them far away from water, out in the sage-brush, hunting locusts), changing again to vegetable food as autumn advances. During the latter season they feed on the water, "tipping" very much as Mallards do, or merely swimming along where the growth of water plants is near the surface, with their heads and necks underneath, gleaning what they can reach as they go. In May, and still more in the fall, they seek out the main traveled roads for gravel, and sometimes for spilled oats. In October, they dabble in springs, apparently for the small, tender plants that grow there. After eating, Canada Geese are apt to fly to some sand, or gravel, bar to preen and bask in the warm sunlight. Sometimes they take a bath before preening. This they do in the warm, shallow water at the edges of sand bars or flats, making a great splashing with their fluttering wings.

What would pass for courtship with other birds, occupies most of April; but geese are believed to mate for life. Still, the young, unmated birds each year outnumber the older, mated birds, especially as the young birds do not usually mate until they are two or three years old. So there is actually a great deal of courting each spring. And perhaps even the older pairs renew their youthful courting at each recurrence of the magic season. Certainly, at this season, all the Canada Geese are very uneasy and noisy, but by the time nesting begins, they all quiet down once more.

The paired geese appear rather particular (from their point of view) about their nest sites, and do considerable searching before selecting a spot. But after they have made a selection, they may, and

usually do, return to it year after year. They may decide on a place that seems very prominent indeed. Low elevations, such as the tops of muskrat houses, and especially beaver lodges, are preferred; but sometimes the top of a boulder, particularly if the base is surrounded by water, is chosen. For several years, there were a pair of geese nesting on the top of a bare and prominent boulder in Gibbon Canyon, and only a few feet from the heavy traffic that flowed so steadily over the loop roads of the Park. More rarely, an old osprey or hawk nest is occupied. If nothing better is found, a pile of dirt or mud, if surrounded with water, will do. The word "nest" is rather a misnomer; usually the geese utilize whatever grass and trash may be on the nest site already, although they almost always add down from their breasts. Nesting time is irregular, the first of the four to seven pale green eggs being laid during the last of April, in May, or even in early June. The gander usually stays near his mate to help defend the nest, and is capable of striking powerful blows.

The goslings are hatched in May, or during the first half of June. When they leave the eggs, they are covered with soft yellow down. They remain in the nest only until they are dry and then leave it forever. All through their callow days they retain their natal yellow down, but they are expert swimmers even then. I have seen them on Yellowstone Lake in quite stormy waves, when only two weeks old, bravely swimming in a line exactly following their parent-leader. Both parents take care of the youngsters, often leading them through the meadows. While their feet are not well adapted to walking on land, the goslings can walk and run quite rapidly; but not fast enough to evade their enemy, the coyote, that no doubt catches many before they can fly. Goslings are not fully grown and able to take care of themselves until two months old. Even after that, the whole family stays together, usually until the following spring.

After the young are a month old, the parents begin to molt. At this time, the ganders resort in large flocks to small undisturbed lakes, where they remain three or four weeks, until about July twenty-fifth, when their new flight feathers are strong enough to bear them back to their mates and little ones that have stayed together, for the female molt is not as severe as the ganders'.

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Jamestown, N. Y.

BOB-WHITE AND SCARCITY OF POTATO BEETLES

BY E. L. MOSELEY

For more than ten years Ohio has protected Bob-white with a closed season, and a great increase in the numbers of these birds may be seen. If we may judge the abundance of the birds by the frequency with which they are observed by human eyes, we would say that Bob-white is now fully twenty times as numerous as when there was an open season. These birds have, however, not only multiplied, but have become so tame that they do not take the trouble to keep out of sight. The apparent increase may be due, therefore, as much to their tameness as to their actual increase. Students in my classes have come to the State Normal College from all counties of northwestern Ohio, and also from other parts of the State. Not one among them knew of any county where the Bob-white had failed to increase in recent years. Most of them would not attempt to estimate the extent of increase: some thought tenfold, others two, three, or fourfold.

For several years past potatoes have been raised successfully on many farms in Ohio without spraying for beetles, or taking any measures to combat the insects. In fact many patches have been practically free from the "bugs." I have never known of the potato grower being so fortunate in previous years. For more than half a century the Colorado potato beetle has been a very serious pest wherever potatoes were raised. Why it should disappear I could not explain. I had wondered if ladybirds, which fed upon the eggs of this beetle, had multiplied; or if some other enemy was holding it in check. The Rose-breasted Grosbeak is so uncommon here that few people ever see one. A captive mole which I fed for some time would not eat potato beetles, either larvae or adults. These insects are not relished by all the birds and mammals that greedily devour white grubs and grasshoppers.

Last year while cutting weeds on the farm where I had first noticed the scarcity of potato beetles, I discovered a Bob-white's nest near the potato patch. I reflected that these birds had probably found breeding places and been numerous near this potato patch for several years. In the city of Sandusky, where Bob-white is presumably uncommon, I had helped a friend in gathering hundreds of beetles from his small patch of potatoes. I decided to make further observations and inquiry.

Close to the much-traveled Chicago Pike I noticed a potato patch badly infested with beetles, while other potato patches which I examined showed few or none. Most of the farmers I talked with reported seeing few potato beetles in recent years. So I enlisted the help of my students in making further observations and inquiries. Below is given a summary of the information thus collected.

Bob-whites have been observed to spend much of the time among the potato vines.

They have been seen to follow a row, picking off the potato beetles.

When the potato patch was located near woodland there was no trouble with the beetles; but when the patch was near the highway or buildings, even on the same farm, the insects were troublesome.

On farms where the Bob-white found nesting sites and protection, the potato vines, if not too near the buildings, were kept free from the insects.

A patch of potatoes surrounded by open fields, without bushes tall weeds, or crops that might shelter the Bob-white, was likely to be infested with beetles.

A farmer living eight miles south of Defiance raised about fifty Bob-whites on his place. During the two years that these birds were there he had no trouble with insects on either potatoes or cabbage. The following autumn a number of the birds were killed by hunters, while others were frightened away. The next summer the potato beetles were back in numbers. The farmer is again raising Bob-whites and protecting them from hunters.

A student coming from Potsdam, in northern New York, reports that they have no Bob-whites, and that potato beetles are plentiful. Another report from western Pennsylvania, where the Bob-white is not as plentiful as in Ohio, potato beetles are still very numerous. E. H. Forbush wrote me from Massachusetts as follows: "When the Bob-whites were most plentiful on my farm they kept the potato beetles in check, so that we did not have to spray at all; and I have heard of several other similar instances."

More recently I have learned from A. F. Conradi, General Manager of the Southern States Chemical Co., Birmingham, Alabama, that in the truck growing regions of the south a greater quantity of arsenical spray (calcium arsenate) is used for potato beetles than for any other insect. He also states they have an open season for shooting the Bob-white.

It has been suggested that this evident scarcity of potato beetles may be due in part to the work of the Hungarian Partridge. It is true that these imported birds have become common on many Ohio farms, and some credit may be due them. But the Bob-white is much more generally distributed, and its habits are much better known: and we are much more inclined to regard this species as the principal cause of the recent scarcity of the potato beetle in Ohio.

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CHIMNEY SWIFTS IN NOVEMBER, 1925

BY OTTO WIDMANN

As it is universally understood that the last Chimney Swift leaves the United States by the first of November, it was a great surprise, when on the afternoon of November 6, 1926, I saw eight swifts hunting up and down low over trees and houses in an outskirt of St. Louis, like in summer. My surprise would not have been so great, if an ordinarily mild October had preceded, but at the end of October and the first two days of November we had seven days of freezing weather. Once (October 30) the temperature was as low as 21° here in the city, and 16° in the county—the lowest temperature of any October day in sixty-two years. The weather was warm on November 3, 60°; on November 4 and 5, 58°; and on November 6, 56°; but where had the swifts been during the freezing days? They could not have found any insect food and probably had spent these cold days and nights in a warm chimney. Passing a week later the same way where I had seen the swifts on the 6th, I found that a high chimney had been built for a parochial school (Santa Rita) in course of construction. This was probably used for a roost, a most suitable place, because fireless and closed at the bottom, therefore draftless and warm. While I saw only eight swifts at three o'clock in the afternoon, there may have been hundreds coming to the roost in the evening, as I was not the only St. Louisan who saw swifts at that time.

In reply to a letter Mr. Luther Ely Smith, President of the St. Louis Bird Club, wrote me: "I recall very vividly on the afternoon

of Saturday, November 7 (a very rainy and dismal afternoon) being at Francis Field at Washington University to witness the Washington-Missouri football game. During the game something like two hundred toy balloons were released from time to time and they made a very pretty sight as they went up in the air. I was particularly impressed because the swifts that were darting about the sky continued their movements apparently quite scornful of the invasion of the army of color in the shape of green, red, and blue balloons that were marching through the sky. The incident and the unusual occasion fixes the date of these particular swifts in my mind."

Miss Jennie F. Chase, Secretary of the St. Louis Bird Club, wrote me on November 9, 1925: "I am glad to be able to contribute one tiny item to your swift story. Early Sunday morning, the eighth of November, I saw one swift from my window in Kimmswick—just one. There may have been more about, but I could not follow up the search."

The *St. Louis Times* of November 14, 1925, had the following article with the headline: "500 Swallows Found Dead in Alton Furnace"—"More than 500 dead swallows were carried from the furnace and bottom of the chimney at the house of Miss Alice Whiteside in Edwardsville, Ill., before the fire would burn. The swallows are believed to have entered the chimney several days ago and after two days of bad draft on the furnace the chimney was examined."

Mr. T. E. Musselman, of Quincy, Ill., who trapped swifts for banding, has the following to say about the unusually late presence of swifts in 1925 (Wilson Bulletin, June, 1926, p. 121): "In 1924 the last swifts departed for the south on October 17, but the last date in 1925 was one month later to a day. In 1925 few swifts were seen about town during the day time after the middle of October: but at dusk as many as five or six hundred circled over the favorite chimneys and it was at this time that I secured my largest catches. Colder weather appeared and I discovered that on days when the thermometer indicated an approach to the freezing point the birds remained in the chimneys until about nine o'clock in the morning. During the daytime the birds quickly returned from their feeding over the river, circled but a time or two, and dropped into the chimney until warm. . . . But the most popular chimneys were those which connected below with the basement and served, therefore, as warm air flues. In such chimneys the temperature reached 70°. Little wonder that the birds preferred these chimneys on damp and cold nights! On October 28 a severe snowstorm forced the swifts into the chimneys. The next morning at eight o'clock I climbed the Wabash chimney and found probably three hundred swifts clinging to the sides of the brick wall four feet down and in a solid mass, three birds deep, on all four walls. At 9:30 A. M. on October 29, a number of birds left the chimney and circled, flying among the snowflakes for five minutes, but quickly returned to the chimney for protection. All day the temperature was about 32° and few birds left their retreat. As their food is 100 per cent insects, and no such life was flying, the swifts were without food. On this day I caught seventy-five of the birds. . . . On the 30th the day was cold, but the swifts were out for exercise. On the 31st it was much warmer and many birds were out. They flew close to the ground. . . . A few fell exhausted on the snow and some returned to the chimneys. . . . A dozen people telephoned me about

finding dead swifts. . . . At the Wabash chimney I opened the base of the flue and found about twenty dead birds. The cold weather continued and on November 16 the last swift circled over the town and departed for the south."

More wonderful yet is what Mr. Robert Ridgway wrote me under date of November 6, 1925. He says: "I have some interesting information for you concerning the Chimney Swift; information that has surprised me greatly and for which I am indebted to Mrs. Ridgway. Would you believe that they are still here in *large* numbers? Well, they are. The last one that I myself saw was seen October 18: but Mrs. Ridgway, who is in Lawrenceville (about twenty miles east of Olney) saw them every evening (this evening included) pouring down the chimneys of the High School building, by thousands. She says their numbers are undiminished: each morning they pour out of the chimneys and fly westward and that, when they return in the evening, they come from the west. What do you make of it? Where do they find enough insects for food? It is evident that we yet have very much to learn as to the habits of *Chaetura*." On a later date Mr. Ridgway wrote me that Mrs. Ridgway watched the swifts carefully and found them in summer numbers up to November 13, but next morning (November 14) there were very few flying about the chimney and then disappeared.

Mrs. Ridgway's last date, November 14, and Mr. Musselman's, November 16, were beaten by Miss Katherine H. Stuart, who observed a swift at Alexandria, Va., on November 19 (*Bird-Lore*, 1926, p. 59). In *Bird-Lore* (1926, pages 11-12) Dr. Oberholser gives a list of fifty-seven latest dates of swifts in the United States. Among these we find only four November dates, viz., November 2, 1919, Pensacola Fla.: November 4, 1896, New Orleans, La.; November 5, 1913, Charleston, S. C.;; and November 13, 1906, Richmond, Ind. There are nine dates between October 20 and 29, all considered exceptionally late dates. Dr. Robert Cushman Murphy was very much surprised to see a Chimney Swift flying above the snow-covered banks of the Miami River at Dayton, Ohio, on October 31, 1925. (Wilson Bulletin, 1926, p. 157).

Thus we see that the mass, the millions of swifts, which spend the summer in the United States and Canada are gone after the middle of October, and all dates later than the twentieth of the month are exceptional occurrences, generally in small numbers. My latest dates of the last few years are 1917, October 21; 1918, October 10: 1919, October 19; 1920, October 26 (Jokerst October 29); 1921, October 17: 1924, October 19. To get these late dates I had to go to the big roost in the chimney of the greenhouse in Tower Grove Park, where they make no fire until it becomes really necessary, the superin-

tendent knowing of the swift roost. But one has not only to visit the chimney but also to watch its mouth closely, for in cool weather the few which come enter the chimney with little or no circling, come low and drop in immediately. Trusting to mere chance of seeing a swift on the wing one does not get those late dates. What kept them so extraordinarily late in 1925 and in such large masses as reported by Mrs. Ridgway is a mystery, though a great heat wave lasted in the Southern States till October 27, when it ended with a tornado in Alabama and zero and subzero weather in the Northwest.

It seems that the temperature alone does not decide the departure, as the record of 1924 shows. On September 2, 3000 swifts entered the Tower Grove chimney. On September 19, 4000; on September 26, 4800; on September 30, 3600; on October 2, 2000; on October 9, 2000; October 18, 60; and on October 19 only 10. The weather on the 18th and 19th was warm, 85° and 84° max., with all fall flowers in full bloom and the tropical water lilies, day and night bloomers, in Shaw's Garden and Tower Grove Park blooming so late in the year for the first time in fifty years. The change to cold came only on the 21st with frost on the 22d.

St. Louis, Mo.

HOW DOES THE TURKEY VULTURE FIND ITS FOOD?

BY JOHN B. LEWIS

A recent article in the *Auk* (July, 1928, pp. 352-355), by Mr. Alexander H. Leighton, entitled "The Turkey Vulture's Eyes," interested me greatly and called to mind some experiments I have made along similar lines, which may be of interest to others.

On January 19, 1927, a dead chicken was placed in an open field ninety yards from our home in a spot easily seen from the windows. A burlap bag was laid over the hen and a weatherbeaten box was placed over all to keep dogs from carrying the carcass away. Either the burlap or the box would have prevented the carcass from being seen, but would offer little resistence to the escape of odor. Either Mrs. Lewis or myself kept close, though not continuous, watch on the situation until February 21, without seeing a vulture near the box. At 10:30 A. M., on February 21, the temperature being just above freezing, the sky clear and a light west wind blowing, I removed the burlap and box from the carcass, placing the box four feet from it, so that if it had frightened the vultures away while the carcass was concealed, it would do so when the latter was exposed to view.

After arranging the carcass and box I carefully scanned the sky, and saw but one vulture, which was flying low in the southern horizon. I walked to the house, washed my hands and went to the window just in time to see a vulture (*Cathartes aura septentrionalis*) alight on the ground fifteen feet from the carcass. In less than as many minutes, three others alighted near the first. All four walked cautiously around the carcass and box for some time before venturing to begin the feast. The temperature all through this experiment was low enough that the carcass did not develop very much odor.

We might summarize the results of this experiment as follows: A dead hen lay in an open field concealed from sight for four weeks without attracting any apparent attention from the vultures that sailed across the sky every day. The carcass was then exposed to view without changing any other of the surroundings, and in less than ten minutes four vultures alighted within twenty feet of it.

On July 20, 1927, I placed the carcass of a Barred Terrapin, ten and a half inches long, under a box in an open field, for the double purpose of letting the carrion beetles clean the skeleton, and to learn whether the vultures would find it when concealed from sight. There was a crack, one-half inch wide by eleven inches long, in one side of the box five inches from the ground, but it is hardly thinkable that a vulture could have seen the terrapin through it, unless from the ground near the box. On July 24, at 1:00 P. M., seven vultures were on, and near, the box.

On December 21, 1927, I shot two stray tom cats that came to our place. The carcass of one was placed in an open field without concealment. The other was placed under a low, thick, branching holly tree in the same field, 140 yards from the first. The lower branches of the holly were far enough from the ground that a vulture could easily have got at the cat, but effectually concealed the latter from above. They ultures found the cat in the open the next day, and were at work at it, trying to get at the flesh under the tough skin, for several days. The cat beneath the holly attracted no apparent attention from the vultures during eleven days, at the end of which time it was carried off bodily during the night, probably by a dog.

At 8:20 A. M. July 15, 1928, the carcass of a newly killed opossum (*Didelphys virginiana*) was placed in an open field in view from the windows of my home and covered with a weatherbeaten box in which all cracks had been covered. Twenty-six yards from the box stood an old telephone pole, left from an abandoned line. This layout was watched closely, though not quite continuously, for four days. At

3:30 P. M., July 16. a vulture alighted near the box, walked up to it and remained eight minutes, then left. At 9:10 A. M.. July 17, two vultures circled about over the box for four or five minutes and then left without alighting. At 10:00 A. M. on the same day a single vulture circled over the box and left. At 2:35 P. M. a single vulture circled over the box, then alighted on the telephone pole, where it remained twelve minutes. At 6:10 A. M. on July 18. I removed the box from over the opossum placing it four feet away. Decomposition was now far advanced, and many carrion beetles were at work. Omitting details, between 10:00 A. M. and 5:00 P. M., eighteen vultures came to the carcass, sailing low over it, many alighting on the telephone pole; but only one was seen to alight on it and eat. Two Black Vultures (*Coragyps urubu urubu*) were with the Turkey Vultures at this time.

I failed to go to the carcass of the opossum early in the morning of July 19 to see that it had not been devoured by dogs or other mammals during the night, but between 9:00 and 9:45 A. M. sixteen vultures, about half of which were of the black species. gathered about it and completely cleaned up whatever remained of it.

These experiments seem to indicate that in cold weather when little odor is thrown off, sight is the vultures chief means of locating food; but that they have no difficulty in locating it by scent alone. in warm weather when odor is strong.

These observations and some others of the author may throw light on a question raised by Mr. Russell M. Kempton in the Wilson Bulletin for September, 1927, as to whether vultures willingly feed on the carcasses of carnivorous animals. That they will eat such carcasses there can be no doubt, as I have frequently seen them eating the carcasses of dogs and cats. They seem to have great difficulty in getting at the flesh of such animals on account of the toughness of the skin, for in some instances I have seen them work day after day without effecting an entrance into the body cavity. In such cases they eat the eyes, tongue, and usually manage to get some of the viscera through the vent.

In my own experience most of these cases have occurred in winter when food may have been scarce, and may not indicate that the flesh of carnivores is eaten from choice.

I hope to experiment further along this line very soon.

Lawrenceville, Va.

SOME ENVIRONMENTAL RELATIONS OF THE BIRDS IN THE MISSOURI RIVER REGION

BY JEAN M. LINSDALE

Over two hundred days were spent between 1921 and 1925 in an intensive survey of the land vertebrates of a small area of ground adjacent to the Missouri River in Doniphan County, Kansas. The center of the area is the townsite of Geary City at the point where a creek called Brush Creek enters the floodplain of the Missouri River. This paper is a summary of the more general environmental relations of the birds observed there. All statements made here are based on observations which were made within one and one-half miles of the center of the area.

The object of this work was to study the relations of the vertebrates to their environment and especially to gather data that would show as nearly as possible: what species of land vertebrates were present within the area; the frequency of occurrence and the relative abundance of those species; the local or habitat distribution of each of those species; the factors which determine the presence and habitat distribution of each species; the annual cycle of activity of each species in this area; a way to analyze vertebrate associations and successions.

The location for work was selected on the Missouri River because: little was known of the vertebrate fauna of that part of Kansas; a great variety in habitat conditions was present due to the influence of the river; rapid changes in the habitat and the vertebrate life could be studied.

Topography

About one-half the area included within this study consists of the Missouri River and its floodplain on the Kansas side. The remainder is made up of the bluffs which face the river and which are broken by the valley of Brush Creek, and a small part of the high land back of them. The riverside elevation at this point is close to 800 feet and the bluffs rise above this from 150 to 200 feet. They are of loess and limestone and are capped with loess. One part of the bluff contains some glacial drift material. There are several shelves on the bluff which mark former levels in the cutting of the river. These shelves are nearly level with steep slopes above and below them. The bluffs face the east and a little to the south. The creek flows in a deep valley that runs, in general, from the northwest to the southeast. In many places it has rather low banks on one side and high, nearly vertical cuts of loess on the opposite side. Back of the bluffs the topography is more rolling.

The Habitat

River. The Missouri River at this point may be said to have reached a stage of late maturity in the cycle of erosion. There is still a considerable amount of current but the valley has been eroded to a width sufficient to make room for meanders from bluff to bluff. During the winter the Missouri River at this point is important to birds chiefly as a feeding ground for a few of the aquatic species which migrate only as far south as they are forced by the frozen waters. During the spring the river furnishes a highway of travel for nearly all the species that migrate through the region. Some of those transients follow the water closely, some follow the shorelines and many of them follow the bluffs and the strip of bottomland bordering the river. In summer the river is used to some extent as a feeding ground for fish-eating birds, but its chief influence upon birds is indirect. This is its influence as an erosive agent in changing the extent and character of the land in the floodplain. During the fall the river again serves as a roadway for migrating birds. The birds appear to be dependent upon the river in much the same way as in spring except that they are not so hurried in their movements and they move down the river more slowly than they go north in the spring.

Creek. Brush Creek, a small stream which is usually dry during a part of the summer, flows across the area. The frequent, nearly vertical banks of loess material through which the creek has cut furnish suitable sites for nesting for several species of birds. The chief influence of the creek upon the bird-life of this vicinity lies in its work as an erosive agent. Since a large share of the land which the creek drains has been in cultivation a large amount of soil is carried away every summer during flood times. While most of this material is carried away by the river, some of it has contributed to the production of the Missouri River bottoms within the area of study. The deep creek valley also serves as a roadway for some birds both in their daily excursions to the uplands for food and in their migration flights.

Lake. Roundy Lake was formed by a shift in the course of the river which took place about twelve years before these studies were begun (1921). The course of the river was deflected by striking the bluff a short distance above this point so that it swung back to the east and left nearly 2500 acres of accretion to the Kansas bank. The lake was left in this newly made land. Brush Creek helped to fill in the lower end of the lake and later contributed largely to the decrease

Figure 1. Roundy Lake from the bluff on northwest side. Trees in foreground are on the bluff. Missouri River is shown in background. Photograph taken August, 1922.

Figure 2. Roundy Lake from east side. On opposite side of the lake at the left is shown a large patch of *Typha*. In the background is shown all the bluff included in this study and, in the center, the valley of Brush Creek as it enters the flood plain of the Missouri. Photograph taken June, 1922.

in depth and area of the water. In the summer of 1921 the water in the lake covered an area of nearly 200 acres. This area was constantly decreased until in the spring of 1925 less than forty acres of water surface remained. During the same period of time the depth was reduced from about four feet to less than two feet in the deepest place. In addition to deposits from overflow from the creek some material was left each season by the overflowing waters of the river, some was washed in from the adjacent bluffs, some dust was blown into the lake by the wind in dry times and when the ground was frozen in winter, and a great deal of organic matter was added by the invading vegetation which grew each summer and was added to the ooze of the bottom of the lake in the fall.

With an abundance of invertebrate and plant food, and being in a rather secluded location that was little disturbed by man, the lake furnished an excellent feeding ground for some summer resident birds, and an even better resting and feeding ground for several transient species.

Lake-shore. In the fall of 1921 the water in the lake was high and the edge was back in the vegetation so that there was no portion of the shore that might in any way be suitable for shore birds. Doniphan Lake, three miles away, had a broad mud-flat around the water's edge upon which several thousands of shore birds were feeding at that season. The next fall (1922) the water was low in Roundy Lake and was high in Doniphan Lake so that the mud-flat conditions were the reverse of those in 1921 and the flats at Roundy Lake were covered with feeding birds from early in August until late in September, while none were seen at Doniphan Lake. The mud-flats attracted a large number of species that would otherwise not have been found in the area. All of them stopped to feed and a few rested on the mud, but no species was found nesting on the shore and none sought protection there.

The finding of meadowlarks on the exposed mud-flats on two different occasions indicated a slight relationship of this division of the habitat to conditions of an open prairie.

Typha. Cattail (*Typha latifolia*) was the most important aquatic plant for the birds of this vicinity. It grew in large patches of several acres. These patches were nearly pure stands in and around the lake.

Slough. Several types of bodies of standing water on the flood-plain of the river may be classed under the name slough. All these are long, narrow and shallow depressions that are filled with water for a part or all of the year. On hot days in the summer many small

birds came to the springs and sloughs below them to drink and to bathe.

Salix-Populus. The name Salix-Populus was given to that division of the habitat in which willows and cottonwoods were the most important plants. Several species of willow grew in mixed and pure stands in various parts of the ground where these plants were dominant. This type of vegetation covered all the bottomland of the Missouri River except that which was covered with water and that which was in cultivation. Accompanying the rich growth of vegetation on this bottomland there was an abundance of insect life especially in late summer and in the fall when birds were preparing for migration and were moving south.

Creek-bottom. The creek-bottom included a narrow strip of land which bordered the creek in its course through the area to the point where it flowed into the floodplain of the river. Here the soil was rich and deep. There was usually sufficient moisture to insure a great amount of vegetation during each growing season. In seasons such as the summer of 1924, when there was an unusually large amount of flooding, the smaller plants and animals were covered with mud and they had little opportunity to grow. Black walnut, American elm, Kentucky coffee-tree, redbud, sycamore, and other trees found favorable conditions in the rich, deep soil along the creek and they grew to large sizes. The fact that there was no uniformity in the size of the various species of trees or in their spaciation indicated that the vegetation in this part of the habitat had reached a stage of climax.

Bluff. The timber on the bluffs covered nearly all the ground not in cultivation, within the area except that which was in the floodplains of the river and the creek. The vegetation on this part of the habitat was in a climax stage. The dominant trees were the various species of oak and hickory. In the spring and in the fall the timber on the bluff influences birds in much the same way as timber in other parts of the habitat except that there is a lesser attraction on the bluff than elsewhere for those birds which are usually found near the ground and which require a more dense ground cover than is present on most of the bluff. In winter there is less protection and less available food in the timber on the bluff except in the deeper ravines than in other types of timber and so this is the least used part of the woods at that season. Only small bands of birds which usually feed on the branches and trunks of trees were usually found on the bluff in winter. A few raptorial birds were found there throughout the year.

In summer the nesting facilities on the bluff are best suited to those birds which nest at some distance from the ground and in the branches of trees. A few nest on the ground and some nest in the cavities of the trees.

The bluff at this point has one peculiar relation to the daily activity of birds that was not noted in other parts of the habitat. That part of the bluff on which most of the work was done faces the east. In the morning the rising sun strikes the whole side of the bluff and it is quickly warmed so that insects become active and in turn the birds are active early after sunrise. In the afternoon shadows from the lowering sun fall over the bluff and it becomes cool sooner than the more level ground nearby so that activity of most birds as well as of other animals ceases earlier in the day on the bluff than on the more level portions of this area which receive sunlight until later in the day. In winter the activity ceases between three and four o'clock in the afternoon. In summer, activity stops on the bluff between five and six o'clock. It was also noted that activity ceases earlier in the afternoon on the lower part of the bluff than it does near the top where the warmth of the sun lasts for a longer time.

Timber-edge. Along the edge of the timber at the top of the bluff and around small timber patches there are narrow belts where conditions are partly like those of the timber and partly like those of open ground. Here are found small thickets of shrubs of various species and sometimes a dense growth of weeds and other herbaceous plants. Some kinds of birds, such as the flycatchers, were frequently found in the trees along the edge of the timber where there was an open ground on one side where they might make flights for insects. Several species seemed to prefer perches in the edge of the woods from which they sang or where they rested.

Sprouts. Whenever a field that had been cleared of timber was allowed to lie fallow for one or more years or was used as a pasture, sprouts immediately began growing from the roots of the trees that had been removed. Among these sprouts there was usually a dense growth of some weeds such as sweet clover (*Melilotus alba*) which with the sprouts often formed a dense tangle that was seven or eight feet high. The sprouts grew rapidly if they were left alone, but usually they were removed after two or three years and the ground was again put into cultivation. In all about forty acres of the ground in this area was growing up in sprouts while this work was being done. These fields of sprouts had the greatest influence in summer when several species of birds selected them as nest sites.

Figure 3. Roundy Lake from the bluff on the west side. In the foreground is a large patch of *Nelumbo lutea*. In the center of the lake is a first year's growth of *Typha*. At the left and in the background is shown the Salix-Populus stand on one of the older portions of the bar. Photograph taken July 18, 1923.

Figure 4. Roundy Lake in winter. In the foreground is a snow-covered patch of *Polygonum*. Back of that is a strip of*Nelumbo* in which are shown some muskrat houses. In the background is shown the bluff as it appears in winter. Photograph taken February 6, 1924.

Orchard. The three small apple orchards within the limits of this area included less than an acre of ground and less than one hundred trees. Most of the trees were old and had not been properly pruned for several years and they were not sprayed in the summer. The ground under the trees and between them was usually planted to some truck crop such as potatoes.

Roads. The public roads within this area totaled nearly six miles in their aggregate length. Most of these roads were narrow and were bordered by timber on one or both sides. Most of the roads were fenced off from the adjacent farm land. When the roads ran through or were bordered by timber the vegetation at their sides was practically the same as that of the timber-edge and the relation to birds was nearly the same in both. Parts of these roads were bordered by osage-orange which furnished favorable nesting sites and protection for several species of birds. Birds were frequently seen gathering food from the bare ground in the middle of the roads.

Pasture. The amount of land in permanent pasture in this area was less than that which was in cultivation. Most of the land in pasture was on slopes that were too steep for convenient cultivation. Other than a few scattered trees the chief vegetation was blue grass (*Poa pratensis*). The thickness of the cover which this grass made was dependent chiefly upon the amount of grazing which was permitted on it. Few birds were found in these pastures in winter. A few species nested and fed in the pastures in summer.

Cultivated Field. This part of the habitat was entirely artificial. Probably less than one-tenth of the ground not on the floodplain that was included in this area was in cultivation. The fields were small and were usually hilly. A larger portion of the land in the river bottom was cultivated because it was level there and was free from rocks. The chief crop on the floodplain was corn. On the upland corn and wheat were raised and some land was planted to hay crops such as clover, alfalfa, and timothy. Nearly all the birds that were found in the cultivated fields came there to feed. In summer there was an abundant supply of insect food on the ground, on the crop plants and on the weeds. In the winter there was usually a good supply of weed seeds in the fields, or around the edges of them.

Yard. The part of the habitat which is considered under this head is that small bit of ground which surrounds each group of farm buildings within this area. Around each house there are numerous large shade trees that are not too crowded to have large and well

developed crowns. These trees are of the same species as those found on the bluff and along the creek. The ground beneath the trees is usually bare. In winter and during the seasons of migration the birds which feed in the trees in the yards are the same small groups which move along the creek bottom and along the bluff.

The nesting population of the yards is much greater in proportion to the number of trees than it is in the surrounding woods. This popularity of farm yards for nesting purposes may be partly due to the presence of more suitable situations in the trees that are found there, but probably it is largely due to the greater protection which this nearness to man affords. Although a few new enemies such as the house cat are encountered, many natural enemies are escaped when birds select their nest sites near human dwellings. Of course this applies only to those species whose nest sites are in the yards.

Buildings. Four groups of farm buildings were found within the limits of this area as well as several scattered sheds and deserted buildings that stood alone. These houses and buildings furnished nesting sites for several species. There were two bridges across the creek and several smaller bridges within the area. These furnished some nesting sites.

Environmental Relations

Dangers. Man is a direct menace to the lives of a great many individuals of a few species of birds within this area. Most of the smaller species are not directly harmed by man here. With the game birds the situation is very different. Most of the land game birds have been hunted so much that, in the area studied, their numbers have been greatly reduced or they have become extinct. This point on the river is almost equally distant from both Saint Joseph, Missouri, and Atchison, Kansas, and is a favorite hunting ground for parties from both cities as well as for the residents of the surrounding country. Hunting on the lakes is much better than that on the river and, during the hunting season, ducks were shot on the lake nearly every day. It is very likely that the number of game birds killed in any one year within this area and during this study did not exceed five hundred.

A very few larger land birds were killed by farmers who thought that the birds were doing damage or who could not resist the temptation to kill any strange and conspicuous bird which they might see. The smaller birds were usually not harmed and most of those that were killed lost their lives by accidentally being trampled in nests or by some other unavoidable accident.

A few house cats were kept at farm houses in the area. In summer these animals depended to some extent upon the surrounding bird population for food for themselves and their broods of kittens. Young birds in the nests and near the ground in the immediate vicinity of houses, and others that had just left the nest, were the ones most often killed by cats. The large number of young cottontail rabbits that was available during the summer season made it possible for this animal to be substituted for young birds by the cats and so the losses to bird life were reduced. No increase could be noticed in the number of nesting birds near the houses in years when no cats were present.

Snakes, especially the pilot snake and the blue racer, were found to be important as natural enemies of birds during the nesting season. These snakes were able to climb the trees to reach the nests and as they were common they probably destroyed many nests of young birds or eggs during each summer season.

Other animals that were natural enemies of birds were chiefly a few species of predatory mammals and some raptorial birds. In the fall mink tracks were seen leading to and away from the remains of ducks, but the birds may have been cripples that would have died from the shock of their wounds. As raccoons took a few chickens from coops near houses and as they were common, they may have destroyed birds in the woods. A few skunks of the genera *Mephitis* and *Spilogale* were present and may have killed some birds although no actual instances were noted. Coyotes and foxes were present in such small numbers that they could not have killed many birds. Squirrels were present in considerable numbers and may have destroyed a few nests.

Several species of raptorial birds were present in sufficient numbers to provide an important check upon birds both in summer and in winter. These birds were not only serious dangers during the nesting season, but as they were able to capture small birds on the wing, they were feared at all seasons. Screech Owls were present during the whole year and in sufficient numbers to hunt over the whole territory. Short-eared Owls were found on the bar in winter and contents of pellets that they ejected showed that they had eaten Cardinals, Red-winged Blackbirds, and some small sparrows. Examination of these pellets indicated that less than one per cent of the food of this flock of owls during the time that it was present at this point consisted of birds. Other owls were found infrequently.

A few pairs of Cooper's Hawk nested in the timber and fed their young on chickens and probably other birds. Sharp-shinned Hawks were present in small numbers.

Figure 5. Dried mud at south side of Roundy Lake. Shore birds fed here before the mud dried as much as is shown in the photograph. Photograph taken September 24, 1922, by Dr. C. E. Johnson.

Figure 6. North part of Roundy Lake. Showing willow stumps in water in which Tree Swallows and Prothonotary Warblers nested. Photograph taken June, 1922.

No records of adult birds being killed by storms or bad weather were obtained during this study. High water from long continued and hard rains may have destroyed some nests that were placed too low. Strong winds destroyed some nests but most of them were rebuilt.

Examples were noted of a few dangers that are not included among those listed above. In late August when the woods were filled with spider webs of various sizes there was some danger of young birds becoming entangled in them. A Redstart was seen struggling to free itself from one of these webs on August 30, 1922. A gunshot nearby caused greater exertions and freedom for the bird. A crippled Virginia Rail which had probably hit a nearby telephone wire was found in a pasture on September 10, 1923.

Influence of Culture upon Birds

Favorable. The settlement and development of the land in this vicinity has benefited most birds in several ways. It has been accompanied by a decided increase in the variety and amount of food suitable for many species. The planting of cultivated crops has provided an abundant supply of grain which has been available for a short time between the time of ripening and the time of harvesting. Usually, there was left in the fields some waste grain which a few species of birds hunted out and ate. Insects have been introduced and have developed into a great variety of pests along with the planting and cultivation of crops. These are available for insect-eating birds. Many species of weeds have been introduced which have taken up every available bit of waste ground as well as the cultivated ground when special measures for their destruction have not been used. In addition to the insects for which these plants are hosts they furnish an abundant crop of seeds which is available through the winter for seed-eating birds. There has probably been an increase in the rodent population of this area proportionate to the amount of land that was put into cultivation. Greater numbers of these animals insured a much larger food supply for birds of prey.

Development of the land has made possible a greater variety of situations suitable for home sites for birds. This has made possible a greater variety in the species of birds which might nest in the vicinity and probably a greater number of individuals since a given bit of ground will support a larger population of birds usually if there are several species present than if only one or a few species live there. Clearing of land that was not immediately put into cultivation gave an opportunity for a new growth of sprouts and so gave new possibilities for nest sites. If the land were pastured blue grass

became the dominant plant and so another type of site was available for nesting. Orchard trees, shade trees, and planted trees along roads were spaced differently from those that grew naturally in the region and as a rule they had a different form from the native trees in their natural situations. Some species preferred these trees to the native trees for nest sites. Improvements such as bridges and buildings provide nest sites that are chosen by several species in preference to any that are found in the natural habitat. Making roads through the woods introduced more openings and tended to break down the climaxial character of the environment and by making it more complex made possible the presence of more species and individuals of birds.

The presence of man brought protection to some species of birds. Screech Owls often roosted in deserted buildings during the day. Juncos and other sparrows found excellent protection from the elements and from natural enemies by roosting in the tops of shocks of corn that were left in the fields. The same shocks were sometimes used in the daytime by resting Screech Owls. Human presence was also a benefit in that it caused the removal or decrease in numbers of some of the enemies of birds. Many raptorial birds were killed by hunters and farmers. Foxes, minks, bob-cats, and nearly all species of snakes were killed at every opportunity, so that their menace to bird life was greatly decreased. An increased interest in all birds, which most farmers in this vicinity have acquired, has led them to take special precautions in many instances for the protection and preservation of birds.

Unfavorable. Development of this region has in some ways been detrimental to the bird life of the vicinity. Mowing of hay lands while birds were nesting there has destroyed many nests with eggs or young. Cutting the timber, especially the larger trees of the bottomland, has removed some of the available nest sites of the larger species of birds so that they have gone to other localities to nest. Stock in pastures trample some nests.

The large amount of land that has been put into cultivation has affected the drainage so that most of the surface water runs off the ground rapidly after it falls, causing floods in the creek valleys and so destroying many nests that are placed near the ground. This change in the process or speed of drainage has tended to cause a restriction in the available supply of water for drinking especially during dry seasons when the creeks are nearly dry. This has had some effect upon the local distribution of some species in summer.

Destruction of some species of birds has been increased with human settlement in this area. Two important enemies (cat and dog) were brought in. They kill many birds. The destruction caused by these animals is greater than that of the same number of individuals of predatory animals that are native because the birds have developed no good means of escape from the imported ones. Men destroy many birds for sport and others because of an idea, sometimes mistaken, that they are harmful to agriculture in some way. An increased use of the roads by people in automobiles and the noise which the engines make as well as frequent picnic parties to the woods, the river and the lake frighten some of the more timid species away from the vicinity. Automobiles make hunting more destructive since this area is made more easily accessible by their use.

Influence of Birds upon Culture

Damage. A few pairs of nesting Cooper's Hawks fed their young chiefly upon small chickens which they took from farm yards in the neighborhood. English Sparrows damaged some of the vegetables that were grown in gardens by picking the young green leaves. The small amount of fruit that was grown on the farms within this area was damaged to a slight extent by birds. Catbirds were the chief fruit-eaters but they ate only a small part of the crop. Some small patches of grain that were sown near houses were damaged by English Sparrows which took nearly all the crop before it was harvested. Flocks of Bronzed Grackles in the fall damaged a few grain crops before they were harvested but they obtained only a small part of the grain.

Benefits. The game birds that were killed were used for food although they were hunted chiefly for sport and recreation. When this country was first settled the people were more dependent upon game for food than at present, but now the value of wild birds for food is very small in this vicinity.

Although most of the birds that were residents here fed upon insects or weed seeds, it was noted that in nearly every case the feeding range did not include the cultivated fields. Insect-eating birds fed chiefly upon insects that were found on the native vegetation. Birds that fed on weed seeds fed mostly on the waste ground where the growth of weeds was more dense and the available seed supply was greater than on the cultivated ground. Although these birds, each season, destroyed great quantities of weed seed, they apparently did not act as a check on the growth of weeds in the following season as every bit of available waste ground and all the fields, where

the weeds were not cut or plowed out, was filled with a dense growth of the weeds.

In the same way the birds of this area had little effect upon insect pests of the farm crops. Protective methods of cultivation were necessary to keep the fields and orchards free from insects as well as to keep them free from weeds.

The presence of the birds was necessary, possibly, to help keep in check the native species of plants and insects which without some such check might also have become injurious. The birds cannot be depended upon to keep down those introduced pests which must be contended with in every effort to cultivate plants. The fact that the stomach of a bird shows that it has eaten some injurious weed seed or harmful insect cannot be evidence that that species of bird is actually beneficial unless it is shown that the bird really reduced the damage which the pest was doing to the crop. Careful notes made in this area in the period of this study show that the weed seed-eating birds and insect-eating birds were of little value in destroying the actual pests of the crops that were cultivated. No attempt was made to determine to what extent these birds prevented native plants and insects from becoming serious pests to the crops. The situation is different in the timber. Very little of the timber is suitable for lumber and that which is used is chiefly used for firewood and fence-posts. Insect-eating birds which fed in the woods obtained their food directly from the trees and they probably were important as checks to prevent the increase of insect enemies of the trees.

Most of the Raptores were important as enemies of rodents although it is doubtful whether they had a great deal to do with the number of these rodents that were present. The increase and decrease in the numbers of the various species of rodents appeared to go on independently of their destruction by birds of prey. It was noted that when rabbits and field mice were most abundant, the number of hawks and owls present within the area was larger than when the number of rabbits and rodents was small. Since whole colonies of the rodents would suddenly disappear, it seems probable that their destruction was due to some other cause than that of being eaten by birds; in which case they would surely have decreased in numbers more gradually. It appears, then, that the number of rodents present has more influence in regulating the presence of predatory birds in this area than the number of the birds has in regulating the number of the mammals.

Response to Seasonal Change

Spring. With the beginning of spring weather, which is usually accompanied by the breaking of the ice on the river and the thawing of the ice on the creek and the lake, the early migrating ducks appear. Late in January Mallards and Pintails come. There is little change among the smaller land birds. Small groups of several species wander over several sections of territory on warm days. During cold waves they seek sheltered places and move very little. In February more of the water birds arrive. Herring Gulls, geese and Lesser Scaup Ducks were seen on the river. There are more warm days in this month and consequently there is more activity among the smaller species of birds. In March more species and larger flocks of ducks are found. The Pectoral Sandpiper, Greater Yellow-legs, and Killdeer are the wading birds that arrive in this month. Some of the winter visitant raptorial birds leave in March and other birds come from farther south. Belted Kingfishers become common. The first Phoebes that arrive in March are sometimes unable to find flying insects. Flocks of blackbirds begin to arrive during this month. Field Sparrows and Swamp Sparrows become common and the Ruby-crowned Kinglet arrives. There is some mating activity among the ducks on the lake and the Red-tailed Hawk and the Prairie Horned Lark begin to nest in this month.

During April and the first half of May, most of the summer residents arrive and begin nesting and the transients pass through on their way to the north.

Summer. During the first week in June a few straggling transients, chiefly crippled and aquatic birds, are still present around the lake. Most of the bird activity consists of caring for the young which, in the case of most summer residents, have hatched by this time in those nests which have met with no serious accident. Later in the month another nest is built by those species which nest a second time. Seventy-four species were found in July, nearly all of which nested within this area. Some species which nested there and were not common, were not found in July and a few that were found in July may not have nested within the limits of this area, but all of them probably nested within a few miles of there. On some of the hot days in July most of the birds were quiet and they were found in the shaded ravines where there were small pools of water. Larger birds, such as the Crow, were seen flying over on hot days with their mouths open on account of the heat. After the period of nesting most of the birds are hard to find for a few weeks while they are molting.

In some species the young and old birds gather in small flocks which range over a limited territory in search of food.

Fall. In early fall the bird population of this area is increased by a few species that reach this point by the first of August. The first to arrive are some of the Limicolae. Some species, as the Little Blue Heron, were found during their post-nest season wanderings. In the last part of this month several species of warblers arrive and are found for a few days feeding in the dense growth of vegetation. The largest number of species and individuals, for any fall period, is present in the first two weeks of September. Ducks are found on the lake from the last of August until the middle of November. Most of the insect-eating birds leave by the middle of October and for the next two weeks the smaller transients are chiefly the seed-eating Fringillidae.

Winter. The winter visitants to this area arrive in November and December and for a period in late December and early January there is a minimum of bird activity, when most of the birds present are flocks of seed-eaters which feed in the weed patches and the Raptores which feed on the small mammals. Thirty-four species of birds were found in December, the month with least activity.

Relationships between Species

The relations, that were noted between the species of birds that were recorded in this study, were largely food relations. Some of the birds of prey depended to a large extent upon their success in catching the smaller birds for a sufficient food supply. The sparrows and other small species that fed in thickets near the ground almost always flew hurriedly to thicker cover and became quiet whenever one of the smaller hawks appeared. Feeding shore-birds in flocks became nervous, called, and flew short distances when hawks flew near them. Pellets that were gathered from the roosting ground of a flock of short-eared owls contained remains of three species of small birds, but the number of individuals of birds eaten was very small in proportion to the whole amount of food, which was composed largely of rodents and shrews.

When any raptorial bird was discovered by Crows, the Crows began calling and flying around it and within a few minutes several hundred individuals, in some seasons, would be calling near the bird. If the bird moved the Crows would follow and continue their noise. If the bird remained quiet the Crows would soon tire of their excitement and would gradually scatter. These gatherings of Crows were

more often seen in winter than in summer as more and larger flocks of Crows were present in winter and there were more raptorial birds in winter.

Some discord was frequently noted between different species that nested near each other. Blue Jays chased Robins out of the former's nest tree. Wood Pewees drove intruding Blue Jays from the vicinity of their nests. Blue-gray Gnatcatchers and Ruby-throated Hummingbirds frequently were seen flying at some larger bird that was perched in or near the nest tree of the smaller one. In contrast to this, several instances were noted in two different species nested in the same tree. Blue Jays and Summer Tanagers nested at the same time in the same tree. Orchard Orioles and Yellow Warblers together nested in the same willow tree.

Usually when two or more species nested in the same kind of tree or in the same part of the habitat they chose different types of situations for their nests so that in most cases the kind of surroundings for the nest site was peculiar to each species. In some cases two closely related species chose nest sites that were similar in some ways but there were always some features that made each specifically distinct. For example, the Red-winged Blackbird and the Yellow-headed Blackbird nested in cattail and at about the same height but, within this area, the Yellow-headed Blackbird was limited to those patches of cattail which grew in water while the Red-winged Blackbird, in addition to that type of location, sometimes chose more dry situations and even nested in trees. This variation in the choice of a homesite made possible a much larger bird population since the supply of suitable nest sites would accommodate many more pairs than it would if they were more nearly alike in their choice.

On the feeding ground there was less necessity for insuring a permanent food supply as the adult bird could move to new grounds when the supply was exhausted at the old one. It is impossible for most species to move their nestlings so that some device is necessary to provide for the proper spaciation of the nesting pairs of birds. The capacity of each species to select a nest site of a type peculiar to it provides this device.

After the close of the nesting season, during the season of migration and in the winter groups of several species of birds were often found together and feeding. Sometimes, as in the case of those water birds which feed in flocks, most of the shore birds, the swallows which flew over the water and most of the smaller birds which fed in weed patches, the various species showed very little preference peculiar to

each one in selecting feeding grounds. For other species which gather food singly, as most of the Raptores, or which feed in groups which move through the timber where there are many types of feeding habitat, there is usually some choice in the particular part of the feeding ground which the individuals of each species occupy. The kinglets, creepers, titmice, woodpeckers, sparrows, warblers and wrens in a group of feeding birds each selected a part of the feeding ground peculiar to it and over which it fed without conflicting with birds of other species.

For roosting and for cover it is still less necessary that each species occupy a "niche" than for the other types of major activity. It was found that a particularly desirable thicket was used by many small species of birds as a refuge from enemies and as a roosting place.

It seems likely that in making any sort of study of the associations of birds it is necessary first to take into account the major activities of the species that are concerned. The knowledge of the mere presence of birds of two or more species in the same or a similar habitat is surely not significant in this connection unless the activity of each of those species in that habitat is known.

Succession

In every part of the habitat there was a constant change in the environmental conditions. These changes proceeded at different rates in the various divisions. Within this area the vegetation serves not only as an index to other environmental conditions, but for most of the nesting birds it appeared to be the most important factor in their presence or absence and in their local distribution.

Within the habitat area studied there are two kinds of habitat changes that are of major importance to the bird life of the vicinity. Each has a different cause and each has a different effect upon the birds. First, there are the natural changes, the most important of which are those which depend upon the erosive action of the Missouri River. When a change in the course of the river leaves a saucer lake such as Roundy Lake, a group of the birds which migrate up and down the river, but which do not regularly feed there, stops to feed in the more favorable lake waters. As soon as the aquatic vegetation has had a chance to develop in the lake to an amount sufficient to provide hiding places and nest sites, another group of birds is attracted which although present in smaller numbers, usually, than the first group, is present for a larger portion of the year. If the water of the lake is drained or is dried up too rapidly for a growth of vege-

tation and it leaves a broad belt of mud, still another group of birds is attracted to the ground to feed.

Sometimes the lake stage is omitted and in its place silt and sand are deposited to a level above the usual height of the water. When this happens or when the lake is gradually filled in so that the ground becomes dry, a dense cover of young and rapidly growing trees and other plants soon covers the ground. In their first seasons of growth these plants provide nesting sites for a few species of birds. If these plants are allowed to continue their growth the character of the vegetation is changed within three or four years so that the birds which nested there at first can no longer find suitable locations for their homes and so they are forced to live in another locality.

From this stage several factors control the development of the vegetation on the river floodplain in such a way that the growth goes on at different rates. Therefore a greater variety in available nest sites is produced so that a greater number of species and individuals remains to nest. If this land is allowed to remain in its place the development of the covering of plants continues. As the development proceeds the rate of change becomes slower until it is nearly imperceptible from one season to another. With some of the changes in the character of the vegetation some new species of birds are added to the list of possible residents and at the same time a few species that have nested there are eliminated because they can no longer find suitable home sites. For example, Crows and Warbling Vireos do not usually nest in the bottomlands until the cottonwoods have reached a certain size which requires about fifteen years of rapid growth. The Traill's Flycatcher does not nest after the willows have passed the thicket stage. Some other species, as the Yellow Warbler, nest in trees that are a little larger. In this way the nesting birds are added to or eliminated from the bird population. There is a gradual change in the group of nesting birds which corresponds to the change that takes place in the vegetation and which is caused chiefly by that change in the vegetation.

Natural changes or those changes which are set working by natural causes take place very slowly in other parts of this area so that only a very slight change is noticeable from year to year. The vegetation has reached a stage of climax on the bluff and in most of the creek bottom and so there is very little change in the bird life there that is due to naturally induced changes in the vegetation. A tree may die and furnish opportunity for hole nesting birds to make homes. Other trees are blown over and a small opening is made in

the timber. A new development of the cycle of plant growth on the bluff begins in these small places. In these clearings there is an opportunity for new species of birds to find home sites for a few years.

Predatory animals and other factors cause some changes in the bird life that can be noted when the effect of the changing vegetation has ceased to be the most important cause of succession in birds. These other factors are also at work in the other parts of the area but their effects are overshadowed by the greater effects of the plant changes.

The second great cause of avian succession in this area is the work of man. This work and its relation to birds has been discussed under the head of Relations to Culture. The works of man tend to cause an even greater irregularity in the succession than that which takes place under natural conditions and a more varied and therefore larger bird population can be supported on the ground than was possible under primitive conditions. With a greater utility of waste land and other resources, a point may finally be reached when the effect of man's work in this vicinity will be to eliminate nearly all the bird species.

At this time (1925) the area under discussion probably has a larger bird population than it had when it was entirely in primitive conditions. A few large and conspicuous species are extinct but many more are found now that were probably not present when the country was settled.

Help from all persons who aided in this work is appreciated. Among those who helped are Dr. C. E. Johnson, who suggested that the work be undertaken and who was generous in giving help and suggestions; Mr. C. D. Bunker, who loaned museum materials for collecting specimens during the first part of the work; and Dr. H. H. Lane, who directed the work during the last two years and who helped with the writing of the report. I am also indebted to the Department of Zoology of the University of Kansas for the use of Biological Survey funds and for the loan of materials to be used in field work.

The material in this paper was first written up in 1925 as a portion of a thesis which was submitted to the Department of Zoology and the Faculty of the Graduate School of the University of Kansas in partial fulfillment of the requirements for the degree of Master of Arts. This part of the thesis was rewritten in 1928.

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BIRDS OBSERVED IN THE VICINITY OF SANTIAGO DE CUBA

BY STUART T. DANFORTH

During the summer of 1926 the author spent nine days, from June 29 to July 7, studying birds in the vicinity of Santiago de Cuba. This is the second largest city in Cuba, and is situated in the southeastern part of the island. Very little has been written recently about the birds of this particular part of the Republic, though many visitors from the North spend a short time there, either to visit or in transit to other places. This list may be of interest to ornithologically inclined visitors, as from it they may obtain some idea of what resident birds it is possible to see during a short stay. A few rather unusual records were also obtained during the short time spent in this region. An annotated list of the fifty-four species observed follows.

Least Grebe. *Colymbus dominicus dominicus* Linne. About twenty pairs were breeding at the Laguna del Sitio, a fresh water lake some four miles east of the city. On July 5 eight nests with eggs and a number of adults accompanied by young birds were observed. The nests were floating and anchored to nothing but floating pondweeds (*Naias*), where the water was about eighteen inches deep, and were constructed of the same weeds. Those which were examined closely contained four eggs apiece. On leaving the nests the incubating birds would cover the eggs with pondweeds, but if I waited quietly they would return in half an hour, remove the weeds, and resume incubation. This occurred at noonday, in the broiling sunshine, thus tending to disprove the theory sometimes advanced that grebes let the sun incubate their eggs whenever possible.

West Indian Pied-billed Grebe. *Podilymbus podiceps antillarum* Bangs. About 125 were noted at the Laguna del Sitio on July 3 and 5. Many young birds of various sizes ranging from a quarter to three-quarters grown were seen, and about ten nests with eggs. The nests were floating affairs made of *Naias* and anchored to bits of brush. Some of them were too far out in the lagoon to be examined closely, but on those the incubating adults could be observed. Four nests were examined closely. Three of these had six eggs apiece, old and stained, while the fourth had one fresh white egg. One adult was noted in a grassy slough nearer the city.

Royal Tern. *Sterna maxima* Boddaert. Six were seen in Santiago harbor on June 29.

Cabot's Tern. *Sterna sandvicensis acuflavida* Cabot. Five were seen over the mudflats at the head of the bay on July 3.

Least Tern. *Sternula antillarum* Lesson. Not seen at Santiago, but one was observed from the boat at Punta Negra on June 29.

Red-footed Booby. *Sula sula sula* Linne. Not seen at Santiago, but one was seen from the boat, diving repeatedly half a mile from the shore at Punta Negra on June 29.

Brown Pelican. *Pelecanus occidentalis* Linne. Common in Santiago Harbor.

Yellow-billed Tropic Bird. *Phaethon lepturus catesbyi* Brandt. One was seen at Punta Negra on June 29.

Ruddy Duck. *Erismatura jamaicensis* subsp. Four full plumaged males were noted at the Laguna del Sitio. Unfortunately it was not possible to collect them to determine their subspecific identity.

Snowy Egret. *Egretta thula thula* Molina. One was observed July 5 at the Laguna del Sitio.

Southern Little Blue Heron. *Florida caerula caerulescens* Latham. Not common. A few were seen in the mangroves and at the Laguna del Sitio.

West Indian Green Heron. *Butorides virescens maculatus* Boddaert. Was seen in the mangroves; at the Laguna del Sitio, and along the Rio Rafael Diaz near Hongolosongo.

Cuban Clapper Rail. *Rallus longirostris cubanus* Chapman. Common in the mangroves near the bay.

Cuban King Rail. *Rallus elegans ramsdeni* Riley. One of these rare birds was seen running along the edge of the Laguna del Sitio on July 5.

Florida Gallinule. *Gallinula chloropus* subsp. About 800 were counted at the Laguna del Sitio, including many young of all sizes from newly hatched birds still in the nest to nearly full grown birds. Ten broods of tiny downy young were observed, and several nests with from one to six eggs. Most of the nests were made of sticks and lined with leaves or pondweeds (*Naias*), though some were constructed entirely of Naias. One nest contained four newly hatched young and two eggs on July 5. The young dived into the water when I approached the nest closely, and swam well, but were easily captured to be photographed. The subspecific identity of the Cuban bird is uncertain.

Caribbean Coot. *Fulica caribaea* subsp. About forty adults and many young, including two pairs followed by broods of downy young were observed at the Laguna del Sitio. A nest containing one egg was also discovered. It was made of sticks and was lined with coarse grass. It was a floating affair anchored to a small dead thorny tree

in water eighteen inches deep. I greatly regretted being unable to collect any specimens, as the status of the Coot breeding in Cuba is in doubt.

Black-necked Stilt. *Himantopus mexicanus* Miller. Four pairs were apparently nesting in a salt swamp at the head of Santiago Bay, and a noisy flock of forty, apparently not nesting, frequented the shallow end of the Laguna del Sitio.

Antillean Killdeer. *Oxyechus vociferus rubidus* Riley. One was observed on June 30.

West Indian Jacana. *Jacana spinosa violacea* Cory. About twenty of these pugnacious birds formed a conspicuous feature of the bird life of the Laguna del Sitio.

Cuban Quail. *Colinus cubanensis* Gould. Fairly common in suitable localities.

Cuban Mourning Dove. *Zenaidura macroura macroura* Linne. Abundant. A nest was found near the Laguna del Sitio.

Zenaida Dove. *Zenaida zenaida zenaida* Bonaparte. Not uncommon.

White-winged Dove. *Melopelia asiatica asiatica* Linne. Not uncommon. A few were seen on almost every day's trip.

Cuban Ground Dove. *Chaemepelia passerina insularis* Ridgway. Common. A nest with two eggs was found about three feet from the ground in a small mangrove at the head of the bay on July 3.

Southern Turkey Vulture. *Cathartes aura aura* Linne. Abundant and exceedingly tame.

Black Vulture. *Coragyps urubu urubu* Vieillot. Four vultures were seen flying around near the summit of a high hill above El Cobre which I feel confident were of this species, despite the fact that there is only one previous Cuban record for the species. They were observed closely, and I was already familiar with the species in other places. Their black heads, all black plumage with the exception of white under the wings, and small size were all noted distinctly.

Cuban Sparrow Hawk. *Falco sparveroides* Vigors. Several were seen, about half in the red phase and half in the light phase.

Siju Owl. *Glaucidium siju* d'Orbigny. These little owls, which are active by day, were noted at Serafina and Hongolosongo. At the latter place one was calling to and answering another a short distance away. The call was a loud rather high pitched *tsweep*, a most unowl-like sound which had me baffled for awhile until I saw the bird.

Ani. *Crotaphaga ani* Linne. Common.

Cuban Lizard Cuckoo. *Saurathera merlini* d'Orbigny. Frequently observed in brushy places.

Maynard's Mangrove Cuckoo. *Coccyzus minor maynardi* Ridgway. A flock of five were seen east of the city on July 5.

Yellow-billed Cuckoo. *Coccyzus americanus americanus* Linne. A few were seen.

Eastern Cuba Tody. *Todus multicolor exilis* Barbour and Brooks. Fairly common in the hills west of El Cobre, and one was seen close to Santiago.

Cuban Woodpecker. *Centurus superciliaris superciliaris* Temminck. A few were seen at El Cobre and Hongolosongo.

Cuban Trogon. *Priotelus temnurus temnurus* Temminck. Common in the wooded hills near Hongolosongo and Serafina.

Ricord's Hummingbird. *Ricordia ricordii ricordii* Gervais. A few were seen near Santiago.

Cuban Nighthawk. *Chordeiles minor gundlachii* Lawrence. Common near Santiago.

Gray Kingbird. *Tyrannus curvirostris curvirostris* Hermann. Common at the Laguna del Sitio and at Hongolosongo, but apparently rather scarce in the immediate vicinity of Santiago.

Cuban Petchary. *Tolmarchus caudifasciatus* d'Orbigny. Common at Hongolosongo, but not seen nearer the city.

Bobito. *Myiarchus sagrae sagrae* Gundlach. Seen only in the hills near El Cobre and Hongolosongo.

Cuban Pewee. *Blacicus caribaeus* d'Orbigny. A few seen near Santiago and El Cobre.

Cuban Redwing. *Agelaius humeralis* Vigors. Quite common.

Cuban Oriole. *Icterus hypomelas* Bonaparte. A few were seen, mostly adults accompanied by their young.

Cuban Grackle. *Ptiloxena atroviolacea* d'Orbigny. Quite common, and found in flocks, sometimes in company with the Wedge-tails.

Eastern Cuba Wedge-tail. *Holoquiscalus jamaicensis gundlachii* Cassin. Not seen as frequently as the Grackles, and seen only in company with them.

Orange-faced Grassquit. *Tiaris olivacea olivacea* Linne. Common.

Melodious Grassquit. *Tiaris canora* Gmelin. A few were seen in the hills near El Cobre and Hongolosongo.

Cuban Martin. *Progne cryptoleuca* Baird. Many were nesting in the city of Santiago. One followed the steamer for about half an hour near Punta Negra, in extreme eastern Cuba.

Cuban Cliff Swallow. *Petrochelidon fulva cavicola* Barbour and Brooks. Was found nesting in the caves under the Morro Castle at the entrance to Santiago Harbor. Considerable numbers were also seen at the Laguna del Sitio.

Black-whiskered Vireo. *Vireosylva calidris barbatula* Cabanis. Common.

Blue Honey Creeper. *Cyanerpes cyaneus* Linne. One was seen at Hongolosongo on July 4.

Cuban Golden Warbler. *Dendroica petechia gundlachii* Baird. Common in the mangroves at the head of Santiago Bay.

West Indian Mockingbird. *Mimus polyglottos orpheus* Linne. Abundant.

Eastern Cuba Thrush. *Mimocichla schistacea* Baird. These noisy birds were common in wooded hilly regions near El Cobre, Serafina and Hongolosongo.

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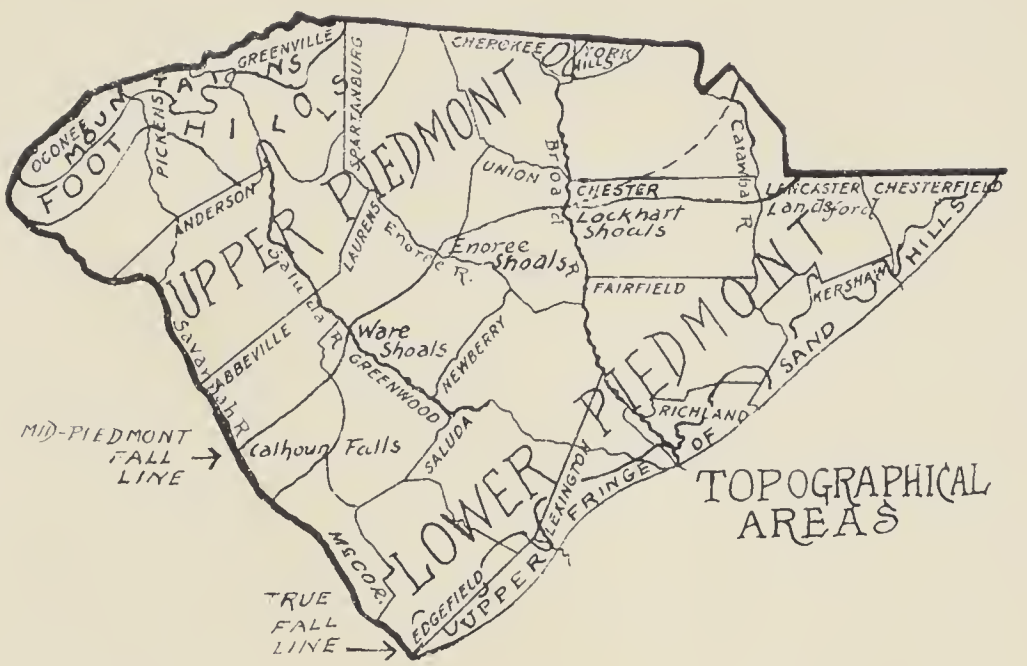
BIRDS OF UPPER SOUTH CAROLINA: A STUDY IN GEOGRAPHICAL DISTRIBUTION

BY A. L. PICKENS

The great Carolinian or Upper Austral (biological) Zone, which includes nearly all of the middle states, is joined to the Atlantic slope portion of the same zone, by a very narrow strip, that passes through the upper part of Georgia and South Carolina. Upper South Carolina, is that part of the state, between the Fall Line and the top of the first ridges of the Appalachians. The Fall Line is a geological boundary, marking the points at which the streams plunge over falls or shoals, in their descent from the hard rocks of the hill country to the softer sediments of the Tertiary formations of the Coast Plain. It runs through the central part of the state from Augusta, past Columbia, to the Yadkin or Peedee River near the North Carolina line. Above this natural boundary occur five distinct topographical belts, each with a preference, beyond that of neighboring zones, for some particular species of pine. First we have the Sand Hills featured by long-leaf pines; next comes the Lower Piedmont, with rocks of a slatey nature, and hills covered with loblolly pines. A secondary fall line occurs at river-bed elevations of about four hundred feet, where the streams drop from the granitic region into the slate regions, and then we find the Upper Piedmont with yellow pines. Still higher, at general eleva-


FOOT HILLS
OCONEE MOUN
PICKENS
GREENVILLE
SPARTANBURG
CHEROKEE
YORK HILLS
UPPER PIEDMONT
ANDERSON
LAURENS
UNION
Broad R.
CHESTER
Catawba R.
LANCASTER
CHESTERFIELD
Landsford
Lockhart Shoals
Enoree R.
Enoree Shoals
FAIRFIELD
KERSHAW
HILLS
Saluda R.
ABBEVILLE
Ware Shoals
GREENWOOD
NEWBERRY
SAND
RICHLAND
MID-PIEDMONT FALL LINE
Calhoun Falls
SALUDA
LOWER PIEDMONT
LEXINGTON
OF
FRINGE
TOPOGRAPHICAL AREAS
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EDGEFIELD
Upper R.
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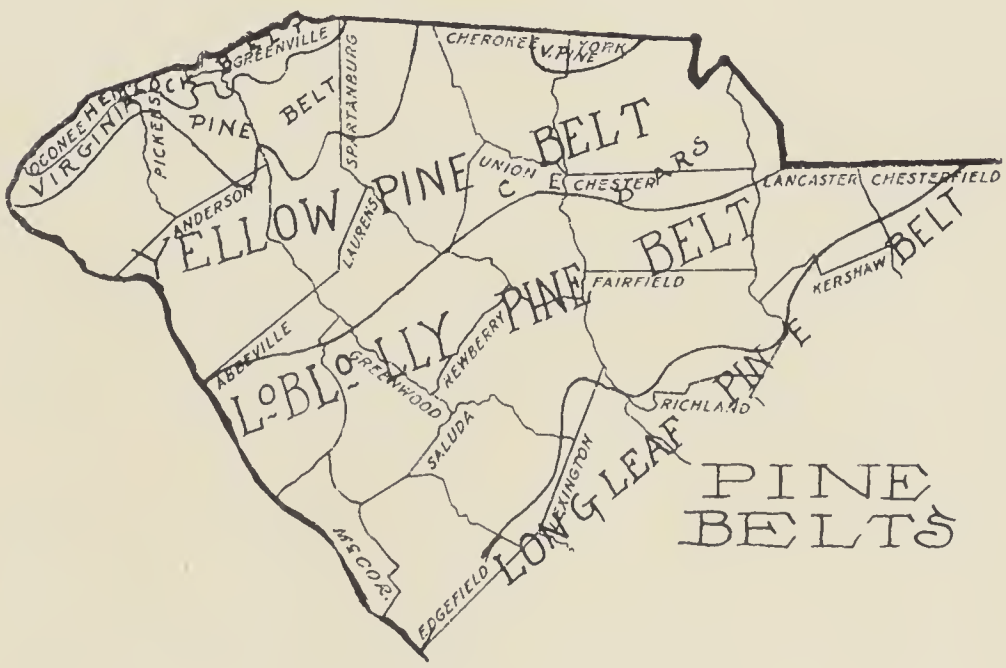
OCONEE
VIRGINIA
PICKENS
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CHEROKEE
YORK
PINE BELT
YELLOW PINE BELT
ANDERSON
LAURENS
UNION
CHESTER
LANCASTER
CHESTERFIELD
FAIRFIELD
KERSHAW
ABBEVILLE
GREENWOOD
NEWBERRY
LOBLOLLY PINE BELT
RICHLAND
SALUDA
LONGLEAF PINE BELTS
LEXINGTON
MCCOR.
EDGEFIELD

tions of 900 to 1000 feet, comes the Foot-hill Belt, with Virginia or Jersey pines more common than elsewhere, and then the hardwood covered mountains with Hemlocks scattered through their ravines.

These topographical belts, and the pine belts too, are traceable into the adjoining states. In warmer Georgia, however, the long-leaf and the loblolly pines are inclined to climb to higher altitudes, above the shelves occupied in South Carolina, and in cooler North Carolina to drop below them.

In round numbers, four hundred vertebrate forms have been catalogued from Upper South Carolina, including 49 fishes, 41 amphibians, 44 reptiles, and 36 mammals. Birds exceed all other vertebrates in approximate proportion of 9 to 7, and all other air-breathing vertebrates by more than 2 to 1. They are of course the most important group, in determining the boundaries of biological zones. The forms recorded for this part of the state are here given.

For some time a few workers in the upper parts of Georgia and South Carolina have been impressed with the number of species, typically of the Lower Austral Zone, that occur within the very shadows of the mountains, though the fourth Provisional Zone Map of the U. S. Biological Survey, shows nearly all of Georgia and South Carolina, above the Fall Line, as being in the Upper Austral Zone. Working with an older list of diagnostic species I decided that the Yellow Pine Belt was barely Carolinian, or Upper Austral, so placing the upper limit of the Lower Austral along the upper limit of the loblolly pine's range. Not thoroughly satisfied, and possibly feeling I was getting too far north, I wrote to Mr. A. H. Howard of the U. S. Biological Survey, and secured a more recent list of forms by which zones are traced. Among birds there were nine characteristic of the Lower Austral, and five of the Upper Austral. All the nine breed in the Sand Hills, and all of the five in the mountains! To show the relation by belts I constructed the following table:

	Sand Hills	Lower Piedmont	Upper Piedmont	Foot-hill Belt	Alpine Belt
Upper Austral forms.....				3	5
Lower Austral forms.....	9	8	1	2	

Another name for the Upper Austral is Carolinian, and I was surprised to find these researches had almost driven the Carolinian claim from South Carolina, only four of her forty-four counties showing the Carolinian, and these only in their higher reaches! Mammalian, reptilian, amphibian, and botanical forms are found that tend to support these conclusions. Lung-breathers carry the battle line of the Lower Austral upward into the highlands, but gill-breathers

coming down the streams make the waters more northerly in character. Following the map that represents this as an Upper Austral area, I have elsewhere, in cataloging the fishes, remarked that they made up a group more related to northern than southern regions, and more consistent with the Carolinian Zone. I have been reminded, however, that fish, influenced by the coolness of mountain streams, are frequently found in the next zone below their proper one. This would of course hold with water-dwelling salamanders, of which we have found several forms well-down into the Piedmont.

To set hard and fast boundaries between the biological zones is, of course, impossible. They apparently shift from time to time, a hot, dry summer favoring the Lower Austral forms, a cool, wet one the Upper forms. The zone notations given above are chiefly from Chapman's Handbook. Counting all available records, the number of species from the Upper Austral Zone are in the lead, even in the Upper Piedmont, but some of these are for single nesting records, and some now appear to have been driven to the mountains by deforestation, whereas most of the recorded Lower Austral forms are constant, and often abundant as to individuals. From the quandary escape is offered in Mr. Howard's diagnostic list, for four Lower Austral and no Upper Austral forms are now found in the higher Piedmont. In the Foot-hills three of the latter appear. It would seem that the Upper Austral, or Carolinian Zone has for its southern boundary in South Carolina, an indefinite limit, roughly following the Foot-hills from Oconee County to higher Spartanburg. In the upper Savannah Valley, it is squeezed against the Transition or Alleghanian Zone in the vicinity of Rabun Mountain. At one place it is apparently a mere wasp-waist of fifteen or twenty miles. This narrow tie is all that holds the Carolinian territory of Iowa, Kansas, southern Ontario and Tennessee to that of New Jersey and Long Island. Slightly to the east of this point, in Pickens and Transylvania Counties, one may, inside of two counties and in a width of forty miles, travel in all the great biological zones between the Gulf of Mexico and the Gulf of Saint Lawrence!

All published records, heretofore, have been vague on the matter of the zone boundaries in this state. Cope, in 1875 and again in 1898, in his "Geographical Distribution," says of the Upper Austral or Carolinian Zone, "It embraces a wide belt in Maryland and Virginia, and all of central North Carolina, and then narrows very much in passing round south of the Allegheny Mountains of Georgia." Loomis, in 1890, in his *Auk* series on the Summer Birds of Pickens County re-

marks, "Three avifaunae meet in the South Carolina highlands—the Louisianian, Carolinian and Alleghanian. The first named is not prominent, the local ornis being characterized by species representative of the Carolinian and Alleghanian, those of the former preponderating. In his Birds of Chester County series published in the Nuttal Bulletin and in the *Auk*, he says in 1891 of Chester County, "The general character of the fauna is Louisianian. The near proximity of the mountains exerts a modifying influence upon it, lessening the force of the Louisianian, however, rather than bringing into marked prominence the Carolinian."

To what extent these pine belts could be used in determining subzones of bird and other life I cannot say, but I have found them of value in South Carolina and Georgia. Certainly the long-leaf pine gives good evidence of the Lower Austral, and the loblolly a slightly toned-down belt of the same, so long as we keep to these latitudes. Further north along the coast, however, they are found to Cape May, beyond their wonted zone. It is possible, though, that southern New Jersey would be Lower Austral but for the wide breaks of the Chesapeake and Delaware. Yellow pines are found from mountains to sand hills, but are more dominant in the Upper Piedmont. The Virginia pines are also found below their belt, but being lovers of thin sterile steeps, they become more conspicuous in the worn fields of the foot hills. From there on the hardwood forests become more pronounced, and Carolinian forms seem to prefer such. The Hemlocks of the Alpine area are safely indicative of Upper Austral.

The foot-hills of the famous Kings Mountain Range, while very low, add an alpine touch in Cherokee and York, with a wide spray of more Jersey pines. Perhaps such an outlying area is to be regarded more in the nature of the patches of such trees found on steep river banks, even in the Loblolly Belt, rather than as part of the Jersey Pine Belt, recognized by lumbermen and dendrologists. This same range disrupts the topography, elevating part of the slate area, normally Lower Piedmont in character, to higher levels. The wide valleys of the Broad and Savannah Rivers, also offers avenues for the mingling of forms from the different belts. This difference between belts is noticeable, not only among summer breeders, but among winter visitors and residents.

I am grateful to Mr. A. H. Howard for aid in tracing the approximate zone boundary, and for various forms of aid from Messrs. Gabriel Cannon, P. M. Jenness, Franklin Sherman, Thomas Smyth, Wm. Hahn, Jr., E. R. Blake, G. E. Hudson, Arthur Wayne, Joseph

Ledbetter, and Miss Mary Baughan of South Carolina; Messrs. T. D. Burleigh, E. R. Greene, and G. A. Dorsey of Georgia; Mr. W. L. McAtee of Virginia; Mr. C. J. Pennock of Pennsylvania; the late Mr. L. M. Loomis of California, the Boston Museum of Natural History, the Charleston Museum, and more than a hundred college and other students.

[The following list contains 220 named forms.—Ed.]

Horned Grebe. *Colymbus auritus.* One taken by Loomis at Chester, March 4, 1880.

Pied-billed Grebe. *Podilymbus podiceps.* Fairly common yearly resident.

Common Loon. *Gavia immer.* Occasional in winter on larger bodies of water.

Red-throated Loon. *Gavia stellata.* I have seen this form only on the coast, but Loomis records a specimen for Chester, February 28, 1885.

Brunnich's Murre. *Uria lomvia lomvia.* Accidental at Anderson. One taken by J. R. Nowell and brother, December 19, 1896. Recorded by Elliott Coues in the *Auk.*

Herring Gull. *Larus argentatus.* Around larger bodies of water occasionally.

Black Tern. *Chlidonias nigra surinamensis.* One, taken on Saluda in upper Piedmont, was mounted by David Smith of Greenville, S. C.

Black Skimmer. *Rynchops nigra.* Accidental at Chester, September 10, 1880. By Loomis.

Yellow-billed Tropic-bird. *Phaethon americanus.* Accidental at Jocassee in the mountains, July 30, 1926. Recorded in the *Auk* by A. T. Wayne and F. Sherman.

Hooded Merganser. *Lophodytes cucullatus.* Winter resident in lower Piedmont.

Mallard. *Anas platyrhynchos.* Common winter resident.

Baldpate. *Mareca americana.* Winter resident in lower Piedmont.

Green-winged Teal. *Nettion carolinense.* Winter resident.

Blue-winged Teal. *Querquedula discors.* Common winter resident.

Shoveller. *Spatula clypeata.* In winter in lower Piedmont.

Pintail. *Dafila acuta tzitzihoa.* One record from Loomis at Chester, March 12, 1883, and recently recorded near Greenville by myself.

Wood Duck. *Aix sponsa.* Resident throughout the year.

Redhead. *Marila americana.* In winter in lower Piedmont.

Lesser Scaup Duck. *Marila affinis.* Winter resident.

Ring-necked Duck. *Marila collaris.* Winter resident.

Buffle-head. *Charitonetta albeola.* In lower Piedmont in winter.

Ruddy Duck. *Erismatura jamaicensis.* Recorded near fall-line by Dr. Thos. Smyth, in the *Auk*, April, 1926, but not taken.

Canada Goose. *Branta canadensis canadensis.* Fairly common in winter.

Whistling Swan. *Cygnus columbianus.* All records from lower Piedmont.

Wood Ibis. *Mycteria americana.* Recorded only near the fall-line.

American Bittern. *Botaurus lentiginosus.* Winter resident.

Least Bittern. *Ixobrychus exilis.* Summer resident and breeder. Mr. Wm. Hahn, Jr., found a nest near Greenwood in May, 1923.

Great Blue Heron. *Ardea herodias herodias.* Found in summer even in the mountains, and in lower Piedmont in winter.

Egret. *Casmerodius egretta.* Recorded by Loomis in lower Piedmont. Not common.

Little Blue Heron. *Florida caerula.* Young white birds are seen in summer to the foot of the mountains. The blue and mixed phases I have found later in the summer below the fall-line.

Little Green Heron. *Butorides viriscens viriscens.* Common in summer.

Black-crowned Night Heron. *Nycticorax nycticorax naevius.* Rather common in spring and autumn, and fairly so during summer.

King Rail. *Rallus elegans.* Summer resident; not very common. Wm. Hahn, Jr., found nests in the lower Piedmont near Greenwood. in 1924 and 1926.

Virginia Rail. *Rallus virginiana.* Winter resident.

Sora. *Porzana carolina.* Migrant.

Yellow Rail. *Corturnicops noveboracensis.* Migrant in lower Piedmont.

Black Rail. *Cresciscus jamaicensis.* One found by Loomis. Chester, September 3, 1887.

Florida Gallinule. *Gallinula chloropus cachinans.* Summer resident.

Coot. *Fulica americana.* Found during migration in both upper and lower Piedmont.

Northern Phalarope. *Lobipes lobatus.* Accidental at Chester, May 17, 1880. (Loomis).

Woodcock. *Rubicola minor.* Yearly resident; not common.

Wilson's Snipe. *Gallinago delicata.* Winter resident; common during migrations.

Pectoral Sandpiper. *Pisobia maculata.* Two recorded for Chester by Loomis, October 10, 1878.

Least Sandpiper. *Pisobia minutilla.* Recorded as migrant by Loomis at Chester.

Greater Yellow-legs. *Totanus melanoleucus.* Seven at Chester, April 21, 1880.

Yellow-legs. *Totanus flavipes.* One recorded, August 8, 1877, by Loomis as Chester.

Solitary Sandpiper. *Tringa solitaria solitaria.* Common migrant in the lower Piedmont. Also found in summer.

Upland Plover. *Bartramia longicauda.* Migrant in lower Piedmont, and perhaps less frequently near the mountains.

Spotted Sandpiper. *Actitis macularia.* Chiefly a spring migrant: less common in the fall; in mountains, about ponds, during summer. I noted it about an artificial lake near Little Rich Mountain in July, 1927.

Golden Plover. *Pluvialis dominica dominica.* One was taken by Loomis, at Chester, September 19, 1877.

Killdeer. *Oxyechus vociferus.* Common throughout the year.

Bob-white. *Colinus virginianus virginianus.* Common yearly resident.

Ruffed Grouse. *Bonasa umbellus umbellus.* Yearly resident in the mountains, where it has been more or less restricted by deforestation of the lower lands.

Wild Turkey. *Meleagris gallopavo silvestris.* Quite extinct in upper South Carolina, except for some possible localities in the mountains.

English Ring-necked Pheasant. *Phasianus colchicus x torquatus.* Introduced.

Passenger Pigeon. *Ectopistes migratorius.* Extinct. Once found in the mountains even in the summer; A. T. Wayne observed two pairs at Caesar's Head in the summer of 1882.

Mourning Dove. *Zenaidura macroura carolinensis.* Common yearly resident.

Turkey Vulture. *Cathartes aura septentrionalis.* Yearly resident; more common in mountains and upper Piedmont.

Black Vulture. *Coragyps urubu.* Yearly resident. More common in lower hills.

Swallow-tailed Kite. *Elanoides forficatus.* Rare, but general in summer.

Marsh Hawk. *Circus hudsonius.* Fairly common in winter in lower Piedmont.

Sharp-shinned Hawk. *Accipiter velox.* Yearly resident.

Cooper's Hawk. *Accipiter cooperi.* Yearly resident, but commoner during the migrations and in winter.

Red-tailed Hawk. *Buteo borealis borealis.* Yearly resident. Common.

Red-shouldered Hawk. *Buteo lineatus lineatus.* Yearly resident. More common during migrations. The Florida variety, *B. l. alleni*, probably occurs in the lower Piedmont, a nest found by Mr. Hahn appearing to be of such a bird.

Broad-winged Hawk. *Buteo platypterus.* Yearly resident. Mr. Hahn reports a nest near Greenwood, April 21, 1926.

Golden Eagle. *Aquila chrysaetes.* Occasional throughout territory, possibly still breeding in the mountains nearby.

Bald Eagle. *Haliaeetus leucocephalus leucocephalus.* Occurs at times.

Duck Hawk. *Falco peregrinus anatum.* Formerly bred in the mountains and may still do so.

Pigeon Hawk. *Falco columbarius columbarius.* Not a common migrant.

Sparrow Hawk. *Cerchneis sparveria sparveria.* Common yearly resident.

Osprey. *Pandion haliaetus carolinensis.* Found along larger streams in summer even into the mountains.

Barn Owl. *Tyto alba pratincola.* Fairly common yearly resident. Chiefly reported from the lower Piedmont.

Long-eared Owl. *Asio otus wilsonianus.* Winter resident.

Short-eared Owl. *Asio flammeus.* Winter resident.

Barred Owl. *Strix varia varia.* Yearly resident. Next to following, most common.

Screech Owl. *Otus asio asio.* Very common throughout the year. The Florida variety, *O. a. floridanus*, occurs along the Savannah into the lower Piedmont, according to Wayne.

Great Horned Owl. *Bubo virginianus virginianus.* Once common, is being driven into the more heavily forested regions of the mountains and coast-plain.

Snowy Owl. *Nyctea nyctea.* Occasional in the winter.

Carolina Paroquet. *Conuropsis carolinensis.* Extinct.

Yellow-billed Cuckoo. *Coccyzus americanus americanus.* Common in summer.

Black-billed Cuckoo. *Coccyzus erythropthalmus.* A migrant which I have noted only in spring, one each in Anderson, Greenville, and Pickens Counties. Loomis records two at Chester. Coues, at Columbia, stated it was rarely seen.

Belted Kingfisher. *Ceryle alcyon.* Throughout year; more common in summer.

Southern Hairy Woodpecker. *Dryobates villosus audubonı.* Common yearly resident. This and the next, both Austroriparian, occur to the summit of the mountains.

Southern Downy Woodpecker. *Dryobates pubescens pubescens.* Common yearly resident.

Red-cockaded Woodpecker. *Dryobates borealis.* Near fall-line. Austroriparian.

Yellow-bellied Sapsucker. *Sphyrapicus varius varius.* Common winter resident.

Pileated Woodpecker. *Phlocotomus pileatus pileatus.* Common yearly resident. Another Austroriparian form occurring to the summit of the mountains.

Red-headed Woodpecker. *Melanerpes erythrocephalus.* Common in summer, and found locally in the winter.

Red-bellied Woodpecker. *Centurus carolinus.* Common in winter in Piedmont; not so often seen in summer, probably retiring to denser forests.

Northern Flicker. *Colaptes auratus luteus.* This form is found in the Piedmont even down to the fall-line, apparently blending in the lower Piedmont with the next following.

Southern Flicker. *Colaptes auratus auratus.* Yearly resident.

Chuck-will's Widow. *Antrostomus carolinensis.* This Austroriparian form is common in summer, to the very foot of, and even into the valleys of the mountains.

Whip-poor-will. *Antrostomus vociferus vociferus.* Once common in summer in the Piedmont, deforestation is apparently pushing it back into the mountains where it breeds, occurring farther down the country as a migrant.

Nighthawk. *Chordeiles virginianus virginianus.* Common summer resident.

[To be continued]

THE WILSON BULLETIN

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EDITORIAL

Late in June the Editor drove by automobile over seven hundred miles of highway in northwestern Iowa. Two observations were made, one concerning the Bobolink, and the other concerning the Red-headed Woodpecker.

During the entire trip only four Bobolinks were seen. Ten years ago through the same territory we would have expected to see upwards of fifty of these birds. Our immediate conclusion is that the marked decrease in numbers of the Bobolink in this part of the country is the result of their slaughter in the south under government permit.

On one part of the drive, covering about 150 miles, our attention was drawn to the number of Red-headed Woodpeckers dead in the road. Seven were casually noted in this one section of driving. These birds were fresh enough to be easily identified without stopping the car. Doubtless a week's traffic would so obliterate the plumage that recognition might be much more difficult. Many of the highways are also dragged as often as once a week. We may assume, perhaps with fair accuracy, that each week discloses a new crop of highway cadavers. A very interesting and valuable mortality study might be made by one who is so situated as to be able to make a census on a given stretch of highway once a week, with fair regularity throughout the summer. To make the record satisfactory all cadavers, of birds at least, should be gathered up: two important ends would be served by this procedure, namely, the reliable identification of the specimens, and the prevention of duplication of count in a succeeding census.

The following short, and possibly incomplete, bibliography on the subject of highway mortality may be of interest to some readers:

Stoner: *Science*, LXI, January 16, 1925. Pp. 56-57.
Dill: *Science*, LXIII, January 15, 1926. Pp.
Baldwin: *Science*, LXIII, April 2, 1926. Pp. 358-359.
Flint: *Science*, LXIII, April 23, 1926. Pp. 426-427.
Neff: *Oologist*, XLIII, April, 1926. Pp. 55-59.
A. H. H.: *Bird-lore*, XXVIII, July-August, 1926. Pp. 314-315.
Blocher: *Oologist*, XLIII, May, 1926. Pp. 66-67.
Birr: *Science*, LXIII, No. 1638, 1926. P. 524.
A. H. H.: *Bird-Lore*, XXIX, No. 5 1927. Pp. 391-392.
Grant: *Fins. Feathers and Fur*, No. 53, 1927. P. 213.

Quite recently there was founded in this country a society to be devoted to the study and propagation of exotic birds in captivity, and their preservation from

extinction. It is called the Avicultural Society of America, and proposes to work along lines similar to the Avicultural Society of England. The Society has already undertaken extensive co-operative work with the different species of the Parrakeet, as described by C. T. Metzger in the July-August *Condor*. If any of our readers are interested in such an organization they may secure information from Mr. Chas. T. Metzger, Secretary, 6312 South Ashland Ave., Chicago, Ill.

Most of our readers will remember that the United States Senate passed on April 18 last, an act known as the "Migratory Bird Conservation Act," or simply as the Norbeck Bill (S. 1271). There is also before Congress another bill commonly known as the Anthony Bill (H. R. 5467), which is essentially the old Marshland Conservation Bill, Public Shooting Grounds Bill, etc., with which everyone is familiar. The Anthony Bill provides for a hunter's license fee, and the shooting of game on the refuges to be established under the bill. The Norbeck Bill eliminates the hunter's license fee and substitutes federal appropriation; eliminates the public shooting grounds scheme and substitutes inviolate sanctuaries for game.

We have never been so sharply opposed to the federal license fee idea as some have been; and yet this principle seems to be closely linked with the shooting grounds principle. For, if the hunter pays the government for a license to shoot game, he may, with some justification, expect that money to be applied to the maintenance of shooting grounds stocked with game. On the other hand, under the Norbeck Bill, the government accepts none of the shooter's money, and is, therefore, under no obligation to provide sport, directly. Under this plan the government's sole purpose is to preserve the game—to prevent or retard extermination; at the same time, of course, indirectly preserving the sport of hunting. It seems to us that this plan is infinitely the better one.

We therefore favor the Norbeck Bill, and believe that every true conservationist and friend of wild life should make some effort to secure its passage in the House of Representatives this fall, without amendment or alteration.

Through inadvertence the legends for the figures in Mr. Sutton's paper on a collection of hawks from Pennsylvania, which was published in the last (June) issue of the Bulletin, were omitted. All of the figures showed the tails of Sharp-shinned Hawks, the first eight figures being of males and the last three being of females. We give below the complete legends for all the figures, as shown in the three cuts:

Fig. 1. An individual probably more than two years old. Note that rectrices are of the same length, that barring of outer rectrices is the same as that of the other rectrices, and that the tips of all rectrices are similar in shape.

Fig. 2. An individual probably in the first breeding plumage. Note that there are more bars on the outer than on other rectrices, and that barring is bilaterally asymmetrical.

Fig. 3. An individual probably in first breeding plumage. Note that there are more bars on the outer than on the other rectrices; that barring is bilaterally asymmetrical; and that the outer rectrices are noticeably longer than others, and with tips of different shape.

Fig. 4. An individual probably in first breeding plumage. Note the unusual number and shape of bars on outer rectrices.

Fig. 5. An individual probably in first breeding plumage. Note unusual bilateral asymmetry of barring, and difference in number of bars on inner and outer rectrices.

Fig. 6. A juvenal. Note large number of bars on outer rectrices, and difference in position of distal bar in other rectrices.

Fig. 7. A juvenal. Note tendency of tip toward rounded pattern of *A. cooperi.*

Fig. 8. A juvenal. Note bilaterally asymmetrical and somewhat abortive barring. Note also pointed character of tip of outer rectrix.

Fig. 9. A juvenal. Note asymmetrical barring, particularly of rectrix adjacent to the outer; note also the tendency of tip toward rounded pattern of *A. cooperi.*

Fig. 10. An individual probably in first breeding plumage. Note bilateral asymmetry of barring, and tendency of tip toward pattern of *A. cooperi.*

Fig. 11. An individual probably in first breeding plumage. Note tendency of tip toward rounded pattern of *A. cooperi.*

Without special legislative action a precedent has become pretty well established of holding our annual meeting in conjunction with the American Association for the Advancement of Science when the latter meets in the territory of the W. O. C. This custom has simply grown, and there are several reasons for it.

In the first place such a connection gave us a great deal of moral support in the past years when we especially needed it; and we may not be wholly past that period yet. We find that such an arrangement is very satisfactory to teachers, of whom there are a great many in our membership. It enables them to attend their professional meeting and the W. O. C. meeting on one journey. We also find that our meetings are always sure of a nucleus of attendance from this source.

When we meet with the A. A. A. S. we are always sure of the reduced railroad fare of one and a half for the round trip. This means a great deal to many who attend the meetings, and without it our attendance would certainly suffer to some extent. By going with the A. A. A. S. we are taken into new localities where we may have few or no members, and where we could not otherwise expect an invitation. Where we have no local committee of our own the A. A. A. S. makes all arrangements for a meeting place, and prints our program.

These are a few of the more cogent reasons for continuing our relations with the A. A. A. S. In accordance with this policy we should be due to meet in Des Moines in 1929; Cleveland in 1930; New Orleans in 1931; and Chicago in 1932. An invitation to meet in Des Moines in 1929 was received at the Nashville meeting. We understand also that the Chicago Academy of Sciences has extended an invitation to hold our 1932 meeting there. They have been our excellent hosts on two previous occasions. We should be ready to accept this

invitation unless it should seem more advisable to hold our meeting on the South Side, at the University, where the general meetings will likely be held.

One of our greatest difficulties in the past has been too much delay in completing the meeting arrangements. We are glad, therefore, to note a tendency on the part of prospective hosts to extend an invitation a couple of years in advance. In fact, Nashville repeated the invitation annually for three years in advance of the first meeting held there. When we meet with the A. A. A. S. a local invitation is not necessary, but is appreciated nevertheless. In recent years our meetings have been well attended, and our programs have been excellent, amply repaying those in attendance. We also believe that the meetings stimulate local interest in our field of scientific work. Our territory is extensive, and it is to our advantage to place the meetings in all parts of it.

THE ANNUAL MEETING AT ANN ARBOR

The dates of the annual meeting have been set for the two days following Thanksgiving Day, namely, November 30 and December 1, at Ann Arbor, Michigan. The sessions will be held in the new building of the Museum of Zoology of the University of Michigan.

It is expected that the two days will be devoted to the formal programs, and if any field work is done, it will probably be on December 2. Considerable time will be desired by many of those in attendance for an inspection of the magnificent new Museum Building in which our meetings will be held.

In June of the present year the University of Michigan completed and opened a new and large building for the Museum of Zoology. This building is undoubtedly one of the finest in the country for museum purposes. The W. O. C. may consider it a real privilege and honor to be one of the first among the scientific societies to hold a meeting here. Much of the credit for the new Museum belongs to Dr. Alexander G. Ruthven, Director of the Museum, and also recently made Dean of Administration of the University.

There are several reasons for believing that the Ann Arbor meeting will be unusually well attended. In the first place we have forty-six members in Michigan, and we expect them all to attend. Ann Arbor is easily reached from points in Pennsylvania, Ohio, Indiana, and Illinois, and we expect a little better than the usual attendance from these states. There will undoubtedly be some representation from the south and from west of the Mississippi River. In addition, the Inland Bird Banding Association will hold its annual meeting at the same time. So we confidently believe that our next meeting will have a larger attendance than any previous one. The officers will soon be at work on the program, and we urge our members to make an early report to the Secretary concerning any contribution to the program.

GENERAL NOTES

Conducted by M. H. Swenk

The Golden Eagle in Indiana.—From time to time eagles are reported as having been killed in various parts of Indiana, but in most instances verification is lacking even when inquiry is made to establish identification. The Golden Eagle (*Aquila chrysaetos*) is much rarer than the Bald Eagle (*Haliaeetus leucocephalus leucocephalus*) throughout our region. I now record two verified reports of the Golden Eagle. Dr. Earl Brooks at Noblesville, Indiana, had a bird of this species brought to him for identification on November 30, 1926, and on December 28, 1927, an immature Golden Eagle was shot in Brown County, about fifty miles south of Indianapolis, and was first taken to Edinburg and then brought to Indianapolis, where proper identification was made. The bird was mounted and photographed, and is now in the high school building at Edinburg. It had a wide spread of more than six feet and had a band of dirty white about five inches in width across the entire upper part of the tail.—S. E. Perkins III. *Indianapolis, Ind.*

How Did This Happen?—A pair of Phoebes (*Sayornis phoebe*), nesting on the cross-bracing of the ceiling joist of the garage, just over the entrance where the cars were being run in and out every few minutes, hatched a Cowbird (*Molothrus ater ater*). This youngster quickly tired of the insect diet given by his foster parents, and shortly after leaving the nest began feeding on seeds in the traps, becoming, finally, a nuisance as he entered them several times daily.

After several days of this we took him "for a ride", well covered to prevent his seeing, and liberated him about a mile from home, only to find him again the next morning feeding contentedly in one of the traps. Another ride of two miles had the same results, and only after taking him out some several miles, and turning him loose with a flock of his own kind, did we get rid of him.

How did this recently born bird, fostered by other than his own kind, never before off the home lot, find his way back so quickly and all by himself, with no guides?—Edward A. Everett, *Waseca, Minn.*

A Note on the Food of Young Great Horned Owls—There recently has come to my attention an interesting study of the food of young Great Horned Owls (*Bubo virginianus virginianus*) made at Mont Alto, Franklin County, Pennsylvania, by Mr. Leonard A. Prichard of the Mont Alto State Forestry School.

Mr. Prichard examined the nest daily from March 11 to April 11, 1927, and, as the following table shows, food of some sort was found on virtually every trip. Two young birds were in the nest. Examination was made in the morning, presumably after most of the night-time feeding was over, so it may properly be inferred that many mice, shrews, chipmunks, and small birds were devoured so completely that no remains were evident. No pellets were examined. The results of these examinations follow:

March 11, adult Cottontail Rabbit remains; March 12, same; March 13, same; March 14, same; March 15, nest empty; March 16, same; March 17, immature Cottontail Rabbit remains; March 18, Flicker; March 19, small bird, species uncertain; March 20, adult Cottontail Rabbit; March 21, adult Cottontail Rabbit, Robin (headless), and Slate-colored Junco; March 22, small bird, species uncertain; March 23, adult Cottontail Rabbit; March 24, same; March 25, nest empty; March 26, adult Cottontail Rabbit remains; March 27, same;

March 28, nest empty; March 29, adult Cottontail Rabbit remains; March 30, nest empty; March 31, adult Cottontail Rabbit; April 1, same; April 2, same; April 3, adult Cottontail Rabbit and Robin; April 4, nest empty; April 5, Robin and Flicker; April 6, Robin; April 7, adult Cottontail Rabbit; April 8, nest empty; April 9, adult Skunk; April 10, nest empty; and April 11, Robin.

It is evident that Cottontail Rabbits form a large portion of the food of the young birds prior to the warm days of early April. With the return of spring, however, birds at once become a prominent item in the bill-of-fare. The Skunk found on April 9 is of interest since it shows that the young birds, as well as the adults, eat this mammal occasionally.

From the standpoint of the farmer and orchardist, the rabbit-killing propensities of this predator are laudable; the sportsman, however, will regard the owl as an undesirable killer of birds and game.—George Miksch Sutton. *Game Commission, Harrisburg, Pa.*

The Cliff Swallow in Clayton County, Iowa.—Some decades ago the Cliff Swallow (*Petrochelidon lunifrons lunifrons*) was a common breeder here, and old-timers tell of the barns being lined with nests. In late years nesting records have been few and far between. On June 15, 1927, Miss Althea R. Sherman and the writer visited the largest breeding colony found here in years. The nests were built on the corn-crib on the farm of Mr. Albert O. Berns, near National, Iowa. Twenty-five were on the east side of the building and two on the opposite side. Three were double, but lack of room cannot be considered as a cause. Seven nests were not completed, ranging from a few smears of mud to nests that were half finished. Building was reported to have commenced on May 19. Several nests were being used by English Sparrows, and some of the Cliff Swallows were reported to have left the vicinity.—Oscar P. Allert, *McGregor, Iowa.*

A Possible Relationship Between Bell's Vireo and the Cowbird.—While on a bird study trip with a class on June 23, 1927, we were attracted by the notes of Bell's Vireo (*Vireo belli belli*), sung in the trees and bushes along a small ravine at the northwest edge of Stillwater. Upon following these birds (a pair) we found ten nests, all constructed in the same manner and of much the same material. All were located within one hundred yards of the first one found. One nest had a Cowbird egg only; one had a vireo egg and a Cowbird egg; one had a vireo egg; another had two dead vireos (young) and one vireo egg that had not hatched; the others were empty.

From all appearances the nests were all built that season. One nest was so high in a slender bush that we could not see into it.

The incident suggests to me the possibility that Bell's Vireo leaves its nest when bothered by the Cowbird, moves over to a new site and builds a new nest. There were only the two vireos in the ravine.—George A. Moore. *Stillwater, Okla.*

Regarding a Late Florida Record of the Flamingo.—In the *Auk*, XLV, p. 201, April, 1928, Mr. H. L. Stoddard records seeing a Flamingo on September 24, 1927, on the Gulf Coast of Florida. Late records of this bird in Florida are worthy of note, but, without detracting from Mr. Stoddard's efforts, I think it is only right to advance the theory that this bird is evidently the one that escaped from the preserve of Mr. Edward Bok, at Mountain Lake Park, Lake Wales, Florida, in late February or early March of 1927.

Soon after it got away, Mrs. Bok wrote me, asking if I had heard anything from it, and if possible to have it returned to their sanctuary. Of the other caged birds that escaped in this section during the hurricane of 1926, two were later seen, and one was captured over six months later.

It would be natural for the Bok bird to work south with the other water birds during the early fall; and, having been in confinement for some time previously, it naturally would not migrate southward to Cuba or the Bahamas in one flight. The light color of the plumage, as noted by Mr. Stoddard, and the nearness of approach allowed by the bird, also indicates it to be the Bok or some other escaped caged bird.—Harold H. Bailey, *Miami, Fla.*

The European Starling Nesting at Nashville, Tennessee—In the Wilson Bulletin for September, 1925, I recorded the European Starling (*Sturnus vulgaris*) as breeding at Bristol and at Knoxville, Tennessee, during May, 1925. About the first of June, 1927, Messrs. G. R. Mayfield and Vernon Sharp observed a pair in a pasture at Woodbury, forty miles southeast of Nashville, this date being reasonable evidence of their breeding. On March 24, 1928, in passing the same place, I observed two pairs going in and out of old Flicker holes in a dead tree, and presumed that they were making ready to nest.

On April 27, 1928, at Nashville, I observed several Starlings feeding in a pasture with Grackles, Meadowlarks and Robins. Realizing that this date meant nearby nests, I returned the next day to "sit it out" with them, so as to locate their breeding place. I did not have long to wait, for soon one of them made off in a low straight flight and dived into an old Flicker's hole in a telephone pole some forty feet from the ground. Within a half hour I located the nests of the other two pairs, also in old woodpecker holes in telephone poles, nine and twenty feet up, respectively.

Ascending the poles I enlarged the openings with a chisel and in the first nest found six young about ten days old, in the second were five young a week old and in the third were five young about five days old. Later in the day, I met Prof. J. M. Shaver who told me that he had just observed Starlings carrying food to young in three nests at another locality, some distance from where I had found mine.

Migrating Starlings were particularly abundant here this year, from January to the latter part of March; so abundant in fact that I felt sure that a number would remain to breed.—Albert F. Ganier, *Nashville, Tenn.*

Banding Robins in Florida.—The Banding of Robins was carried on around my place at Pass-a-Grille, Florida, during the week ending March 5, 1928, when a total of sixty-five Robins had ben banded. I have measured some of the wings, and most of them appear to be northern birds. Today one female measured had a wing 120 mm. long, which I believe, together with the paleness of the bird, indicates a Southern Robin. Never before in my Florida experience of six seasons have there been so many Robins as this past winter. In April I made some cross sections of the Robin flocks, which covered a territory two and a half miles long on this island, and placed the number at 11,000 and with them about 4,000 Myrtle Warblers. The movement northward was apparent for some weeks prior to March 5, by which date onlyy stragglers were lingering. They swarm where any fresh water is available in this region of salt water.—Wm. G. Fargo, *Jackkson, Mich.*

An Unusual Flight of Geese—It may be common in some parts of the country for immense flocks of geese to pass by on migrations—the writers cannot be positive of that—but it is very uncommon in Iowa, Nebraska, or the Middle West for six or seven thousand geese to pass over in a few hours.

Such was the experience of the writers on March 14, 1928, between the hours of 7 A. M. and 1 P. M., in South Dakota across the Big Sioux River west of Sioux City, Iowa. It seemed to be one continuous procession of flocks going northward, flying high or low, but never stopping on the partly ice-covered lakes of the region.

Four species of geese were noted: White-fronted Goose, 2; Blue Goose, 3805; Snow Goose, 668; Canada Goose, 2386; and unidentified geese, 316 indi-

Flocks of Blue Geese on March 18, 1928

viduals. The total number of all species was 7177. Flocks varied in size from a few to over a thousand. Snow Geese were never seen in flocks by themselves but were scattered in flocks of other species. The two White-fronted Geese were in a large flock of Canada Geese with a few Snow Geese included.

Flocks could be heard long before coming into sight. It was noteworthy that the Canada Geese flapped their wings much slower than other species, and also appeared to maintain their flock formations better.

Never, within the knowledge of bird students of the Sioux City locality, has there been as many geese seen in one day and the big, unanswered question is, what was the reason for such a large number at that time.—WALTER M. ROSEN and WALTER W. BENNETT, *Sioux City, Iowa.*

Increase of Blue Geese in the Missouri Valley.—On March 18, 1928, I had the pleasure of being in the field with Mr. Bennett and Mr. Youngworth, on the Missouri River bottoms, about twenty miles south of Sioux City. The trip was taken especially to see the geese, which had been reported to us. The geese were too numerous to count, or even to estimate with very great accuracy. But the writer put down the following figures for the Blue Goose: 1500, 250, 500, 4000, 300, 4000; and the following figures for the Snow Goose: 6, 100, 40, 100. These figures refer to birds in the air, except the two counts of 4000 for the Blue Goose, and the two of 100 for the Snow Goose. Those in flight were in many flocks of varying size, some of which undoubtedly contained one or two

hundred birds. In both cases the 4000 Blue Geese were flocks at rest in a shallow slough or mud flat. Among these were Snow Geese, estimated at 100 in each case. These birds were simply standing at ease. There was more or less commotion in places from time to time, and in the second large resting group, geese were constantly arriving in small flocks from the direction of the first large flock; when we first came upon the second flock it contained at least 2000, possibly 3000, geese, and hence was in addition to the first large flock of 4000. No Canada Geese or White-fronted Geese were seen among these resting flocks, nor did we see any Canada Geese flying with the Blue Geese; but the Snow Geese and Blue Geese were always intermingled, the latter far outnumbering the former.

On the way home, toward evening, we saw a great flock coming from the direction of the slough, and saw them alight in a stubble corn field, where they began to feed, apparently on stray kernels of corn. Flocks continued to come in and alight, making a column of geese numbering, perhaps, 1500. The column proceded through the field, at times approaching within a hundred yards of the highway, where twenty-five or thirty automobiles were parked to enable the occupants to view the unusual sight. These birds are not included in the figures, because we assumed that they came from the flocks already counted.

I have never before seen or heard of such numbers of Blue Geese migrating through this part of the country. It is probably the result of adequate protection in the winter quarters in the south together with spring protection. Their far north breeding ground renders them practically immune during that season. I have not heard of any corresponding increase in the number of Canada Geese.—T. C. Stephens, *Sioux City, Iowa.*

Actions of a Young Wilson's Plover.—On June 26, 1927, I visited a colony of Least Terns which were nesting on a sand-bar close to the shore on the Indian River, right in the city of Titusville, Brevard County, Florida. While looking for types of Least Tern eggs new to me, I caught sight of a fleeting, small object near to the edge of the water, and, suspecting it to be a young Least Tern, I went to the spot where it was last seen. Here, crouched upon the ground among shells and debris, was a young Wilson's Plover about five days old. It lay with its head and neck lying on the ground, and as I stooped to pick it up it dashed away with remarkable speed. I gave chase, and when close upon it it dodged between my legs. This was repeated a number of times before I was able to catch the nimble little fellow. When captured it cried loudly, and struggled to escape. As I was chasing the young the parents flew toward the spot with sharp cries, and alighted within a few feet of me, uttering their plaintive cries while they dragged their wings along the ground, with the feathers of their backs raised.

It was such a splendid opportunity to secure good poses at close range that I decided to go for my camera in the car a few hundred feet away, so I put the young plover under a shell of a Horse-shoe or King Crab, placing wet sand around the edges to keep it from escaping. Returning shortly, I found the young lying quietly beneath the shell. It commenced to cry out as I held it, thus attracting the parents once more, but this time they did not offer anything near the previous chances to take good pictures, so I gave it up and endeavored to get one of the young. But every time I got a focus it would dive off, and right after it I went. Finally, it made its escape to the water, running out as

far as it could and then swimming five or six feet until it reached a submerged log. It lay within a few inches of the log, with its neck and head resting flat upon the surface, in the shadow. A more effective concealment could not have been found. I crept up easily to take a picture, but, sensing its detection, it swam off in a wide circle, then made rapid strokes for shore. While I was maneuvering with the Graflex it gained the shore and when I looked around it was nowhere in sight. I never saw it again.

The young of the Least Terns that were old enough to leave the nests were found hiding under the small green weeds, on the sand-bar, which afforded them shade and concealment.—Donald J. Nicholson, *Orlando, Fla.*

Some New Bird Records for North Dakota.— Trumpeter Swan (*Olor buccinator*).—On April 25, 1928, a pair of Trumpeter Swans were seen on Slades Lake, a few miles southeast of Dawson, North Dakota, by Lee Pettibone. These swans were in company with a flock of 125 Whistling Swans, but kept off to themselves. Their large size, in comparison with the Whistling Swan, was very noticeable. The difference in their call notes was also observed.. Mr. Pettibone is an old and well known bird student, and his observations can be relied upon. Trumpeter Swans are now so scarce that any note of them is of sufficient importance to record.

Little Blue Heron (*Florida caerulea*).—The North Dakota Historical Society now has a mounted specimen of an immature Little Blue Heron, which was taken near Sims, North Dakota, about forty miles west of Bismarck, in the fall of 1914. The bird was taken by Mr. August Timmerman of Mandan, North Dakota, and was thought to be a White Egret. I do not believe that there is a published record of this species for the state.

White Gryfalcon (*Falco islandus*).—While visiting the taxidermist shop of J. D. Allen of Mandan, North Dakota, I was attracted by a large white hawk. Upon closer examination the bird proved to be a White Gyrfalcon. Mr. Allen stated that the bird had been sent and later sold to him by Zepphon M. Smith of Buffalo, North Dakota. By correspondence with Mr. Smith, I found that the bird had been taken at his farm six miles northeast of Buffalo, on or about the first of December, 1922. Noticing his Belgium pigeons very much excited over something, he went outside to investigate. He found the gryfalcon making repeated dashes to catch them. It was not at all shy and he had no difficulty in shooting it. Unfortunately the sex of the bird was not noted, but judging from its size and coloration it is probably a young female. The mounted specimen is now preserved in the collection of the North Dakota State Historical Society. As far as I am aware this is the first record for the state.

Brewer's Sparrow (*Spizella breweri*).—On May 28, 1928, while on a visit to the Bad Lands about eighteen miles south of Marmarth, North Dakota, I was attracted by a small sparrow singing from the sage brush. It was a new song to me, so after some difficulty, due to the approaching darkness, I was able to secure a specimen. Upon examination it proved to be a Brewer's Sparrow. On the following day I saw and heard several of these birds a few miles west of Marmarth. As far as I am aware this species is not given in any of the state lists.

Blue-headed Vireo (*Lanivireo solitarius solitarius*).—On May 24, 1927, the writer secured a fine male specimen of the Blue-headed Vireo at Bismarck, North

Dakota. As this species is rare in the extreme eastern part of the state, and none have been reported for the central west portion, this capture seems to be worth recording. The specimen is now in the collection of the North Dakota State Historical Society at Bismarck.—Russell Reid, *North Dakota State Historical Society, Bismarck, N. Dak.*

Ring-necked Pheasant vs. Bull Snake.—Recently, while passing the farm of John Welke, located eight miles southeast of Redfield, I saw a female Ring-necked Pheasant (*Phasianus torquatus*) giving battle over its nest with a three-foot Bull Snake (*Pituophis sayi*). The male pheasant was near by, watching the conflict but not participating in it. The hen pheasant would strikek at the snake, and then the snake would strike back at the pheasant. After watching this battle for a time, I approached to get closer to the contestants, when both of the pheasants flew away. I then examined the Bull Snake, and found it to be very weak. I think the pheasant would have had no trouble in eventually killing it. I finished killing the snakek before I left. On other occasions I have witnessed other fights between Ring-necked Pheasants and different kinds of birds and animals.—Claude McCurdy. *Redfield, S. D.*

A Brown Thrasher Feeds a Snake to Its Young.—On the afternoon of May 24, 1928, from my window I saw a Brown Thrasher with a snake ten to twelve inches long in its beak. The snake was very much alive, and was twisting about trying to escape.. The thrasher held on to it, beating it against the ground, and then striking it with its beak, until the snake ceased to struggle. A young bird was close by, watching and begging for food. After the snake was apparently dead the thrasher flew with it to a bare spot of ground a few feet farther from the window, where there were small stones, and beat the snake against these. The young bird followed, eager for a bite, and was fed several bits. Then for a moment both birds appeared to be pulling on the snake. The parent let go and the young bird began swallowing the remainder of the snake, a piece five or six inches long. It was hard work, especially the last inch, which protruded from its mouth for several minutes, but that also finally disappeared and the young bird once more started tagging its parent.—Beryl T. Mounts, *Macon, Ga.*

English Sparrows Nesting in the Homes of Cliff Swallows.—In the March number of the Wilson Bulletin (p. 50), Dr. F. L. R. and Mary Roberts mentioned the Cliff Swallows (*Petrochelidon lunifrons lunifrons*) nesting along a gorge of the Big Sioux River, near Dell Rapids, South Dakota. A party from this institution visited the colony in the hope of securing motion pictures of the nesting birds, but it was found that most of the nests were inaccessible. The site referred to by Dr. Roberts as being accessible for photographs was not being used, and the old nests were occupied by the English Sparrows. Many sparrows were seen entering with nesting material.—Alfred M. Bailey, *Chicago Academy of Sciences, Chicago, Ill.*

[Editor's Note.—Following the receipt of the preceding note from Mr. Bailey, the Editor communicated with Dr. Roberts and both made a trip to the "Dells" in South Dakota on July 14-15. We found conditions just as described by Mr. Bailey, although we estimated that about 200 Cliff Swallows were flying over the river. An attempt was made to count the nests occupied by the swallows; by using a boat on the river we counted well over a hundred nests. Some nests were being used by English Sparrows, but we could not ascertain whether the swallows had abandoned them or had been driven out.—T. C. S.]

BIRD BANDING NEWS

Conducted by W. I. Lyon

TRAPS FOR BIRD BANDING

BY W. I. LYON

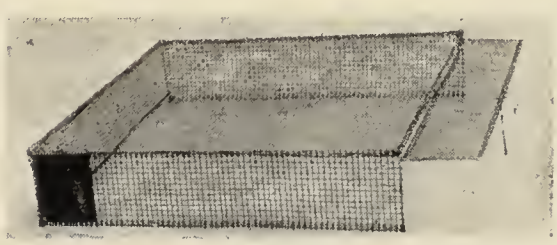
The trapping of birds and animals, without injuring them, has been a hobby of the writer since early boyhood. In 1912, when I received some vague information about bird banding, I trapped about twenty-five Bronzed Grackles and placed pigeon bands on their legs.

The next year I joined the American Bird Banding Asscciation, but there were no available bands so we trapped another twenty-five Bronzed Grackles and banded them with colored celluloid rings.

When the first bands arrived in 1915, the instructions were to band only the nestlings, but the temptation was too great to wait until the nesting season and a few adults were trapped and banded. A suggestion was made to the Association that many adults could be trapped and banded; although a favorable answer was not received, we continued to trap and band adult birds. So it can be imagined how we felt when Mr. S. Prentiss Baldwin's message on systematic trapping arrived. It was like being released from bondage, and the making of traps was started at once.

When Prof. W. B. Barrows came to Waukegan, after the meeting of the American Ornithologists Union in 1922, to inspect the traps, he wished to buy some for the Michigan State College and in that way we were forced to make traps for sale. They still are for sale to those who have not the convenience to make them, but all bird banders are at full liberty to copy any of our traps for bird banding at any time. We hope to give enough measurements in the following article so that anyone can make his own traps; and we hope some one will be ingenious enough to show us how to make a better trap.

There is a way to trap any bird if one will study its foods and habits, but the degree of success may be limited.

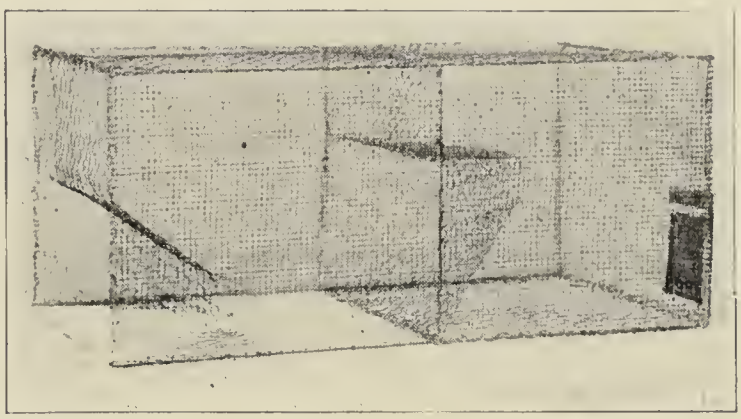


Begin the easiest way, trap only at convenient times. Most anyone can make a flat box-like trap similar to the illustration and raise one side with a stick as a prop and run the string to your window. Keep the ground underneath the trap always baited so when you are not around it becomes a permanent feeding station and the birds become accustomed to it, and eventually you will catch them. You will be surprised just what one small trap will catch with a little persistence, even if only worked at odd times. You can make the size or the shape to fit your window ledge, up in the tree, or on the ground, but the following size for on the ground is found very convenient.

Your material should be what is known as hardware cloth, No. 2 mesh, that is two and one-half meshes to the inch. No. 3 mesh may be used if desired.

Get the cloth three feet wide and six feet long, be sure they cut it square. Take one square, three feet each way, and fold over a double turn like a hem, make this hem one-half inch, this will stiffen the outside edge and do away with the sharp points. If you can find a No. 8 or No. 10 wire it should be placed in the edge where you expect to make the door. Cut the other three-foot piece into four nine-inch strips and fold double one-half inch hem all the way around the edges. In one of these make a door which should slide up and down. The opening should not be very large. In most of our traps we make it 5x5 inches. Then if you have to reach in it is just a convenient size for your arm, not leaving any extra space for the bird to escape. When your trap is made it is always best to paint it with some very thin paint. Any neutral color will do.

The next step is to make a carrying cage about 6x6x16 inches with a door 5x5 inches that slides up and down, so this door may be put against the door of the trap and the birds driven into the carrying cage for convenience in handling.

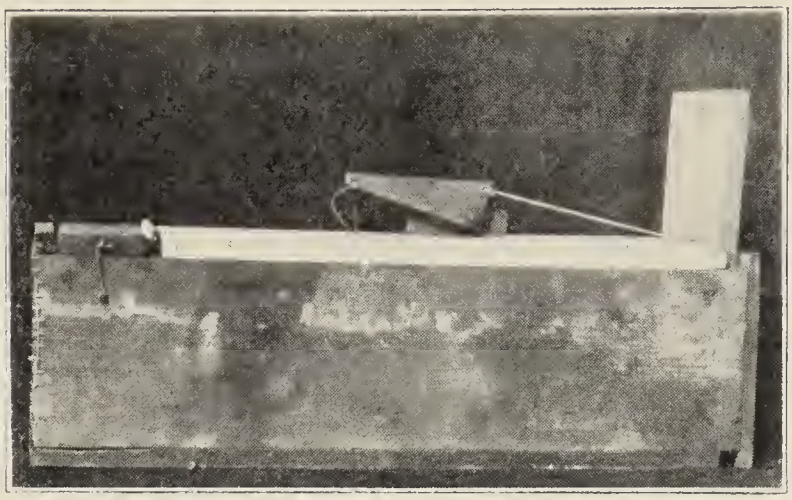


Our first traps were made on the pattern of the old government sparrow trap. We immediately found that the front funnels had such a slope that the birds were uncomfortable in resting on them and by making the funnel only half as high it seemed better. By observing the birds when they were trapped it was noted that they immediately would fly to the top and gradually settle down to the most convenient perch. With the front funnel much lower this would put them right in line to see the hole into the rear compartment, and by making the rear funnel perfectly flat on top it gave them a very convenient resting place up off the ground and they were more contented. The funnels and the top and bottom of this trap are made out of three-quarter-inch poultry netting, which is more or less hexagonal in shape and is less visible than the square mesh. The sides and back of the trap are made of No.3 hardware cloth and then there is the door in the rear compartment with the opening of 5x5 inches, with a door that slides up and down so the arm can be inserted to catch the birds.

We place a sheet-metal cover over the rear compartment, which protects the birds from rain, snow, or sun and also from cats, rats, hawks, dogs, etc. On many of the traps we bend the edge of the metal roof down over each side a few inches to act as a wind-break. Especially during the winter, we place a little perch up in this protected corner.

The most convenient size we have found to be 20 inches wide, 16 inches high and 36 inches long. It should be painted a dark neutral color to preserve the

wire and make it inconspicuous. This has been the most successful trap of any trap we have ever used in trapping over 15,000 birds.



The cat trap illustrated shows the most successful of a number that have been tried out. It is made of 1-inch lumber about 30 inches long, using two boards 8 inches wide and two 10 inches wide. When nailed together this will give you a hollow box 8x8 inches inside.

The guide strips are nailed to the front so an 8-inch rising and falling door will just fill the opening. If the guides are extended a little above the box it is found to be an advantage but in shipping they cause an extra rate and are often broken so they are left off.

The tripping device is made with a thin piece of board a little less than 8x8 inches with a half inch strip tacked under the center, so it acts like a teeter board. The triangle on top of the trap is made of wood or a good stiff piece of galvanized iron. The string is attached to the outer hole and a slight weight on the teeter board gives four times the pressure on the trigger.

The back of the trap is divided into an extra compartment by a partition of wire cloth, one-third or one-half inch mesh. This forms a bait chamber which can be entered only by a door on top of the trap; and is securely hooked shut. By putting the fish head in this compartment the cat can see and smell it very readily but there is no access to it. Anything caught in this trap is out of sight and can be easily carried to a convenient point of disposal.

Two or three of these traps count for twenty-five cats annually at our station.

There is a bird bander, a carpenter by trade, who makes these traps so they can be shipped from Waukegan at $4.00. That is only in case you are unable to make your own.

Many banding stations fail to attract birds on account of lack of shrubbery or other cover in which the birds can hide or make their escape. You can increase the number of birds by planting sunflower and hemp.

Hemp produces one of the best covers for birds, and also provides an enormous lot of food that stays up off the ground during the entire winter. One of our hemp plants reached the height of fourteen feet and was at least ten feet in diameter. The extra size of this plant may be attributed to the fertilizer that was in the ground underneath it, because this particular seed was planted upon

the grave of two cats. Try planting some hemp and sunflower around your trapping sites and along the fence lines.

Cardinals in Minnesota.—On November 11 last, Mrs. Commons saw a male Cardinal in our shrubbery and on the following day, November 12, captured a female in one of our traps and banded it (band No. 482843). Some fifty years ago the Cardinal was a rare bird in Minnesota but of recent years it has been gradually extending its range farther north, and having banded this one at our Tanager Hill station we were somewhat elated about it and were anxious to learn to what extent it had become a Minnesota bird. We requested Dr. Thomas S. Roberts, Director of the Zoological Museum, University of Minnesota, who is the best authority on the subject, to give us information about its occurrence in Minnesota, which he has kindly done and of which the following is an abstract:

Dr. Roberts states substantially that the first positive record in this state was a male bird shot by himself near Lake Harriet (Minneapolis) in October, 1875. A few were reported seen before and after this date, up to October, 1878. After this time the records became more frequent and from about 1911 they became permanent residents in the southeasterly part of the State, spreading gradually northward until now they are established and nesting as far north as Minneapolis. From Red Wing south they are now fairly common, remaining through the year and nesting in considerable numbers. The farthest north nesting record is at upper Lake Minnetonka (our locality). For a number of years the only records were in the fall, winter or early spring, and it was not until about 1911 that they became established as nesting birds.

Although there have been several reports of them in our Lake Minnetonka locality we, ourselves, had never seen one here before through many years of observation.

After banding the one referred to we became interested in learning the banding record of them in our state. In reply to a letter sent to the Bureau of Biological Survey we are in receipt of one from Mr. Lincoln in which he says that after examining their files they were unable to find records of any of these birds having been banded heretofore in this state, and that accordingly he feels satisfied that Mrs. Commons has the honor of banding the first Cardinal banded in Minnesota.—Frank W. Commons, *Minneapolis, Minn.*

Continuous Mating of Towhees.—As there is a question as to the time some birds retain their mates, the following experience with a pair of Towhees may be of interest.

On April 19, 1923, I banded a male Towhee with No. 46786. March 27, 1924, I caught him again and also his mate No. 46793. I was not as active in 1925, so I did not catch either of them that year. November 19, 1926 I again caught 46786 and his mate 46793. I found the band 46786 had worn very thin and I replaced it with a new one, so that this new number is 46817.

This year, April 27, I trapped 46817 again, and while I am sure she (46793) was with him, (you know I band on the "off side") I was not able to capture her. The record is sure, however, for at least three years, and probably it is safe to assume that their partnership is a life-time mating.—Dr. H. H. Hayes, *Hubbard Woods, Ill.*

Behavior of Chickadees.—On May 27, 1925, I caught and banded a Chickadee in my canary-cage trap. He did not seem frightened and I watched the trap closely for his return. The next day he came back, and every day for at least a week. One day I was surprised to see him come, and this time accompanied by his family of three little ones (I never saw the mother). He directed the little ones and had them in a row on the ledge outside of the cage; then he hopped in and proceeded to feed the babies through the bars of the cage. One little fellow slipped around the cage and jumped up in the door, but the father saw him and flew to the door and pecked the baby and made them all stay out of the trap. He returned for four days, and each day the same performance took place; but never once could I catch one of the little ones and of course I did not try to trap the father again.

Each year he comes back for I can see the band through my binoculars, but I have been unable to catch him again.—Mrs. M. L. Coutant. *Danville, Illinois.*

An Albino Purple Martin.—A white Purple Martin was born, raised, and went on his migration from one of our martin houses. I tried my best to trap him but, on the two occasions when he entered the house, he "gave me the slip." I hope he will return next year. This bird was also seen among the martins at DeTour. Of the forty Purple Finches banded in 1926, nineteen returned in 1927. —Geo. W. Luther, *DeTour, Michigan.*

Catbirds Remain Mated.—Catbirds, Nos. 146857 and 146858, which were banded as a mated pair on June 6, 1926, and July 11, 1926, were retrapped, still mated, at their nest within five feet of both 1926 nests on June 24, 1927, at Riverside Park.—S. E. Perkins III, *Indianapolis, Indiana.*

Notes

In the Massachusetts Items of Interest, February 1, 1928, Mr. Forbush writes: "We hope that bird banders will take pains to record the colors of the bill, eyes, legs, and feet of the birds that they band. There is so much confusion in various publications regarding the colors of these parts of small birds, as well as large birds, that a systematic effort should be made to record the colors from *the living birds in the hand.* Many notes on the colors of the bills and feet of birds have been taken from dried skins in which the colors are often quite different from those of the living bird.

"These colors change more or less according to age and season. In recording them it is well to state whether the bird is an adult or young, and to give the *date* of the record."

The Inland Bird Banding Association will appreciate any efforts to carry out Mr. Forbush's suggestions.

COMMUNICATIONS

Editor, Wilson Bulletin: Mrs. Taylor's paper on Alexander Wilson, appearing in the June (1928) issue of the Bulletin, contains what I believe to be an erroneous statement which, though of minor consequence, should, to guard against repetition, be spoken of. Mrs. Taylor says of the American Ornithology that "Volume I contains two plates colored by Wilson's own hand."

It is indeed true that by his own hand Wilson etched two plates which eventually became plates 1 and 2 of his published work; and it is true that when he had etched the plates he took prints, colored them, and sent them to his friend William Bartram. He did this in the first enthusiasm of the idea of his great work. But at once he perceived that zeal alone was not enough: he saw that professional aid was necessary, and he had no money with which to buy professional aid: and so he laid the matter aside.

A few months later the publisher, William Bradbury, undertook to finance the project, and that changed the situation. Alexander Lawson, a master engraver, was employed: Wilson's two plates were brought out: Lawson took them in hand, retouched them, and put them in the condition in which they at length were used in the published work.

Wilson meanwhile, with zeal rekindled, devoted his spare hours to collecting, to writing, and to the soliciting of subscriptions. Eventually four hundred and forty subscribers were enrolled.

The production of a book of the size intended (nine volumes, small folio, with eighty plates, more or less) and in an edition of upwards of five hundred copies necessitated a staff of trained workmen. In that day the hand coloring of engravings was a common practice, and shops of colorists were maintained by publishers. Miss Lawson alludes[1] to the fact that Wilson eventually employed Alexander Riter in that capacity. The data in the light of which Mrs. Taylor's statement should be revised are contained in a letter which on the 22nd of May, 1807, Wilson wrote to William Bartram. The important passages are as follows:

"By the impressions of my two first plates that accompany this you will see that I have a request to make to Miss Bartram if the state of her health will permit. We want well coloured specimens of the plates to be sent to Boston, Charleston, New York, &c., and as my time will not permit me to do them myself I have presumed to apply to her to colour the impressions that are sent with this according to the specimens that accompany them, for which I shall make any return. Perhaps Mary Leech might be set to some parts of them with safety which would lessen the drudgery. . . .

"In washing the blue Jay the most difficult part of the process is to lay on the colour without being streaked (which you will see I have not succeeded in) and in giving the true tint which I think is nearly approached in the specimen. Nothing but a wash is necessary as the engraving must be seen thro the colour.

"But you know the whole affair ten times better than I can pretend to and as I shall be engaged in Drawing on Sunday I beg you would drop me a line tomorrow by Mr. Leech. . . .

"P. S. The yellow bird has been coloured with a too dull yellow and the *breast* of the hanging bird may be more of a vermillion."[2]

Wilson did color a few prints of his first two plates; but it is quite plain that he did not color the several hundred prints of them which were involved in publication.

Sewickley, Pa. Bayard H. Christy.

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[1] "Miss Lawson's recollections of ornithologists." By Frank L. Burns. *Auk*, XXXIV, No. 3, July, 1917, pp. 275-282 (p. 279).

[2] "Some unpublished letters of Alexander Wilson and John Abbott." By Witmer Stone. *Auk*, XXIII, No. 4, October, 1906, pp. 361-368.

TO OUR CONTRIBUTORS

Our members are urged to submit articles for publication in the BULLETIN Short items are desired for the department of General Notes, as well as longer contributions, especially pertaining to life-history, migration, ecology, behavior, song, economic ornithology, field equipment and methods, etc. Local faunal lists are also desired, but they should be annotated, at least briefly, and should be based upon sufficient study to be reasonably complete. Authors are asked to include the common name, the scientific name (from the A. O. U. check-list), and annotations, and they should be arranged in this order. The annotations should include explicit data concerning unusual species. Omit serial numbering.

THE MANUSCRIPT. The manuscript, or copy, should be prepared with due regard for literary style, correct spelling and punctuation. Use sheets of paper of good quality and of letter size (8½x11 inches); write on one side only, and leave wide margins; if at all possible manuscript should be prepared with a typewriter, using double spacing and a reasonably fresh, black ribbon.

The title should be carefully constructed so as to indicate most clearly the nature of the subject matter of the contribution. Where the paper deals with a single species it is desirable to include in the title both the common and the scientific names, or, to include the scientific name in the introductory paragraph. Contributors are requested to mark at the top of the first page of the manuscript the number of words contained. This will save the editor's time and will be appreciated.

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NOTES ON THE NESTING HABITS AND SONGS OF THE MOCKINGBIRD*

BY J. PAUL VISSCHER

Although the Mockingbird is but rarely seen as far north as Cleveland, it is nevertheless a common resident of large areas of North America, ranging from Mexico northward to the zone in which we are, which is perhaps, its most northern limit.

It is an exclusively American bird and is closely related to the Catbird and Brown Thrasher and more distantly to the wrens, all of which are noted for their singing ability. But of them all it is generally agreed that the Mockingbird stands supreme in some respects, at least, as America's most remarkable song bird, and it seems doubtful to such men as Chapman and Shufeldt if even the Nightingale of Europe can equal the remarkable vocal powers which have made the Mockingbird famous throughout the world.

Although the scientific name, *Mimus polyglottos*, and the common name, Mockingbird, clearly indicate the habit of mimicking the notes of other birds, yet there are but few actual records of the notes and songs which it imitates.[1]

On Piver's Island in the harbor of Beaufort, North Carolina, there are each year some ten or a dozen pairs of these birds nesting in the luxuriant growths of Yucca which adorn the grounds of the U. S. Biological Station located there. Here during the months of June and July for three successive summers, and on other occasional visits of a few days at a time, the writer has had the opportunity to study the nesting habits and songs of these most interesting birds.

The birds appear to be permanent residents of this locality; at least Mockingbirds are to be found there at all seasons of the year. They are more numerous, however, during the spring and summer months.

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*Presented at the joint meeting of the Wilson Ornithological Club and the Inland Bird Banding Association at Cleveland, Ohio, on November 26, 1927.

[1]Whittle, C. L. "The Arboretum Mockingbird." *Auk*, vol. 39, 1922, pp. 496-506.

Nesting begins in late March or early April, and a second brood is often well advaneed by the middle of June. A third brood appears to be eommon but not universal.

Of the ten nests observed during one season, nine were placed in forks or in the dense foliage of the large Yuccas which grow to a height of more than twelve feet, with their sword-like leaves bristling for several feet in all direetions. These growths afford admirable protection against most enemies, and even man frequently has diffieulty in observing these nests.

The nests are made and completed during the course of about three days' endeavor on the part of both birds. The nests were begun by forming a loose structure of twigs as a sort of platform, on and in which a fairly substantial nest was made of sea weeds and grasses. mostly the common eel-grass which is found abundantly in windrows along the beaches of the island. This was lined by finer grasses, by pieees of cloth and even feathers.

The eggs are relatively large, about an inch in length and are heavily blotched with rufous brown on a pale bluish-green background. There were four eggs in each completed nest examined by the writer; but Chapman states that five and six are occasionally laid.

Ineubation begins with the laying of the first egg, so that the young are not all hatched simultaneously. This difference is clearly noted throughout the brooding period when the nestlings are of notiecably diverse sizes, and this often results in the death of one or more of the brood. Although the nests are well built and advantageously loeated with referenee to their enemies, they are frequently destroyed by the elements, often being exposed to the powerful rays of the sun and to the rather frequent torrential rains which often cause great havoc to the nests and nestlings. Several nests were found completely in ruins after sueh storms, and others were found in which the young were apparently drowned within the nest. Sinee heavy showers and storms of this sort oeeur with increasing frequency and strength during the course of the summer months it is evident that sueh disasters would oeeur more frequently with the second and third broods than with the first.

Piver's Island contains several acres of land but little more than one is exposed at flood tide. On this higher portion some thirty Yuecas are found. These are apparently allotted rather definitely between the Moekingbirds of the Island, as no two nests were found within twenty-five feet of eaeh other, and during the nesting period eaeh male appeared to guard his territory very effectively against eneroachment. not to mention enpoachment.

FIGURE 1. 1, Approach to the Laboratory Building of the U. S. Biological Station at Beaufort, N. C., with a portion of the pier in the foreground. 2, Scene on the island looking toward the "Banks," or sand dunes, which lie to the southward. 3, Waterfront of the town of Beaufort as seen from the island. 4, Piver's Island, with the U. S. Biological Station as seen from the mainland. 5, The waterfront of Piver's Island, showing the row of beautiful yuccas. 6, A view of some of the yuccas on Piver's Island; a Mockingbird is sitting on its favorite song perch in the top of the nearest yucca tree, but is invisible in the reduced photograph.

It is indeed an interesting and remarkable spectacle to observe two cocks in combat. Although these occur with some frequency during the course of a season, one pair in particular seemed always in trouble, and the fighting occurred in a very restricted area (less than ten yards in diameter) apparently midway between their nests. These two were observed on several occasions to utter peculiar notes and then to alight on the open ground some ten feet apart and to run toward each other with great speed, while constantly uttering harsh and rasping calls. Upon approaching each other they would literally jump perpendicularly into the air and attempt to peck the opponent on the top of the head. To observe such birds rising time and again by powerful jumps to heights of three to four feet, meanwhile calling loudly—perhaps vilifying each other or calling to their mates to watch—was indeed a novel spectacle. These fights frequently persisted for fully five or more minutes, but on no occasion was there a fatality.

It is also at the mating season that these birds display their remarkable vocal achievements. Each male apparently has a favorite nest perch from which he can guard his territory and from which he pours forth his songs in marvelous variety. Not all of the birds are equally expert as musical artists but the powers of one bird in particular attracted attention. The favorite perch for this bird was high up on the edge of the platform of the water-tower on the island. This bird would frequently sing from this perch for more than thirty minutes with little or no intermission. Not only did this bird sing in the daytime but on clear moonlight nights would pour forth his songs at most all hours—apparently determined by the fullness of the moon on that particular night. It was heard in early evening, late evening, at midnight, and during the very early morning hours as well as during the regular morning hours when many Mockingbirds would seem to join in chorus.

Taking advantage of this opportunity the author made, with the aid of a colleague at the laboratory, Dr. Hoyt Hopkins (formerly of Oberlin College), a list of the more characteristic songs and calls which were heard, uttered in most cases by the single male referred to above.

Robin (very often)
Bluebird (frequently)
Tufted Titmouse (very often)
Crested Flycatcher (occasionally)
Towhee (occasionally)
Killdeer (occasionally)
Cat-bird (frequently)
Brown Thrasher (frequently)

Maryland Yellowthroat (frequently)
Yellow Legs (rarely)
Oriole (Baltimore) (frequently)
Rail (Clapper) (rarely)
House Wren (occasionally)
Carolina Wren (frequently)
Yellow-breasted Chat (frequently)
*Grackle (Boat-tailed?) (rarely)
*Nuthatch (occasionally)
Cardinal (very often)
Oven-bird (very often)
Chickadee (frequently)
Quail (rarely)
Pewee (occasionally)
Scarlet Tanager (frequently)
Phoebe (occasionally)
Whip-poor-will (rarely)
Goldfinch (rarely)
*Green Heron (once)
Cedar Waxwing (once)
*English Sparrow (occasionally)
Song Sparrow (frequently)
*Purple Martin (once)
Kingbird (rarely)
*Night Hawk (rarely)
Flicker (frequently)
Crow (rarely)

Although this list comprises thirty-five birds it was apparent to both Dr. Hopkins and myself that many more were mimicked whose songs we were unable to identify at the time.

Mr. Charles W. Townsend in his article on Mimicry of Voice in Birds[2] states that the Mockingbird is the most proficient mimic among our native birds and notes that a single mocker at the Arnold Arboretum has been heard to mimic fifty-five different birds. He says in reference to this bird, which was also studied with care by H. W. Wright[3], and C. L. Whittle[4] as well, "the alarm and call notes of the Robin were as perfect as was the cheerful, glorious song of the familiar bird. The multiple calls of the Flicker were evidently favorites of his and were introduced at frequent intervals. The melody of the Song Sparrow was as unmistakeable but not perfect. The rattling of the Crow and of the Kingfisher, the whistle of the Bobwhite, the call of the

*Common on island.

[2]Townsend, Charles W. "Mimicry of Voice in Birds." *Auk*, vol. 41, 1924, pp. 541-542.

[3]Wright, Horace W. "The Mockingbird in the Boston Region, and in New England and Canada." *Auk*, vol. 38, 1922, pp. 382-432.

[4]Whittle, C. L. "The Arboretum Mockingbird." *Auk*, vol. 39, 1922, pp. 496-506.

Barn Swallow and the songs of the Baltimore Oriole, the Bluebird, the Scarlet Tanager and the Chewink, all in turn delighted my ears." He then asks, "could any one doubt that his imitations were conscious ones and that he took pleasure in them?" Townsend also relates an instance reported by Dr. S. C. Brooks of an apparent example of conscious mimicry in the Mockingbird. The bird was imitating the calls of the Killdeer, when a Sparrow Hawk flew by, and the mimic at once set up the rolling call of this hawk apparently throwing the hawk completely off his guard.

The author has wondered if this is a proven case of mimicry or if, as in so many birds, it is only an example of the ability to sing more than a single tune. Of the thirty-five birds listed above, those birds which were co-residents on the island were mimicked with much less frequency than others which were never seen by the author during his sojourns there, although it must be admitted that in almost every case they are listed by Pearson in his "Birds of North Carolina" as migrants through this territory. It is also significant that the songs most frequently mimicked by these birds at Beaufort, N. C., are the same ones which are the favorites of Mockingbirds from widely separated territories as at Cambridge, Massachusetts, at St. Louis, Missouri, and even of those in California.

Townsend admits that the close relatives of the Mockingbirds, the thrashers and the wrens, have many inventive songs, although most of them have series of couplets which are characteristic of the songs of other birds. He would agree that all real songsters mimic to a certain extent, but that the better ones are inventive as well; that is, they have the ability to add short musical phrases to the songs inherited or heard, and that thus new songs are produced. As typical examples of this he would list the Brown Thrasher and the Hermit Thrush while he believes that the English Starling and the Mockingbird are only mimics.

Opposed to the idea of Townsend, however, are the observations of Mr. Donald R. Dickey[5] in which he cites examples of mimicry in a Western Mockingbird in a bird which had just completed its juvenile molt. He believes that "the very few months which had actually elapsed since his youngster first saw light would seem to form all too short a period for the purely imitative acquisition of so varied a repertoire." and suggests that the basic phrases of the Mockingbird's vocabulary which simulate the notes of other birds may be an intrinsic part of his inherited vocal ability.

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[5]Dickey, Donald R. "The Mimetic Aspect of the Mocker's Song." *Condor*, 1922, vol. XXIV, pp. 153-157.

Saunders[6] in his study on the "Recognition of Individual Birds by Songs" would also give some support to the idea that not all of the remarkable vocal abilities of a Mockingbird are his by virtue of mimicking power alone.

On the basis of my own observations it seems probable that many of the tunes which a Mockingbird sings are inherited in much the same

FIGURE 2. 7, A typical yucca in full bloom, in which Mockingbirds nested for three successive seasons. 8, A cluster of yuccas, showing the favorite nesting place of the Mockingbirds.

manner as instincts. We are aware on the basis of recent studies of inheritance, and of neurology as well, that there are many complex cortical patterns, which when stimulated produce a definite and complete series of reactions. It seems very probable that in the Mockingbird there are many such complex patterns which are definitely inherited and only need an appropriate stimulus to provide expression.

Since the songs sung by the Mockingbird under observation were not those most commonly heard, since they agree in the main with the songs which are the favorites of other Mockingbirds in widely scattered areas, and since there is such great variability in the vocal powers of different individuals, it seems probable that a Mockingbird does not as

[6]Saunders, Aretas A. "Recognizing Individual Birds by Song." *Auk*, vol. 41, 1924, pp. 242-259.

a rule consciously mimic songs, but only possesses an unusually large series of melodies which it calls forth in wonderful perfection and in most surprisingly clear and melodious tones. To me the thrill of listening to a fluent Mockingbird is much like listening to a symphony where the themes are those which we often associate with other less able or artistic birds.

The author in no wise wishes to belittle the wonderful artistry of this remarkable bird. He has enjoyed to the fullest the marvelous songs, has been thrilled to the depths by its music, and has often been surprised at the dexterity of this avian artist, but he only questions if these are "conscious" and even "purposive" endeavors, as has been claimed by many writers.

And so he would suggest that perhaps the Mockingbird is no more of a mimic than the Robin, the Cardinal, or the wren, each of which mimics more or less successfully the songs of its parents. The Mockingbird, however, is outstanding in its remarkable repertoire but is only slightly if at all more remarkable than the Hermit Thrush, or the Brown Thrasher, and others of its close relatives, with which we rarely if ever associate mimicry. Accordingly, it seems probable that all of these birds inherit various neural patterns, which appropriate stimuli activate, thus reproducing the songs characteristic of each species.

Western Reserve University,
Cleveland, Ohio.

ON THE STATUS OF HARLAN'S HAWK

BY G. EIFRIG

Last June I spent ten days in Northwestern Wisconsin, near Hayward, at the home of Mr. K. W. Kahmann, the Chicago taxidermist.

Here I observed the Clay-colored Sparrow in life, as a breeding bird, for the first time in my life, and noticed the Sharp-tailed Grouse and Brewer's Blackbird to be common residents, showing that here there is a strong infusion of western avifauna. I was equally interested, however, in a collection of mounted raptores which Mr. Kahmann had in his shop. Among them was a large black hawk. It was not the roughleg, as one look at the tarsi showed; nor a Swainson's Hawk, because it had the four, instead of the three, outer primaries notched. It turned out to be a typical Harlan's Hawk (*Buteo borealis harlani*).

After reaching home with the specimen in my possession, I consulted all available literature on the status of this hawk, which has

always been looked upon as being rather uncertain. Baird, Brewer, and Ridgway have a long detailed description, also Ridgway in his "Birds of Illinois"; Bendire has notes on the behavior of this species, but no description. Mrs. Bailey, in her "Handbook of the Birds of the Western United States" does not mention it, but Chapman in his "Handbook" has it. Taverner, in his "Birds of Western Canada" expresses the opinion that Harlan's Hawk is only a color phase of the Western Redtail (*Buteo borealis calurus*), and his opinion carries considerable weight because he probably gets more material of these species than most collectors or museums.

However, the question as to the status of Harlan's Hawk has recently acquired a new phase by the findings of Swarth and Brooks in the Atlin region in Northern British Columbia. This is published in their "Report on a Collection of Birds and Mammals from the Atlin Region, Northern British Columbia", 1926. To their surprise and the readers' surprise, they found Harlan's Hawk to be the only species of *Buteo* breeding there. Thus, for the first time a definite breeding range has been found. All the previous records seem to be winter and migration records from the southern and central states, never a breeding record. This also holds good for the first of all records, that by Audubon, whose statement that the bird or birds he got had bred near St. Francisville, Louisiana, is evidently based on hearsay. Beyer, Allison and Kopman, in their "List of the Birds of Louisiana" (1908, p. 442) say that they have no evidence of this bird breeding or ever having bred in Louisiana. No wonder the status of Harlan's Hawk was rather hazy in character. But this uncertainty now seems to have been largely swept away by the finding of a definite breeding ground of this form.

Now the question arises, "Are the differences in coloring between Harlan's Hawk and the melanistic phase of the Western Redtail pronounced enough and constant enough to justify the belief that Harlan's Hawk is a distinct subspecies?" We think they are.

First, there is much more white in the plumage of Harlan's Hawk than in the Western Redtail. In fact, many of the feathers on the neck and breast have only a rather small arrowhead-like black mark, the larger part of the feathers being snowy white. This is not true to nearly the same extent in *calurus*.

Second, there is no brown on breast and belly in Harlan's Hawk as is true of *calurus*.

Third, there is an utter lack of barring on the tibial feathers in *harlani*, which seems to be diagnostic for *calurus* in any color phase.

Fourth, the tail of *harlani* is decidedly different from that of *calurus*. The latter in its tail always shows its relationship with the Western Redtail, by the larger amount of reddish brown on this member. The tail of Harlan's Hawk shows next to no brown, but only slight traces of it and gray marks *longitudinally* arranged. The tail is also more square than in *calurus*. A peculiar condition was brought out by Swarth and Brooks' investigations, inasmuch as they found one of their specimens, undoubtedly *harlani*, to have only three notched primaries instead of four. Therefore, the conclusion seems to me to be warranted that *Buteo borealis harlani* is entitled to subspecific, if not to specific, rank.

River Forest, Ill.

TRAILL'S FLYCATCHER IN SOUTHERN MICHIGAN

BY WM. G. FARGO

Until 1927 I had not discovered Traill's Flycatcher (*Empidonax trailli trailli**) breeding in Jackson County, Michigan, which is in the latitude of Detroit. For the past five years I have searched the woods and marshes of this county for nests in general and have always found fairly common: *E. virescens*, *E. minimus*, *Myiochanes virens*, and *Sayornis phoebe* as breeding birds, but until 1927 never *E. t. trailli*.

On June 1, 1927, along a sluggish spring brook, bordered with willow brush, *Cornus*, etc., winding through marshes in the northwest part of this county I saw two *Empidonaces* a quarter of mile apart that appeared to be *E. t. trailli*. On June 6 I saw one pair of these birds beginning a nest at the same place where one was first seen. This nest was about six feet up in an upright crotch of willow bushes on the creek bank. Going a quarter of a mile down stream I collected a male *Empidonax* that subsequently was identified by Dr. H. C. Oberholser as *Empidonax trailli trailli*.

On June 27, going to the above locality, I found that the nest I saw being started was not completed, but further down the creek I found a nest of *E. t. trailli*, with one of the adults hovering about. The nest was three feet, ten inches above the ground in an upright, multiple crotch of a one-inch elm sprout, and contained three young birds about two days old and two creamy white eggs with cinnamon brown spots in

*In the Ohio Journal of Science, Vol. XVIII, No. 3 (Jan., 1918), p. 85 and following, Dr. H. C. Oberholser points out that the type locality of *Empidonax trailli trailli* (Audubon) was within the range of the eastern form, hence *E. t. alnorum* (Brewster) becomes a synonym. The western form Dr. Oberholser proposes to call *E. t. brewsteri*. In the present paper the change of name thus proposed is used.—W. G. F.

a wreath about the large end, also a few spots elsewhere. One egg measured .49x.72 inches.

This nest, shown in photograph No. 1, appears to be a typical nest of the species for this locality. It was composed of dry grass stems with some cottony material around the top and a bit of fur and feather-down at the top of rim. It was lined with dry grasses and measured 3¼x3¼x3¼ inches outside and 2¼x2 inches inside, hori-

Figure 3. Nests of the Traill's Flycatcher, referred to in the text.

zontally. It was well hidden by the foliage of the elm and the five-foot high "blue-joint" grass in which it stood.

In the south part of the city of Jackson is located Ella W. Sharp Park containing 530 acres, where on June 30, near a ditch leading from a cat-tail marsh I found my second nest of Traill's Flycatcher. This nest was 3½ feet above ground in cornus bushes (*C. paniculata*). These bushes make a dense group in the interior of which the nest was hidden. It was on top of a nearly horizontal ascending branch about three-eighth inch in diameter and contained four typical eggs.

I was attracted to the locality by an adult *Empidonax* feeding in the vicinity. This nest was quite similar in appearance and materials to those of the Yellow Warbler and Goldfinch, but as stated it was on a nearly horizontal branch cradled by rising twigs. No grasses were visible, it being made of gray plant fibres.

The third nest I found on July 10, 1927, in a small scrubby elm on the banks of a sluggish grass-filled creek, twenty feet wide, some two miles southwest of the nest in the Park. The elm scrub was immediately on the creek bank and the nest in plain sight on a half inch descending limb three feet out over the water and less than two feet above the water surface. It contained one egg similar to the others described. One adult was hovering along the opposite bank of the creek.

Visiting this nest again eight days later I found a young bird that must have left the egg a week before, and as before one parent was hovering about. This nest is shown in photographs Nos. 2 and 3.

On July 22, 1927, three miles east of the Park along a bush bordered stream in a broad open marsh I found an *Empidonax* having the brownish back of *E. t. trailli* hanging about a certain spot and soon located an empty nest eight feet up in a bushy red maple some thirty feet from the creek bank. This nest in an upright crotch, was of the size and form of the nest first described, but contained less grass and more plant fibres. This nest was visited again on July 27 and the bird was in the immediate vicinity as before, but the nest was empty and seemed too fresh and clean to have raised a brood. It was too large for the nests of either Goldfinch or Yellow Warbler, neither of which nor other birds likely to have built the nest were seen here. This nest is shown in photograph No. 4.

During June and July, 1927, I found *Empidonaces*, usually in pairs located in definite "territories" in a total of seven different localities in Jackson County. Two specimens submitted to Dr. Oberholser were identified as *E. t. trailli*. In nearly every instance it was possible to observe the birds in such light and close distance as to be reasonably certain that the color of the back was not the *greenish* brown of *E. virescens*.

In this region the habitat of *E. virescens* is quite different from that described above for *E. t. trailli*, the former nesting in the forest and invariably building a thin-walled basket-like *pensile* nest. It is true that *virescens* sometimes builds near a stream bank but those nests I have found were never out in open marshes but on the contrary on higher ground whether near a stream or not.

It is well known that *E. t. trailli* breeds abundantly in Ohio and there are several old records of its breeding in Michigan, particularly in the southeast corner of the state and in the southern two tiers of counties. (See Barrows' "Michigan Bird Life," page 404).

After the young left the nests it was noted that but one adult was seen about the nest area in any of the Jackson County localities. Two Traill's Flycatchers thus collected proved to be adult males. This would point to the fact that the female and young leave the nest locality as soon as the latter are able to travel, while the male parent lives in his "territory" until the end of July or later, and he is almost certain to be found in a rather restricted area, say of two hundred feet along a stream.

Jackson, Michigan.

A THEORY OF HOW THE TURKEY VULTURE FINDS ITS FOOD

BY WILLIAM BREWSTER TABER, JR.

Having read Mr. Lewis' "How Does the Turkey Vulture Find Its Food" in the Wilson Bulletin (Sept., 1928, also published in the Oct. 1928, *Auk* under the title "Sight and Scent in the Turkey Vulture"), and Mr. Leighton's article on the same subject in the *Auk* (July, 1928), it seems pertinent to contribute the results of an experiment which I made to test the food finding faculties of Turkey Vultures, and to advance what I believe is a new theory of just why it is easier for a Turkey Vulture to find its food by *sight* when the food is rotten and of a particulary offensive and foul odor than when it is fresh.

First, let me describe an experiment which convinced me that vultures do not find their food by scent and that sight is their only means of discovery, and then I shall give some observations which led to the before mentioned theory.

In the late winter of 1926, while trapping Crows, I caught a Turkey Vulture. Thinking that it would serve as a call bird for Crows, I kept it for several weeks and during that time repeated Darwin's experiment with Condors (Voyage of the Beagle), which led him to believe that vultures find their food by sight alone. During this period the vulture was kept at night, and likewise during the days when I did not use it as a call bird, in an old empty chicken house. It inhabited these quarters for more than two weeks before the experiment was made, and had been fed there many times, so that the effect of these artificial conditions was reduced to a minimum. The first procedure was to whet the bird's appetite. This was done by supplying it with no other food than water for a period of sixty hours. It showed no signs

of inconvenience or suffering during this time, and except possibly for a keener, more alert, attentive, and expectant attitude whenever I entered the building showed no visible signs of excessive hunger. Nevertheless after such a fast there could be no doubt that the bird was hungry.

I then cut from a hog carcass, which I had been using for bait for Crows, a piece of strong smelling meat and wrapping it in newspaper placed it on the ground before the vulture, which was perched on a low roost a foot or so above it. Believing that my presence might distract the bird I retired from the building, closed the door, and watched through a crack. I could distinctly smell the bait from where I stood fifteen feet away and outside the building. After what appeared to be a casual inspection from the roost, it preened its feathers and paid no further attention to the newspaper or its contents. Waiting for full twenty minutes, I then entered the building, opened the newspaper, left the meat on the paper, and took a seat inside the chicken house about ten feet away. As soon as the carrion was visible the vulture was all attention, waiting only until I had moved a few feet away before hopping down from its perch onto the newspaper and its long postponed repast. It was plain that neither the newspaper nor my presence deterred it from eating; and it also seemed certain from its lack of interest before the paper was opened that the bird simply did not know the food was there. This was in spite of the strong odors, so unpleasantly apparent to even the dull sensory organs of a human being. The experiment convinced me that scent is not a factor in finding food.

But then how shall we explain Mr. Lewis' experiences in the summers of 1927 and 1928 when vultures were attracted to covered baits, which were not visible, only after they had been dead long enough and under warm enough conditions to be somewhat decomposed and odoriferous? The first inclination is to conclude that it was the smell that attracted them. But it may have been by their sight they detected the presence of food even though they could not see the food itself, as I shall explain.

My explanation is based on the fact that the association of events has meaning to birds as well as the lower animals. This does not necessarily imply the ability to reason, although they may to a limited extent possibly have that ability, but merely that through long experience they have learned to recognize the significance of certain events, and consequently govern their acts accordingly. Anyone who has witnessed the rapid response of a group of tree sparrows, juncoes, woodpeckers and chickadees to the stimulus of the sight of a Sharp-shinned

Hawk skimming above the tree tops, realizes that this event has meaning to the group, and a meaning which causes immediate action. As I have pointed out in an article, "The Mentality of the Crow," published in the WILSON BULLETIN (March, 1927), a number of Crows feeding on the ground attract other Crows to their feast. Similarly vultures perceiving Crows in a compact group about an object realize that often this means food for them. It is by such signs that the vultures found Mr. Lewis' bait although they could not see it. In these particular instances, it was unquestionably not Crows that attracted the vultures. However there are other creatures which through smell detect the presence of carrion and are attracted to it. Carrion beetles and some small rodents feed upon decomposing meat and undoubtedly find their food by following up the scent. Although such small creatures could not be seen by a human being at any considerable distance, the carrion beetles, some of which are brightly colored, and the larger forms of mice and ground squirrels converging upon a rotting carcass might be easily distinguishable to the keen eyed vulture flying over-head in search for just such indications; and having perceived these signs the vulture through long experience knows that this means food.

I therefore wish to advance the theory that vultures find their food by observing the actions of carrion feeding creatures, as well as by discovering the food for themselves by direct vision.

KANSAS, ILLINOIS.

A SOUTHWARD MOVEMENT OF BREEDING SAVANNAH SPARROWS IN OHIO?

BY LOUIS W. CAMPBELL

It is a general fact accepted by ornithologists that the trend of breeding ranges of birds is always northward. Familiar examples in Ohio are the Carolina Chickadee and the Bewick's Wren. But occasionally one observes a species which apparently is either not obeying this rule or is returning to its original nesting ground. At present it is the Savannah Sparrow (*Passerculus sandwichensis savanna*), whose normal breeding range is given as southern Canada, which seems to be spreading southward through Ohio.

The history of this species in the state as a nesting bird is soon told. Dr. Wheaton in 1879 lists is as a probable breeder in the northern counties but states that it was not recorded by Dr. Kirtland or Mr. Read. In fact, his only positive record was that of Mr. H. C.

Benson at Gambier, Knox County, in the central part of the state. The next nesting accounts were those of the Rev. W. F. Henniger (Wilson Bulletin, XVII, p. 91), in Scioto County, and Mr. E. A. Doolittle (Wilson Bulletin, XXIX, p. 161), in Lake County. Both Dr. Lynds Jones and Mr. W. L. Dawson state in their publications that they have never found this species breeding, nor was it reported to Dr. Jones by his large number of correspondents, among whom, incidentally, were two observers from Lucas County. This makes a total of but three published records for the state of Ohio up to the year 1926. It is also interesting to note that in "Michigan Bird Life," by Professor Barrows (1912), there is no mention of its occurrence in the bordering counties of Michigan.

In the years 1926 to 1928, however, there was a very decided increase in the number of breeding Savannah Sparrows in Ohio. I am indebted to Mr. Charles Walker for the following records of the Wheaton Club of Columbus, Ohio. In 1926 this species was found "breeding commonly" at Camp Perry in Ottawa County by Mr. E. S. Thomas. In 1926, 1927, and 1928 a few pairs were found in Huron County by Mr. Walker, and in 1928 Mr. Trautman located one or two pairs in southern Delaware County. Besides these records of the Wheaton Club, there is a report in *Bird-Lore* of July-August, 1928, of a pair nesting at Youngstown, Trumbull County (Mr. Christy). From Lake County Mr. Doolittle sends word that his small colony of from one to three pairs still persists. These birds, therefore, do not enter into the picture.

My own observations of bird-life in Lucas County began in 1926. In 1927 I found four pairs of Savannah Sparrows rather widely separated. The year 1928 brought a very great increase, due to some extent, no doubt, to my greater familiarity with the song of the species. Counting each singing male in the nesting time a pair, I have the following records: Wood County, 1; Ottawa County, 4; and Lucas County, 41, which includes a single colony of about 20 pairs on the east shore of Maumee Bay. The remaining were mostly in small groups of two or three pairs. It must be borne in mind that I did not make any special search for these sparrows, merely listing them on the usual field trips. All of these recent records would certainly seem to indicate a southern movement throughout Ohio.

Any change which may have been made in the physical condition of the state through clearing or drainage would in all probability be unimportant when dealing with a bird as easily suited as the Savannah Sparrow. Its choice ranges from a "pasture of rather barren soil with many granite boulders scattered about" in Lake

County, to a cranberry bog in Huron County. I have found this species on the borders of wet prairies with Henslow's Sparrows, in hay fields and meadows with Grasshopper Sparrows, and in clover fields with the Dickcissel. The only requisite seems to be the presence of water nearby, whether it be a narrow drainage ditch or Lake Erie itself. In fact there is a tendency to group in large numbers along the lake. This is brought out by Mr. Thomas' observations at Camp Perry, which is on the lake, and my own on Maumee Bay.

It would, of course, be foolish to attempt to draw any conclusions from the records of three years but I am presenting these facts for the consideration of other observers. Perhaps this species has always been present through the state, but I cannot believe that such pioneer ornithologists as Dr. Kirtland and Dr. Wheaton, and, in later years, Dr. Lynds Jones and Mr. W. L. Dawson could have so consistently and unanimously overlooked a bird as comparatively easy to identify as the Savannah Sparrow.

Toledo, Ohio.

NESTING HABITS OF THE SEASIDE SPARROWS IN FLORIDA

BY DONALD J. NICHOLSON

The Seaside Sparrows are well represented among the extensive coastal marshes on the Forida Peninsula, which, taking all the curves and indentations, is about 3,000 miles of coast line. For miles along the Atlantic side, the Halifax and Indian Rivers parallel the ocean with a narrow strip of land between. In the river at places there are many islands and marshes with a network of creeks and sloughs running among them. Most of the marshes have heavy, extensive growths of *Salicornia*, or pickleweed, marsh grass, salt grass, and a sharp pointed grass or reed—a species of *Juncus*. In spots on Merritt's Island where the Dusky Seaside Sparrow breeds, and at Cape Sable where the Cape Sable Sparrow nests, there are large patches of bunch or switch-grass. Also among the Salicornia marshes small mangroves are found and are sometimes used for nest-sites by the Macgillivray's Sparrow. Among the bayous and mouths of the various rivers that flow into the Gulf, are favorite habitats of the Seasides of the West coast.

Florida has six breeding species and subspecies of Seaside Sparrows. The Macgillivray's and Dusky, both found breeding only on the Atlantic side; the Cape Sable Sparrow at the extreme southern end of the mainland at Cape Sable; and Scott's, Griscom's, and Howell's Seaside which range from Clear Water to Tarpon Springs north to the Alabama line.

Macgillivray's Seaside Sparrow

It is not supposed that the Macgillivray's breed south of Matanzas Inlet, but on June 22, 1925, I found quite a large colony breeding in the salt marshes on the Indian River, opposite New Smyrna, Volusia County, Florida, which is the southernmost record known. Scattered colonies are found from New Smyrna north almost to Daytona, according to A. H. Howell, of the U. S. Biological Survey.

According to Arthur T. Wayne (*Auk*, Vol. XLIV, April, 1927, page 254) Pea Island, North Carolina, is the most southern breeding record, and it breeds from that point to the southern breeding range of *P. m. maritimus* to the north. He also states that there is another race entirely different from the *macgillivraii*, which he discovered upon an examination of a series of skins, nests, and eggs taken at Cabbage Island, Warsaw Sound, near Savannah, Georgia, by Gilbert R. Rossignol, Jr., years ago. These Cabbage Island specimens are identical in color and size, with the Seasides which were referred to as *macgillivraii* by Alexander Sprunt, Jr., in his paper (*Auk*, Vol. XLIII, October, 1926, pages 549-550) according to Mr. Wayne's findings.

Specimens of a number of the Seaside Sparrows which breed at New Smyrna, Florida, were secured by A. H. Howell, and pronounced in Washington as true *macgillivraii*. It seems strange that the breeding colonies of Matanzas Inlet and New Smyrna, which are pronounced Macgillivray's should be nesting so far from others of this form; a jump from Pea Island, North Carolina, to Matanzas, Florida! Might it be possible that the members of the Biological Survey in Washington were mistaken? Mr. Wayne is now working on this puzzling distribution and I hope that he will soon publish his solution.

It was not known that the Macgillivray bred farther south than Matanzas Inlet region, and no Seasides were known to breed any farther south than Merritt's Island, the home of the Dusky, which is found in considerable numbers in suitable localities along the river's edge on the Island. I discovered a species of Seaside Sparrows nesting in the vast salt marshes on the Indian River opposite New Smyrna, on June 25, 1922. At the time, and for two years afterwards, I felt sure that I had found the Dusky; still there was a doubt in my mind, and this was settled by my friend, A. H. Howell, who secured specimens which he sent to Washington for identification, and which were found to be Macgillivray's.

The strange part about the colony is its *isolation* from others of this species. The bird is only found embracing a range of possibly ten miles in length, and none are again found until you reach Matanzas Inlet, a distance of about forty miles: with much of this inter-

vening region apparently much the same, one would naturally expect to find them. It would not be easy to overlook them if they were here, as they pour forth their jerky little songs quite regularly, frequently rising in the air while singing, to a height of thirty feet above the marshes.

The nest found on June 25, 1922, contained four eggs well incubated. It was built in the lower limbs of a small mangrove bush growing among tall marsh grass, and situated a few yards from the river. The nest was placed in the fork of a branch, with the bottom hanging in mid-air, and composed of dead marsh grass lined with

FIGURE 4. Nest and eggs of Macgillivray's Seaside Sparrow, Halifax River, near New Smyrna, Volusia County, Florida.

finer grass and deeply cupped. Where the bush stood the tide covered the marsh for a depth of several inches. The bird was not seen to flush, but was seen scolding with its mate a few yards away. No other occupied nests were discovered, but two other old nests were found in dense *Salicornia* a few inches from the ground.

At this point the river is very wide, perhaps three-quarters of a mile. There are many islands, coursed with shallow sloughs and mud flats exposed at low tide. Some are covered with dense growths of *Salicornia* mixed with marsh grass and fringed with mangrove trees and here and there among the open spots are small mangroves several feet high surrounded by the undergrowth. In these open spaces the Macgillivray's nested in colonized form, and were quite numerous. The birds would rise every few feet, and drop into the grass again.

Some took quite long flights of two hundred yards before alighting. Even when watched from concealment these long flights took place.

One morning just after sunrise I arrived on the scene and they were in full song all about me. Some perched unseen in the tops of the *Salicornia* or grass, and often in a mangrove bush. Occasionally, a bubbling male would rise on fluttering wings, singing as he flew upward and, in his descent, alight in the grass and resume the song. I have watched a male change his singing station a number of times within half an hour, flying from twenty to over one hundred feet, and continue his buzzing song. Many males sing at the same time, and this continues all day, until after sundown, but there are periods during the heat of the day when all are silent. These lapses are short, and in about forty-five minutes some smitten male will burst out in song and the others will follow.

It was not until April 20, 1925, that I visited this colony again, and fortunately I struck them at the beginning of the season, and full sets were in order. I took five complete sets of three eggs each, and the following day took another set of three eggs, and found an incomplete set of two eggs. Six of these were built in marsh grass or *Salicornia* from ten to twenty-four inches from the ground. The other nest was built 2½ feet up in a young mangrove. All nests were extremely well concealed, and it was necessary to part the grass in most cases to find them. I watched the bird from a distance fly to the mangrove nest and flushed her at a few feet. But in most cases it is pure perseverance that rewards one. Seldom a bird is flushed off the nest. They never drop to the ground and run, but always fly directly from the nest. All seven nests were built of the same material—dead marsh grass, lined with finer grass, neatly cupped, but varied in size considerably. Later in June I discovered another nest with four naked young, in a small mangrove bush, making three found in bushes.

On April 25, 1926, in company with William Leon Dawson, I visited the same colony and found them a trifle earlier. One nest contained a single fresh egg, another three young in pin feathers, and two other nests containing three incubated eggs each. All four were in the *Salicornia* or grass. Out of a total of thirteen nests examined up to this time only three nests held four eggs or young; but in the season of 1927, four nests with four eggs or young were found, also two nests with three eggs and a complete set of two eggs badly incubated.

Numbers of times I have found one or two eggs, or a nest ready for eggs, and left for complete sets, only to return to find them in-

variably destroyed; and the only logical conclusion is that the sparrows destroy the nests themselves, as it could not just happen in so many instances. In no case did I ever find a Macgillivray nest resting on the ground, and in the greatest majority of cases the nests were open-topped and not arched; but some of the nests found in marsh grass had a canopy or arch built of green or dead grass, or both, bent over and woven in sides of nest. In numerous nests discovered never more than four eggs or young have been noted, with three eggs in majority. Only four nests have been found in small mangroves, and all others in grass or *Salicornia*.

Dusky Seaside Sparrow

I had never seen a Dusky until May 2, 1926, when I was on a trip accompanied by Mr. Dawson on Merritt's Island, about fourteen miles North of Cocoa, Brevard County, Florida. The nature of the country is somewhat different from that around New Smyrna. The territory where a nice colony was found bordered the Indian River, and was covered with dense patches of *Salicornia* close to the water extending back many yards and beyond this in the drier parts, were patches of switch grass, a rush-like species of *Juncas;* and here and there in spots the thick luxuriant salt-grass grew. The sparrows nested as readily in the dry places as the moist ground, and if anything, preferred to nest on dry ground. This sort of country stretched for miles, as far as the eye could reach along the river, and through this ran sloughs, creeks, and bayous.

Soon as we reached this place we saw several of the birds flying about, and their songs appeared to us a little different from those of the Macgillivray's, and the two songs would have to be heard together to notice any appreciable difference. The best description of the song that I can give is the following: It is preceded by two metallic notes in the same pitch resembling *Dick, Dick,* and followed by a buzzing which is hard to describe. Different males have different songs, and some have four or five different songs. Another phase of the song is a series of bubbling, zig-zag notes similar in character to the song of the marsh wrens. So similar are the songs of the Macgillivray and Dusky Seasides, that we could not tell which bird it was until we had observed the Dusky at close range, and found them decidedly darker than the birds of the New Symrna district.

Dawson was the first to discover a nest with four young in the pinfeather stage, by seeing the parent fly directly to the nest. It was built in a lone bunch of switch-grass, ten inches above the ground, and extremely well concealed. The parents did not scold as we ex-

amined the nest. This was the first nest of this rare species that I had ever seen. Not to be outdone by a brother ornithologist, in a strange country, I soon located a second nest with four young about the same age, and in a similar situation.

The birds did not come near and were not seen. These two nests were the only ones found and we felt well rewarded in our first attempt. I did, however, find a young bird just out of the nest, by watching the parent patiently. The parent held in her bill a large green worm fully an inch long, and fed it to the young, after holding it about ten minutes scolding, and too cautious to reveal her mission. I caught the young after a lively chase, and after securing several excellent pictures, set it free.

It was quite evident that the first nesting was about over, as no new nests were seen. It is apparent that the Dusky and the Macgillivray begin nesting about the same time, and fresh eggs may be expected by April 20.

I figured that the birds would rear another brood in about six weeks and from the following account will be seen how well my surmise was calculated.

On June 20, 1926, I again visited this interesting colony, and found the marshes fairly sizzling with their peculiar songs. Birds were heard in every direction, from the grass-clumps, *Salicornia*, rushes, and salt-grass and very infrequently, a male would rise in full song to a height of twenty to forty feet, dropping back to the grass on quivering wings.

After an all-day search in the scorching hot sun, looking in every possible place for nests, I succeeded in finding two sets of four eggs and a nest with three eggs. The first one was found by raking the short dead salt-grass with the toe of my shoe, and came near upsetting the first nest with eggs that I had ever found. The bottom of the nest did not quite touch the ground, but very close to it.

The next nest was built in the dead top of living *Salicornia* twelve inches above the ground, and the bird flushed at eight feet alighting in the grass ten feet away. She soon flew some distance away. The third nest was well concealed in a slim bunch of switch-grass (only about ten inches wide) out in the open. It contained three fresh eggs. The male scolded fifty feet away.

Desiring a nice series of the eggs of this little known species I again returned on June 27, 1926, and was well rewarded. Upon this

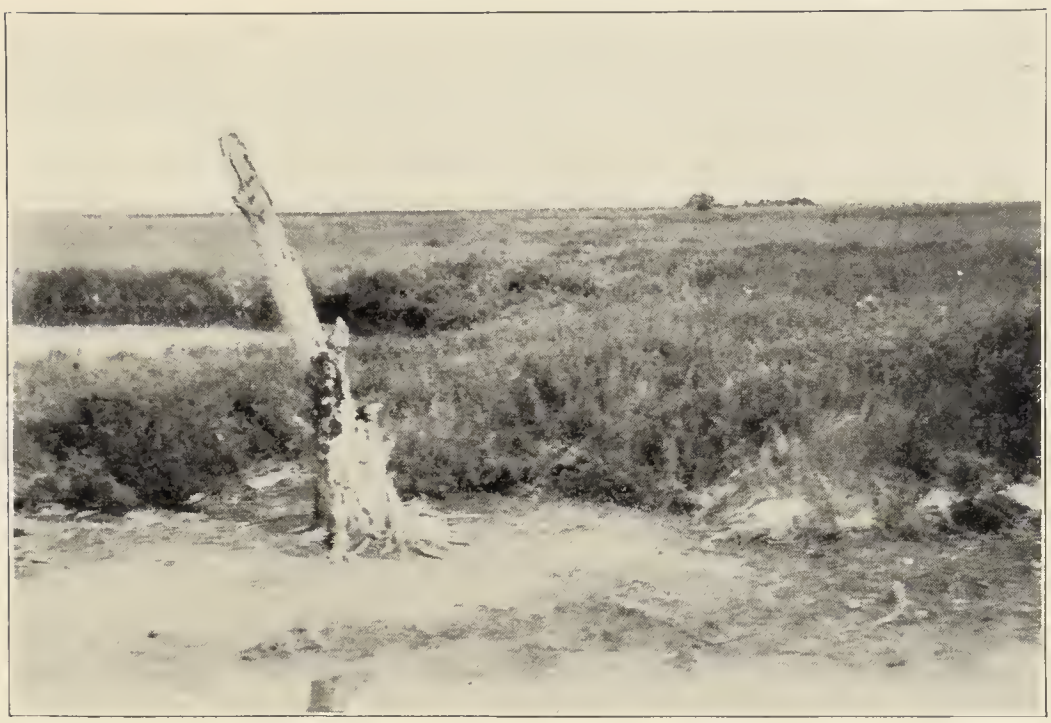

FIGURE 5. Typical nesting grounds of the Dusky Seaside Sparrow bordering the Indian River on Merritt's Island, Brevard County, Florida.

FIGURE 6. Nest and four eggs in Salicornia of Dusky Seaside Sparrow on Merritt's Island, Brevard County, Florida.

date the second broods were in bull blast, and I was fortunate enough to locate fourteen nests, summarized as follows:

One nest with two eggs.
One nest with one egg.
Two nests ready for eggs.
One nest with three small young and one egg.
One nest with one young and two eggs.
Six nests with four eggs each.
Two nests with three eggs each.

None of these were found upon the ground, and the average height above the ground was twelve or fourteen inches, except one nest found on June 20, which was within two inches of the ground. I am of the opinion that the birds of this particular colony *do not* build upon the ground. These fourteen nests were built in either dense growth of *Salicornia*, in isolated bunches of switch-grass, or in patches of *Juncus*.

In the switch-grass were found the cleverest and most artful nests which were marvels from a standpoint of concealment. The nests were constructed of the same grass, and attached to the stems. When standing within a few feet or even directly over the nest, some of these nests could not be detected. A neat little trick, practiced in a number of instances, was the habit of scattering a few wisps of grass *carelessly* but directly, over the nest proper, thus shielding it from view from above and giving it the decided effect of an incompleted nest, so deftly and craftily was this done. Looking directly down upon such a protected nest I was on the point of passing on, but by removing the obstruction four speckled eggs were revealed. This custom, perhaps, serves a two fold purpose; first for protection against marauders, and to shield it from the sun. On the same day I came upon a nest that I had found, on a previous trip, in the process of construction, and upon returning to it, found it apparently in the same condition as when first discovered; but remembering the trick I lifted the grass and there were four fresh eggs.

The tendency to build arched nests seems stronger in the Dusky than in Macgillivray's, and a greater number of arched nests have been found. The most beautiful nests of the Dusky are built in burned-over clumps of switch-grass where the green fresh grass has grown about a foot high. In such sites the green grass is bent over to form a canopy with the entrance over the rim of the nest. These are ex-

FIGURE 7. Nest and four eggs of the Dusky Seaside Sparrow in rushes on Merritt's Island, Brevard County, Florida.

FIGURE 8. Nest and four young of Dusky Seaside Sparrow in switch-grass on Merritt's Island, Brevard County, Florida.

tremely hard to find. I once found a nest built in a red-wing's nest. which the sparrows had arched.

All nests built in *Salicornia* or switch-grass were made of grass, deeply cupped, and lined with finer grasses. Nests found in rushes were made of dead pieces of this coarse round-stemmed grass, lined with fine grass.

The breeding season continues for about five months, beginning in April and lasting until early August. On July 13, while searching for Black Rails I discovered two nests of this sparrow each with two fresh eggs. And on July 20 a few males were heard singing.

The eggs of the Macgillivray's and Dusky Seaside Sparrows are quite similar in size and shape. Most specimens are enlongated with blunt ends, while some sets are more or less rounded. The eggs are more richly marked in the Dusky, with bolder markings of rich chestnut, and are often capped at the large end. Specimens of both species are as a rule finely sprinkled with light browns, greys, and lavender, and some sets are indistinguishable. The sets of larger numbers are in favor of the Dusky. and I believe Oscar Baynard, who found the type set, reported sets of five eggs.

The behavior of the two species around the nests is quite similar but I believe the Dusky travels farther for food, and was seen to make quite extended flights.

There is a species of ant that builds its nest in the grass, and after several heavy rains I found that it had built nests in the same grass clumps with the sparrows in three instances. The birds were compelled to desert their eggs. The nests were alive with ants, though the eggs were unharmed. Rats and Crows must play a part in the destruction of these eggs, as I found several destroyed, with broken eggshell in the nest. It is my belief that the sparrows also destroy their own eggs, for I have four or five times found nests with one or two eggs and upon returning always found them broken up.

Cape Sable Seaside Sparrow

The Cape Sable Sparrow was only recently discovered by A. H. Howell, of the U. S. Biological Survey, while working on his latest book, "The Birds of Florida." It is entirely different from any other Seaside Sparrow and is considered a full species. The type specimen was taken at Cape Sable, Munroe County, Florida, and is extremely local in distribution, with a total range of about nine miles long and a mile wide, and is found nowhere else.

H. H. Bailey, of Miami, was the first man to discover the nest of this very rare bird. His nest contained three eggs, taken in the

early part of May. No other nests had been found until 1926, when Edw. J. Court, on his trip to southern Florida, succeeded in finding a nest with eggs, which was the second in existence to my knowledge.

While on an expedition to the southern part of Florida with Wm. Leon Dawson in April, 1927, I was fortunate in finding three occupied nests, and collected a fine set of four eggs, which I have in my collection, making the third set known to science.

As nothing has ever been written about the habits of this new sparrow it might be well to relate my experience in detail.

The topography of the Cape Sable region is peculiarly different from the other parts of Florida, and many strange tropical trees abound in the big black mangrove swamps that are not found elsewhere in the State. In spots where one would expect to find wet low lands, a kind of desert vegetation abounds, such as cactus, century plants, and thorny trees and vines. Along the shore line of the Bay of Florida, is a fringe of mangrove trees, and just back of this is the peculiar vegetation spoken of above. Beyond this is a low, flat savanna covered with extensive patches of switch-grass, and, in places, acres of salt-grass, mingled with brackish shallow ponds. On the other side of the savanna are dotted clumps of black mangrove, cabbage palms, and other varieties of trees; and beyond is the heavy dense mangrove swamp. Back of the windbreak and in the savannas is where these sparrows make their home, shielded from the strong winds that sweep over the Gulf. In September, 1926, this entire region was in the throes of the most terrific hurricane Florida ever experienced, and the water washed over their haunts six and eight feet high. Where they went and how they survived through the storm that lasted three days I do not know.

The country is still about as wild as ever, and five families would cover an area of twenty miles.

Dawson, and two other members of the party with myself, arrived at the Cape on April 9, 1927. That night sleep was almost out of the question, for the sandflies and vicious, bloodthirsty mosquitoes came near killing us. Three nights were spent in such misery, until one of the natives told us to use a deserted house and build a smudge of black mangrove wood. This we did, and slept in comfort. It had not rained in four to five months, and the water supply came from rain water housed in open cisterns filled with bugs and flies. We did not care to drink this filth and were obliged to go 150 miles for twenty gallons of water. This, after we had traveled 315 miles to get to the territory.

On April 10 I started out for the sparrows not knowing exactly where to find them, and was following directions, given by my friend Howell, which are always hard to fathom in strange country. I soon sighted a scope of country that looked promising, but had to swim a canal with my clothes on to reach it. In twenty minutes I had sighted my first Cape Sable Sparrow, which rose and flew hurriedly away and lit in the grass. Soon another flushed and I could hear their weak calls among the grass. Coming to several scattered bunches of switch-grass near a shallow pond, I thought I would give it a search and in a few minutes was staring down upon my first set of four eggs of this very rare sparrow.

There was no bird in sight nor did I see one leave the nest, and there was no indication that sparrows owned this nest, so quiet and indifferent were the birds. I left the nest for fifteen minutes and returning flushed her off the nest at ten feet. She flew directly from the nest and perched on top of the grass fifteen feet away, giving a weak chirp and no other sound. Soon she disappeared seeming indifferent to the fate of her nest.

This nest was situated sixteen inches above the ground in switch-grass, about midway; and made of dead grass lined with finer blades of grass neatly cupped. Over the top of nest enough grass was placed to conceal it, though it could not be strictly called an arched nest. It gave the impression of a nest just begun. A clever stunt much used by the Dusky Sparrow. No more nests were found that day, and the number of birds seen was far less than the birds found in the colonies of Macgillivray's and Dusky Seasides.

Again on April 13, 1927, I returned with Dawson and the other two parties, determined to find more nests. I found three nests, while the others were not so fortunate and had to content themselves with examining mine. The first nest was built in the short salt-grass several inches above the ground, built of the same material, lined with fine grasses. It was only found by accidentally parting the grass and contained three young about two days old. The parents were quite solicitous, scolding with a loud chipping note, accompanied by jerks of the tail. The two preceding species also had this habit. A second nest was located by observing the parent fly into a dense clump of switch-grass three different times. Twice I searched well but could not find a nest, but the third time was rewarded by finding the nest with three young of the same age as found in the other nest. A deserted nest that had been occupied earlier in the season was found several inches above the ground in dense patch of salt-grass.

As I was alone the day I found the set of eggs and could not swim and carry my Graflex, and not daring to leave the set for fear of destruction, I did not secure any pictures.

On May 2 or 3, 1928, while searching for the eggs of the Swallow-tailed Kite, I saw and heard a male Cape Sable Sparrow in full song about forty miles north of the supposed limit of its range. The exact location was six miles northwest of a small village called Pinecrest, in Munroe County, Florida. The bird was seen among the tall bunches of switch grass, on a savanna surrounded by pine forests, possibly eight or ten miles from the Gulf. Ordinarily, water stands on this open spot, but the severe drouth in Florida for the last two years caused this area to become dry and dusty. This bird was not secured, and of course identification was not positively established, but it could hardly have been any other species and was evidently breeding. Further investigation may reveal a wider range for this species than is now known.

The nesting habits and customs are quite like the preceding species, and the eggs were like those of other Seasides. The songs seemed to me weaker, and slightly different in tone but uttered in the same characteristic fashion. Flight songs were also noted.

This sparrow nests much earlier than any other Seaside Sparrow as several fledglings were seen on the wing on April 13. These young must have come from nests built about March 15. I might say in conclusion that nests of these three species are among the most difficult to find, so well are they hidden.

The three subspecies of Seasides inhabiting the Gulf Coast I have never seen, and know nothing of their habits.

Orlando, Florida.

BIRDS OF UPPER SOUTH CAROLINA: A STUDY IN GEOGRAPHICAL DISTRIBUTION

BY A. L. PICKENS

[Concluded from the WILSON BULLETIN, September, 1928, p. 191]

CHIMNEY SWIFT. *Chaetura pelagica.* Common summer resident.

RUBY-THROATED HUMMINGBIRD. *Archilochus colubris.* Common summer resident.

KINGBIRD. *Tyrannus tyrannus.* Common summer resident.

CRESTED FLYCATCHER. *Myiarchus crinitus.* Common summer resident.

PHOEBE. *Sayornis phoebe.* Winters in Piedmont; breeds in the mountains.

WOOD PEWEE. *Myiochanes virens.* Common summer resident.

ACADIAN FLYCATCHER. *Empidonax virescens.* Common summer resident. Carolinian form ranging into the mountains, to about 2500 feet.

PRAIRIE HORNED LARK. *Otocoris alpestris praticola.* Found in winter in the lower Piedmont, at times abundant, and ranging occasionally higher in the hills.

BLUE JAY. *Cyanocitta cristata cristata.* Abundant throughout the year.

NORTHERN RAVEN. *Corvus corax principalis.* Once a yearly resident in the mountains, this species is apparently being driven back from its old nesting sites deeper into the mountains. Still occurs at times, especially in winter.

CROW. *Corvus brachyrhynchos brachyrhynchos.* Abundant throughout the year.

FISH CROW. *Corvus ossifragus.* This Carolinian bird is rare even in the lower Piedmont, probably on account of the distance from the coast and smaler rivers. Wm. Hahn, Jr., reports a single nest in the lower Piedmont in April, 1925.

STARLING. *Sturnus vulgaris.* Becoming common throughout the year about towns.

BOBOLINK. *Dolichonyx oryzivorus.* Common migrant, especially in spring.

COWBIRD. *Molothrus ater ater.* Common in lower Piedmont in winter.

YELLOW-HEADED BLACKBIRD. *Xanthocephalus xanthocephalus.* Accidental, at times in the winter, in the lower Piedmont.

Red-winged Blackbird. *Agelaius phoeniceus phoeniceus.* Common in summer, returning in winter during warm periods, especially in lower Piedmont.

Meadowlark. *Sturnella magna magna.* Chiefly a winter resident, but some pairs have been found breeding both in the upper and lower Piedmont.

Orchard Oriole. *Icterus spurius.* Curiously enough, this, sometimes called an Alleghanian form, I have found breeding only in the lower Piedmont near the Austroriparian Zone. There it breeds abundantly, when further up the country one cannot be found. The wide valleys of the Broad River and the Savannah appear to invite it farther north into the upper Piedmont, locally, however.

Baltimore Oriole. *Icterus galbula.* Chiefly a migrant, but Mr. C. A. David of Greenville, found nests in his yard in several different seasons.

Rusty Blackbird. *Euphagus carolinus.* Common in winter, especially in lower Piedmont.

Brewer's Blackbird. *Euphagus cyanocephalus.* Mr. Loomis took specimens of this bird at Chester in the lower Piedmont in 1886. Forty years later Prof. Franklin Sherman and a student found specimens near Clemson College in the upper Piedmont and near the mountains. A rare winter resident apparently.

Purple Grackle. *Quiscalus quiscula quiscula.* Found in winter in the Piedmont, but Mr. Hahn has also found it breeding in Greenwood County.

Bronzed Grackle. *Quiscalus quiscula aeneus.* Reported from lower Piedmont in winter by Loomis. Abundant, at least, at times.

Purple Finch. *Carpodacus purpureus purpureus.* Common in winter.

English Sparrow. *Passer domesticus domesticus.* Abundant throughout the year.

Crossbill. *Loxia curvirostra minor.* It is somewhat strange that this bird which nests in the mountains, and winters on the coast-plain, should not be recorded, even as a migrant, in the intermediate Piedmont. Mr. N. C. Brown has reported it at Camden on the fall-line, which gives it the right to mention.

Goldfinch. *Astragalinus tristis tristis.* Common in the Piedmont in winter. Breeds in the mountains, making excursions into the upper Piedmont during summer.

Pine Siskin. *Spinus pinus.* Common winter resident.

Lapland Longspur. *Calcarius lapponicus lapponicus.* One record from Chester, by Mr. Loomis, January 1, 1881.

Smith's Longspur. *Calcarius pictus.* Two specimens from Chester by Mr. Loomis, one, December 1, 1880, and one February 9, 1889.

Vesper Sparrow. *Pooecetes gramineus gramineus.* Common winter resident.

Savannah Sparrow. *Passerculus sandwichensis savanna.* Common in winter in lower Piedmont.

Grasshopper Sparrow. *Ammodramus savannarum australis.* Summer in lower Piedmont, and along Broad River valley still higher.

Henslow's Sparrow. *Passerherbulus henslowi henslowi.* Migrant in lower Piedmont.

Leconte's Sparrow. *Passerherbulus lecontei.* Winters in lower Piedmont.

White-throated Sparrow. *Zonotrichia albicollis.* Common winter resident.

Chipping Sparrow. *Spizella passerina passerina.* Summer resident, but found in winter near fall-line.

Field Sparrow. *Spizella pusilla pusilla.* Common yearly resident.

Slate-colored Junco. *Junco hyemalis hyemalis.* Common in winter. The Carolina variety, *J. h. carolinensis*, appears to visit us in very cold weather.

Bachman's Sparrow. *Peucaea aestivalis bachmani.* Summer visitor in lower Piedmont. An Austral form apparently limited to the lower Piedmont.

Song Sparrow. *Melospiza melodia melodia.* Common winter resident in Piedmont; found in mountain valleys occasionally during the summer.

Swamp Sparrow. *Melospiza georgiana.* Loomis records it at Chester as a common migrant; Hahn at Greenwood as a winter resident; at Greenville I have noted it only as a spring migrant.

Fox Sparrow. *Passerella iliaca iliaca.* Winter resident, arriving late.

Towhee. *Pipilo erythrophthalmus erythrophthalmus.* Common yearly resident, and of *P. e. alleni*, a single female was found breeding near Greenwood by Mr. Hahn, 1923.

Cardinal. *Cardinalis cardinalis cardinalis.* Common yearly resident. An Austral form ranging into the mountains, at points, quite to the summit.

Rose-breasted Grosbeak. *Hedymeles ludovicianus.* A somewhat uncommon migrant. I have found it at Greenville only in spring.

Blue Grosbeak. *Guiraca caerula caerula.* Common summer resident to foot of the mountains.

Indigo Bunting. *Passerina cyanea.* Common summer resident.

Painted Bunting. *Passerina ciris.* I have noted a single female barely above the fall-line near Columbia, May 21, 1923.

Dickcissel. *Spiza americana.* Formerly nested in lower Piedmont, as noted in Wayne's Birds of South Carolina.

Scarlet Tanager. *Piranga erythromelas.* Migrant in Piedmont. Breeds in mountains.

Summer Tanager. *Piranga rubra rubra.* Common summer resident, even in mountains.

Purple Martin. *Progne subis subis.* Common summer resident.

Barn Swallow. *Hirundo erythrogastra.* Migrant in lower Piedmont.

Tree Swallow. *Iridoprocne bicolor.* I have encountered this species only on the coast-plain during migration, but Loomis records two specimens from Chester in the lower Piedmont.

Rough-winged Swallow. *Stelgidopteryx serripennis.* Common summer resident.

Cedar Waxwing. *Bombycila cedrorum.* Found in higher Piedmont, or in the nearby mountains nearly every month in the year, but nests in this state remain to be discovered.

Loggerhead Shrike. *Lanius ludovicianus ludovicianus.* Yearly resident, but more common in the winter. Seeking the *migrans* variety I have measured a specimen, taken near Greenville, with the characteristics of the present form even more marked than in specimens from Florida. An Austroriparian form often found near the mountains in summer.

Red-eyed Vireo. *Vireosylva olivacea.* Common summer resident.

Yellow-throated Vireo. *Lanivireo flavifrons.* A common migrant; breeds at times.

Blue-headed Vireo. *Lanivireo solitarius solitarius.* Occasional migrant. The Mountain Solitary variety; *L. s. alticola*, is a common

summer resident in the higher mountains. This is a Canadian and Alleghanian form.

White-eyed Vireo. *Vireo griseus griseus.* Summer resident throughout Piedmont, to foot of the mountains.

Black and White Warbler. *Mniotilta varia.* Common summer resident, in higher Piedmont and in mountains. Migrant in lower Piedmont.

Prothonotary Warbler. *Protonotaria citrea.* Of this Austral form that ranges so far north in the Mississippi Valley, I have but two records in upper South Carolina, neither above five hundred feet in regard to altitude.

Swainson's Warbler. *Lymnothlypis swainsoni.* Loomis found one in Chester County, and Mr. Hahn three in Greenwood, and a single nest, July 3, 1924. All these records and others are below or in the lower Piedmont, and this is an Austroriparian species.

Worm-eating Warbler. *Helmitheros vermivorus.* A Carolinian form that is migrant in the Piedmont but breeds in the mountains. Fairly common, from the lower valleys on up.

Blue-winged Warbler. *Vermivora pinus.* One specimen from Chester, April 30, 1887. Collected by Loomis.

Golden-winged Warbler. *Vermivora chrysoptera.* A rare migrant in Piedmont, and Loomis found it nesting near Caesars' Head. Visiting the identical spot as shown on the map, I failed to find any, some thirty years later. An Alleghanian form.

Nashville Warbler. *Vermivora ruficapilla.* This heretofore hypothetical species was collected near Clemson College by Mr. G. E. Hudson, April 27, 1927. (*Auk*, January, 1928).

Tennessee Warbler. *Vermivora peregrina.* A common fall migrant in the Piedmont.

Northern Parula Warbler. *Compsothlypis americana pusilla.* Intergradations of both this and the typical Parula, *C. a. americana* occur in the Piedmont during migration. Apparently the northern form is more common as a mountain breeder.

Cape May Warbler. *Dendroica tigrina.* A common spring migrant about Greenville.

Yellow Warbler. *Dendroica aestiva aestiva.* Common migrant; breeds in mountain valleys, and perhaps in upper Piedmont.

Black-throated Blue Warbler. *Dendroica caerulescens caerulescens.* Both the typical form and Cairn's variety, *D. c. cairnsi*, are found in the Piedmont as migrants, the latter may occasionally breed in our mountains. Both are Alleghanian forms.

Myrtle Warbler. *Dendroica coronta.* Common migrant; often seen in winter.

Magnolia Warbler. *Dendroica magnolia.* A less common migrant.

Cerulean Warbler. *Dendroica cerulea.* Migrant, reported only from lower Piedmont.

Chestnut-sided Warbler. *Dendroica pensylvanica.* An Alleghanian species breeding in the mountains. Migrant in the Piedmont.

Bay-breasted Warbler. *Dendroica castanea.* Spring migrant in Piedmont.

Black-poll Warbler. *Dendroica striata.* Common spring migrant.

Blackburnian Warbler. *Dendroica fusca.* Migrant. Loomis found it common in the autumn though rare in spring. My observations are rather for spring. He took specimens in the higher mountains in June.

Yellow-throated Warbler. *Dendroica dominica dominica.* Loomis found this common in summer at Chester in the lower Piedmont. This is an Austroriparian form. The Sycamore variety, *D. d. albilora*, ranges also into the Carolinian, and this form Loomis found breeding in Pickens County near, or among, the mountains.

Black-throated Green Warbler. *Dendroica virens.* An Alleghanian species that nests in the mountains. Migrant through Piedmont.

Kirtland's Warbler. *Dendroica kirtlandi.* Recorded by Loomis and also by Jenness as migrant in the eastern part of the Piedmont. No other records.

Pine Warbler. *Dendroica vigorsi.* Common yearly resident; common in winter.

Palm Warbler. *Dendroica palmarum palmarum.* As far east as Chester, Loomis found this and its variety, the Yellow Palm Warbler, *D. p. hypochrysea*, about equal in number in spring. I have found it very rare in any form in the higher Piedmont.

Prairie Warbler. *Dendroica discolor.* Piedmont migrant; in mountain valleys in summer. A species of the Austral zones.

Oven-bird. *Seiurus aurocapillus.* Migrant in Piedmont; common mountain breeder, seeming to prefer higher altitudes though a Carolinian form.

Water-thrush. *Seiurus noveboracensis.* Migratory in lower Piedmont. Most forms according to Loomis are *S. n. notabilis*, or Grinnell's Water-thrush, others being intermediate with true *S. n. noveboracensis.* which is rare.

Louisiana Water-thrush. *Seiurus motacilla.* A Carolinian form common in the mountains in summer, and migrating through the Piedmont.

Kentucky Warbler. *Oporornis formosus.* Migrant in Piedmont; breeds in mountains. A Carolinian form.

Connecticut Warbler. *Oporornis agilis.* Rare spring migrant in Piedmont, by all records from Loomis and my notes. This is interesting, as the spring route of this species is supposed to barely tip the western corner of the state.

Maryland Yellow-throat. *Geothlypis trichas trichas.* A common summer resident. The Florida variety, *G. t. ignota*, occurs along the fall-line even in winter.

Yellow-breasted Chat. *Icteria virens virens.* Common summer resident throughout the Piedmont, and to the tops of the mountains, though an Austral form.

Hooded Warbler. *Wilsonia citrina.* Common migrant in Piedmont, and less frequent as a summer resident; breeds well up into the mountains.

Wilson's Warbler. *Wilsonia pusilla pusilla.* Loomis' record of May 10, 1887, at Chester, remains the only one, for not only upper South Carolina, but the state, except for two males taken by Mr. G. E. Hudson near Clemson in the spring of 1927. (*Auk.* January, 1928).

Canada Warbler. *Wilsonia canadensis.* Migrant in Piedmont; rarer in fall.

Redstart. *Setophaga ruticilla.* A common migrant both spring and fall.

Pipit. *Anthus rubescens.* Migrant in upper Piedmont; in winter in lower.

Mockingbird. *Mimus polyglottos polyglottos.* Common yearly resident in Piedmont.

Catbird. *Dumetella carolinensis.* Common summer resident.

Brown Thrasher. *Toxostoma rufum.* Common yearly resident.

Carolina Wren. *Thryothorus ludovicianus ludovicianus.* Common yearly resident.

Bewick's Wren. *Thryomanes bewicki bewicki.* In Piedmont in winter; breeds in mountains. A Carolinian form.

House Wren. *Troglodytes aedon aedon.* Rare at all seasons; one breeding record from the lower Piedmont.

Winter Wren. *Nannus hiemalis hiemalis.* Common winter resident.

Short-billed Marsh Wren. *Cistothorus stellaris.* Rare during migration.

Long-billed Marsh. Wren. *Telmatodytes palustris palustris* Migrant at Chester.

Brown Creeper. *Certhia familiaris americana.* Common winter resident.

White-breasted Nuthatch. *Sitta carolinensis carolinensis.* Yearly resident at points in upper Piedmont and mountains. Would appear to be a winter resident only, at some points, which may indicate a dividing area between this and the Florida variety of the species which occurs nearer the coast, *S. c. atkinsi.*

Red-breasted Nuthatch. *Sitta canadensis.* A rare migrant.

Brown-headed Nuthatch. *Sitta pusilla.* This Austroriparian form is a yearly resident and breeder to about 2000 feet in the Alpine regions.

Tufted Titmouse. *Bacolophus bicolor.* Carolinian form; yearly resident.

Carolina Chickadee. *Penthcstes carolinensis.* Throughout year; Carolinian form. This and the preceding occur to the mountain-tops and down in the Piedmont regions. Of the occurrence of the Common Chickadee, *Penthcstes atricapillus,* in winter in the lower Piedmont section there is good hypothetical evidence.

Golden-crowned Kinglet. *Regulus satrapa satrapa.* Common winter resident.

Ruby-crowned Kinglet. *Regulus calendula calendula.* Common winter resident.

Blue-gray Gnatcatcher. *Polioptila cacrula caerula.* An Austral form. Summer resident, but more common during migration, in

the Piedmont; does not nest in the mountains as a rule, it would seem, though it may penetrate mountain vales.

Wood Thrush. *Hylocichla mustelina.* A common summer resident.

Veery. *Hylocichla fuscescens fuscescens.* A common migrant. An accidental Willow Thrush, *H. f. salicicola*, was taken at Chester by Loomis, October 5, 1888.

Gray-cheeked Thrush. *Hylocichla aliciae aliciae.* A common migrant. Two of Bicknell's variety, *H. a. bicknelli*, were taken at Chester, by Loomis in the migrations of the spring and fall of 1887.

Olive-backed Thrush. *Hylocichla ustulata swainsoni.* A common migrant.

Hermit Thrush. *Hylocichla guttata pallasi.* Common winter resident.

Robin. *Planesticus migratorius migratorius.* Winter resident. The Southern and Carolinian form, *P. m. achrusterus*, nests in the upper Piedmont and mountains, and I have found it nesting at Rock Hill in York County. Here Hickory Knob, 1200 feet in altitude, and lower eminences of the Kings Mountain range, while less than alpine in height, serve to bring Carolinian and Austroriparian more sharply together along the upper Wateree than any place I have taken notice of.

Bluebird. *Sialia sialis sialis.* Common yearly resident.

[The foregoing list contains 220 named forms.—Ed.]

Greenville, South Carolina.

THE WILSON BULLETIN

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EDITORIAL

The annual meeting was held at Ann Arbor and was carried out as planned in every particular. The attendance was fully up to expectations. A full account of the meeting will be published in the March issue.

In the writer's boyhood a well-known lecturer (name forgotten) visited many parts of the country with a lecture entitled "Seeing the Elephant." Three blind men were taken to the circus to "see" the elephant. One took hold of the tail, another felt of the trunk, and the third surrounded a leg. Each one carried away a different impression of the elephant. Likewise, perhaps, different ornithologists have different impressions of the nature and importance of ornithology, according to the different phases of it with which they come in contact. So, our closet naturalists, or systematists, got hold of the tail and thought they had the whole thing; life history students surrounded the leg and took little interest in the rest; bird banders are feeling the trunk and are getting a wonderful sensation. All need to realize that the real body is greater than the parts. But many of us never get beyond the blind man stage.

A recent issue of one of the leading ornithological magazines of the world carries an advertisement of an important ornithological work now being issued. The publishers announce that "In order that this work shall not depreciate commercially, [the publishers] guarantee that, after its completion and on a date hereafter to be given, the unsold copies (if any) with the exception of a very limited number which will be retained for retail purposes, shall be destroyed."

This is probably a custom brought up from the past, and which we think hardly befits the age in which we are living. If the publishers were to profit by the destruction of the unsold copies we could understand the motive, and would consider it justifiable. But we do not see how they will gain. Only the owners of the existing books will have advantage by maintenance of the original price; and, presumably, the purchasers are mostly scientists who do not buy as an investment.

Why should not unsold remainders be held at the original price for future buyers five, ten, or more years hence? Even if sold at a reduction the publishers will be ahead more than by destroying the remainders. As the matter thus appears to us the proposal to destroy the remainders is wholly in the interest of the purchaser. This is difficult for us to understand when, as we believe, the work is purchased by scientists for its usefulness rather than as an investment. Surely science would be better served by the holding and subsequent distribution of the unsold work.

There may be a question here of the relation of the original selling price to the cost of production, which, however can only be considered with certain facts in hand. If at the completion of the work the publishers have not sold enough copies to pay for the publication, they do not add any to their income by destroying the remainders. If they have paid out on the copies sold and still have remainders which are to be destroyed, then it would seem that the subscribers take the loss. Perhaps after all we must realize that most publication, even of a scientific nature, is a commercial proposition, and is not to be judged by ideal ethical standards.

GENERAL NOTES

Conducted by M. H. Swenk

Breeding of the Florida Gallinule in Lake County, Ohio.—To my knowledge this is the first record of the Florida Gallinule breeding in this country. In late June, 1928, I discovered that a pair had remained, and judged from their actions and "talk" that they had a nest concealed somewhere along a certain point of marsh vegetation that extended into a swamp pond. Without a boat it was useless to search for the nest, but by keeping watch eventually I saw two of the young, and at the present writing (July 22) they can occasionally be seen along the edge of the water. They are in their first summer plumage.—E. A. Doolittle, *Painesville, Ohio.*

The European Starling in Calhoun County, Michigan.—Late in December, 1927, the European Starling (*Sturnus vulgaris*) was first observed near Battle Creek. There was a flock of about forty-five, and these birds spent the rest of the winter in the vicinity. They fed on scattered grain found around the barn yards.

The birds were still present this summer (1928). Two nests, the first observed in the vicinity, were found. Both were in telephone poles along the roadside. Of these two nests, the eggs were destroyed in one while a brood of four was reared in the other. Nearly every orchard immediately in this vicinity had a pair of Starlings present, probably nesting.

The birds were identified by their brownish-black color, yellow bill and their noisy character. The eggs were blue.—Lawrence Walkinshaw, *Battle Creek, Mich.*

The Pollination of Scarlet Sage Flowers by Hummingbirds.—The writer has been interested in the pollination of Salvias and other "hummingbird flowers" for quite a number of years. He does not happen to have the exact

dates that he has noted hummingbirds here at Ames, but as long ago as 1905 he observed the Ruby-throated Hummingbird (*Archilochus colubris*) upon the common Scarlet Sage, and frequently used it as an illustration of the relation of birds to the pollination of flowers. *Salvia splendens*, the Scarlet Sage now so commonly cultivated, is a native of Brazil, where it is one of the splendid "hummingbird flowers." We have quite a number of flowers pollinated by the Ruby-throated Hummingbird. One of these that I noted some years ago, in 1900, is the Jewelweed (*Impatiens fulva*). This is noted in my Ecology (p. 45).

Much has been written on the subject of pollination of the "hummingbird flowers." Dr. William Trelease (*Am. Nat.* xiv, p. 362, 1880) in several articles called attention to the pollination of such flowers as the *Passiflora incarnata*, *Oenothera sinuata*, *Lobelia cardinalis* and *Erythrina herbacea*. In another splendid article (*Am. Nat.* xv, pp. 265-269, fig. 1, 1881) he describes in detail the pollination of *Salvia splendens*, giving an excellent figure, and in another connection has mentioned the bird pollination of *Salvia gesneraefolia*. He notes the fact also in the first species that the color of the flower is most attractive to the hummingbird. Moreover, there is a reference here to the work of Fritz Mueller (*Bot. Zeit.*, p. 275, 1870) on Brazil, in which the author states that Scarlet Sages are commonly pollinated by hummingbirds. In other words, the South American hummingbirds are the important pollinators of the several *Salvias* occurring in that country.

Charles Robertson in several interesting articles has incidentally referred to the pollination of certain flowers by hummingbirds, and W. J. Beal (*Am. Nat.* xiv, p. 126, 1880) has called attention to the relationship existing between the Jewelweed and Ruby-throated Hummingbird, based on some observations made at Lansing, Michigan. My purpose in calling attention to these is the fact that I think there is a definite relationship existing between the migration of the Ruby-throated Hummingbird and the blooming of bird flowers; a matter that will be looked up later by Mr. W. M. Rosen and myself.

In a letter to me Dr. Stephens states that in 1926, on September 25 and 26, he observed the Ruby-throated Hummingbird at the *Salvia splendens* in Sioux City; that on September 25 of the same year Mr. Chas. J. Spiker saw it at the *Salvia* in another part of Sioux City; and that the same year it was observed as late as October 2 and 3 in Sioux City. Dr. Stephens further tells me that in Frank Pellett's book "Birds of the Wild" (p. 70) the hummingbird was noted at the *Salvia* as late as September 21 (year not given).

The writer was at Garner, Iowa, on October 6, 1928, and saw a beautiful patch of Scarlet Sage that was in full bloom being very appropriately used as an ornamental plant at an oil station. The owner of the station, Mr. Fred G. Hagel, told him that he had watched the hummingbirds on this all summer, and had observed sometimes as many as five or six of these birds at the same time visiting these flowers. During the last cold spell (September 26, 1928), Mr. Hagel found several hummingbirds evidently chilled. One of these died and one recovered.

Very few of the "hummingbird flowers" bloom as late as the introduced *Salvias*. I have seen the Coral Honeysuckle (*Lonicera sempervirens*) bloom as late as the month of September, but this is exceptional.—L. H. Pammel, *Ames, Iowa.*

The European Starling in Porter County, Indiana.—During the early spring months of 1927 I was greatly pleased to see a fine specimen of an European Starling (*Sturnus vulgaris*) at my farm near Wheeler, Indiana. His mate appeared a few days later. The pair nested in the cupola of a high barn. Later on, the whole family could be seen wheeling when in flight in their customary manner. All of these birds disappeared about Thanksgiving Day. This year two pairs nested in the cupola. They have now (October 2) all left the vicinity, except an adult male which can be seen every morning and evening perched on the top of a weather vane, enlivening the surroundings with his pleasing half whistling notes. I am anxious to encourage these birds, although they are fond of fruit and eat grain during the severe cold weather. They are insectivorous and frequently ride on the backs of sheep, searching for food.—Thos. D. Newton, *Wheeler, Ind.*

The European Starling at North Bristol, Trumbull County, Ohio.—A flock of eleven European Starlings (*Sturnus vulgaris*) appeared in Norton's ravine during zero weather in January, 1924, and remained about a month, feeding about the outlet of a spring. Several pairs nested the following summer in various hollow trees on the outskirts of the village of North Bristol. In every succeding summer these trees have been occupied by this species. For five successive winters Starlings have spent considerable time in and near the ravine during the severest weather, feeding and bathing at the spring outlet where I first saw them, but they never nested in any of the adjacent trees until 1928, when a pair occupied an old nesting site which had been used for years by Red-headed Woodpeckers. When the Red-headed Woodpecker arrived and found the site taken, it tried unsuccessfully to dispossess the intruders. After the Starlings had raised their brood, the red-heads again took possession of the hole. In 1927 it was the Starling which tried to dispossess the Red-headed Woodpecker. It launched no aggressive tactics, but sat in the tree hour after hour and squeaked, evidently hoping to wear out the patience of the other birds. Whenever the Red-headed Woodpecker could stand it no longer he flung himself at the Starling, but the latter bird only sailed into the air, then circled back to his perch, where he again continued his irritating squeak. After a week of this, the Starling gave up and left the vicinity. In August, 1926, appeared the first large flock of Starlings roaming around with a huge flock of Bronzed Grackles.—Marcia B. Clay, *North Bristol, Ohio.*

The Tennessee and Connecticut Warblers in Michigan.—On July 16, 1928, I found, in a small tamarack swamp at the head of an inland lake, at Huron Mountain, in northwestern Marquette County, Michigan, both the Tennessee Warbler (*Vermivora peregrina*) and the Connecticut Warbler (*Oporonis agilis*). Both were still in song, intermittently; and, while I could not be sure, I judged that more than one pair of each species were present. There was a thick undergrowth of alders, footing in the sphagnum bog was uncertain, and mosquitoes were rather bothersome. For all that, the birds responded to squeakings, and with the exercise of patience it was possible at length to get good views of both of them through the glass. The Connecticut Warbler was the more easily seen, perching more openly and moving in a more leisurely way, like a vireo; but the Tennessee Warbler, rather wary and ever active in the tangle of alder tops, was difficult. Unquestionably these were nesting birds.—Bayard H. Christy, *Sewickley, Pa.*

The Bander Is Found.—I have been able to get data as to the banding of the Marsh Hawk (*Circus hudsonius*), the capture of which was recorded in the June number of the WILSON BULLETIN (pp. 112-113) by Harold H. Bailey. According to Mr. Bailey's note the bird was shot by a friend in Brevard County, Florida, some time in November, 1927. It had a home-made aluminum band bearing the inscription "A. F. M., CoKato, Minn."

With the aid of N. E. Berg, Cokato postmaster, and the Cokato weekly newspaper, I have been able to locate the bander of the bird, Mr. Albin F. Mattson. On July 10, 1927, Mr. Mattson found a Marsh Hawk nest with five young. Four left the nest as he approached, but the fifth was much smaller than the others and it allowed Mr. Mattson to capture it. He carried it home and placed the band on it and brought it back to release it. Since this is the only bird Mr. Mattson has ever banded he has the enviable record of having received returns on 100 per cent of his banded bird(s).—GUSTAV SWANSON, *Minneapolis, Minn.*

The Snowy Owl in Tennessee.—On February 4, 1918, there appeared in one of our local papers, the following dispatch from Paris, in West Tennessee:

"White Owl Bagged. Paris, Tenn., Feb. 4.—A bird of an unusual variety has stirred up a great deal of interest in the New Boston section of Henry County. It was brought down by D. T. Emerson and it was finally decided to be a White Owl. It had beautiful plumage and was of very unusual size, measuring six feet from tip to tip."

I wrote immediately to Mr. Emerson and to the press correspondent at Paris, requesting that full particulars, and if possible the specimen itself, be sent me. On March 19th, I received by mail from Mr. Emerson a foot which I identified as that of a Snowy Owl (*Nyctea nyctea*) and a letter in which he stated that the bird had first been seen the day before he shot it, that it preferred sitting on the fence posts to the woods, and that it was perfectly white all over except for a few small black spots on the wings.

The preceding December and January had been abnormally cold months, January showing a temperature of 26.4° F. as against a normal 38.0° F., with a record breaking 10° below zero on the 12th, and also a record breaking snowfall of seventeen inches during the middle third of the month. During the week preceding February 3, the weather averaged 10° below normal, with no further snowfall.

This Snowy Owl is the only definite record for Tennessee of which I have knowledge.—A. F. GANIER, *Nashville, Tenn.*

The Sycamore Warbler in Arkansas.—Of the ten or more new records which I have been fortunate enough to secure this season, none impress me as being of as much importance as the finding of the Sycamore Warbler (*Dendroica dominica albilora*) as a resident here.

On June 24, 1928, the local boy scout troop opened their camp near Little Frog, one of the smaller mountain streams, about seven miles south of here. We had been in camp only a few hours when I started out with a group of scouts on a period of bird study instruction. We had been on this trip probably fifteen minutes when I first heard the note of these birds, and we soon found them, six in number, feeding in the tops of the sycamore trees that lined the bank of the stream. There were two adult birds and four young, just out of the nest, still being fed by the old birds. We watched them at very close range

with glasses for about thirty minutes before returning to camp. Later that day I went out with another group of boys for a longer trip, and this time we found ten birds, all but four of which were adults. We were in camp four days, and during our stay there these birds were one of the most common of the species present.

This location is in the northwest portion of the state, at an elevation of 1500 feet, and is altogether different from the Sunken Lands in eastern Arkansas, where Howell and Wheeler report the bird as a probable resident. This seems to be the first positive record of it as a summer resident in this state.—J. D. Black, *Winslow, Ark.*

A Diurnal Local Migration of the Black-capped Chickadee.—On May 20, 1928, while collecting at the tip of Sand Point (seven miles southwest of Caseville, Michigan), I witnessed a most interesting migration flight of Chickadees (*Penthestes atricapillus*). Sand Point juts out nearly four miles into Saginaw Bay from the southeast, and apparently forms an important point of departure for many species of birds migrating northward across the bay. The day was clear with but little wind. At 9:30 in the morning I noticed a compact flock of over fifty chickadees flitting rapidly through the brushy growth toward the end of the point. Their strange appearance immediately attracted my attention. They seemed very nervous and tense, with necks outstretched and feathers closely compressed against the body. They made no attempt to feed, but kept moving steadily toward the end of the point. Reaching the last tree, a twelve-foot sapling, the first birds flitted upward to the topmost twigs and there hesitated, lacking the courage to launch forth. But the rest of the flock, following close behind, in a few moments began to crowd upon them. Fairly pushed off the tree-top, the leaders finally launched forth, the rest following in rapid succession. They started upward at an angle of fully forty-five degrees. After climbing perhaps a hundred feet the leaders lost their courage, and, hesitating a moment, they all dropped precipitately back to the shelter of the bushes. But once there they immediately headed for the sapling again and repeated the performance. Finally, after several false starts, they continued out over the lake toward the Charity Islands in the distance.

It was a new experience to me to see chickadees fly by day out across miles of open water. Indeed, Brewster, in his classic paper on Bird Migration (Memoirs of the Nuttall Ornithological Club, No. 1), included the Paridae among "birds which migrate exclusively by night" and other writers seem to have accepted this statement.—J. Van Tyne, *Ann Arbor, Mich.*

Magnolia Warblers in Pelham, Massachusetts, in 1928.—The Magnolia Warbler (*Dendroica magnolia*) nesting near the house at Grey Rocks this season differed considerably in his song activities from his predecessors in 1925 (Wilson Bulletin, XXXVIII, pp. 185-199) and 1927 (*Ibid.*, XXXIX, pp. 236-237). Instead of singing a large part of the time in late June and early July he sang very little. He almost never indulged in "*wichy wichy weesy*" (I recorded it twice on July 7, once on July 18, and twice on July 23). His "*wechy weechy wee*" was slightly different from that of the 1927 Warbler, the "*wee*" being higher and more accented than the "*weechip*" was. He did not sing regularly in the evening as the others had done, nor did he frequent the west grove. In 1928 the last songs were heard August 4, six days later than in 1925 and about ten days later than in 1927.

On July 14, 15 and 21 the male was seen feeding full-grown young in juvenile plumage. On August 9 to my great surprise I discovered the female feeding two babies, with tails only three-fourths of an inch in length, just south of the house. This brood must have been hatched about July 29 or 30, the eggs laid about July 15 to 18, and the nest built about July 9 to 14.

Ten days later the young in juvenile plumage were being fed by a parent in fall plumage. They begged with a double note "*gee-gee gee-gee gee-gee*" at the rate of eight to thirteen notes in fifteen seconds. Both caught insects for themselves, but teased and fluttered with the greatest enthusiasm at the approach of the parent. One procured a green caterpillar, but in manipulating it dropped it to the ground. They were fed eight times in the hour and a half from 2:30 to 4:00 P. M. On August 20 the parent was still feeding them.

In 1925 the male *Dendroica magnolia* courted his mate while the young were in the nest, from July 7 to 15. This season a second brood must have been raised, for there was never more than one pair of birds near the house. It seems as if Black-throated Green Warblers must also have raised second broods, for two sets of parents were seen feeding young on August 7, and a third male was giving insects to a bird in juvenile plumage as late as August 23, 1928.—MARGARET M. NICE, *Columbus, Ohio.*

The Chestnut-sided Warbler Nesting Near Toledo, Ohio.—On June 20, 1928, Miss Emily Campbell and I visited an oak wood located in the eastern part of Spencer Township, Lucas County, Ohio, about eight and one-half miles west of the corporate limits of the city of Toledo. This is part of that old lake bed known as the "Oak Openings." In the middle of this wood is a small clearing, overgrown with blackberry and sumac. Here we saw a male Chestnut-sided Warbler (*Dendroica pensylvanica*) in full plumage and song.

On June 23, Mr. E. S. Thomas and Mr. Charles Walker, of Columbus, and the writer returned to the place and found the male and female both carrying food. After several false starts, due to the ingenuity of the female in making her approach, we located the nest, three feet from the ground in a clump of cornel near the base of a large oak. In the nest were four fully-fledged young. The female was very bold, and continued feeding while we stood less than six feet away. When Mr. Thomas attempted to photograph the fledglings, they left the nest with cries which brought the parent birds fluttering at our feet. But it was interesting to note that in spite of their anxiety and fear, they were not above snapping up flies or any other food which presented itself. Shortly after, Mr. Thomas secured several pictures of the female feeding one of the young. The male carried food but remained some distance away, chipping constantly. Mr. Walker collected the nest and one of the young for the Ohio State Museum.

This is probably the first nesting record of the Chestnut-sided Warbler in northwestern Ohio. Dr. Wheaton, in his "Report on the Birds of Ohio," 1879, states that it is a "summer resident in northeastern Ohio where it breeds" and mentions a nest observed by Mr. M. C. Read. Both Lynds Jones and W. L. Dawson include this species as an Ohio breeder solely on Dr. Wheaton's authority. What is probably the last account of this warbler nesting in the state appeared in "The Ohio Naturalist" of November, 1907. This nest was discovered by Miss Mary I. Hoskins on June 26, 1907, at Jefferson, Ashtabula County, Ohio, and placed under observation and reported by Robert J. Sim.—LOUIS W. CAMPBELL, *Toledo, Ohio.*

Why a New Florida Blue Jay?—The *Auk* (xlv, p. 364, July, 1928), has an article giving the description of "A New Blue Jay from South Florida," by W. E. Clyde Todd, that calls for comment.

For the past eight years, the writer has spent on the average of ten months yearly (excepting generally July and August) in Florida, most of it in lower Dade, Monroe, Brevard and West Palm Beach Counties, with the months excepted having been spent in collecting in the Piedmont and mountain sections of Georgia and North and South Carolina.

During this time, and especially previous to the going to press of "Birds of Florida," late in 1925, the writer very carefully studied the Blue Jays of Florida, and secured as well numerous skins from Georgia, with a possible view to "splitting" the local bird from those farther north.

A large series was handled, of both winter and summer birds, and birds of various ages, and after boiling it all down, the writer came to the final decision that a subspecific "split" was not warranted.

In the first place, Mr. Todd erred in selecting a winter (January 21) bird for his type, which specimen is undoubtedly a migrant; for it is a well known fact to all our year around residents that our breeding birds do not arrive in numbers until in late March or early April, and then in almost a regular migratory wave. It has always been a question where our local birds migrate to, and from whence they come in the spring.

A few Blue Jays do, however, remain in Dade County during the winter, but nothing like ten per cent of the number that breed here during the summer; and the majority of these winter birds are from farther north, generally migrating southward.

A study of the color distinction, as set forth by Mr. Todd, will not hold good, for seldom can one find any two birds alike in plumage, winter or summer; and Mr. Todd has based his supposed subspecies on color alone.

Mr. Todd uses the words "extreme southern Florida" in giving the range of this new bird. This, however, would not be Coconut Grove from whence comes his type. This would mean Monroe County. especially the keys, and possibly the Cape Sable region, where, however, Blue Jays are seldom found except as rare stragglers. If Mr. Todd means Dade County, from whence his supposed type came (Coconut Grove), he should have used breeding birds of June and July, or August (second settings), instead of a migrant of which we know not whence it came.

Much as we would like to see some bird named after Mr. John B. Semple, for he is also a personal friend of the writer, I feel certain that it should not be tacked to this supposed new subspecies, as offered by Mr. Todd, which I for one would certainly not have passed up as a "split" after all the time spent on it. Such fine points of plumage only, and which do not remain constant, varying as they do with food conditions, seasons, years, and age, must exclude it.

I must, therefore, assume that Mr. Todd, who generally is so thorough and painstaking, has in this case sacrificed his usual thoroughness. We trust he will admit his error, and so follow in the footsteps of another of our leading ornithologists, who has lately admitted in print that a subspecies he created, and which has been even universally accepted for some years, was uncalled for.—Harold H. Bailey, *Miami, Fla.*

The Morning Twilight Song of the Crested Flycatcher.—From early June through July, the Wood Pewee sings a long and beautiful composition described by Dr. Wallace Craig as its "twilight song".[1] It does not seem to be generally known that the Crested Flycatcher also has a twilight song, which, though much simpler and far less musical than that of the Wood Pewee, nevertheless is a very creditable accomplishment for *Myiarchus crinitus*. My first impression of it was that it resembled somewhat a song of a hoarse Robin, although it is timed about half as fast. It consists simply of a low *wheeyer*, a pause, then a high *wheeyer*, the whole repeated over and over again.

I heard it in Oklahoma on May 25 and June 13, 1920, June 11, 1926, May 27 and June 4, 1927, and in Arkansas on June 11, 1927; on each occasion just before dawn.

On May 19, 1927, the Crested Flycatcher in the sloo woods south of Norman had not begun his song; he called from 5 A. M. on with his curious loud shouts. At my next early morning visit, May 27, the bird sang from about 5:03 to 5:07 o'clock. On June 4 the song was given from 4:55 until about 5:12 A. M. Usually high and low notes alternated, but occasionally there were two high or two low notes in succession. In one minute there were twenty-eight notes; in the next twenty-four, but during this minute there were two short rests. In the first of these minutes there were two high notes together in three cases, while in the second minute, the same was true of the low notes.

The song near Little Rock, Arkansas, on June 11, began at 4:24 A. M. and proceeded with great regularity, high and low notes alternating, until 4:32 A. M. After a few seconds' pause it began again, but now it was irregular, consisting mostly of low notes. At 4:40 A. M. the bird was still singing somewhat, almost entirely with the low notes with long intervals in between. (This was different from the Oklahoma individual, who after finishing his song gave only *wheeps* and grunts.) During one minute of the song itself there were twenty-four notes, during the last fifty seconds, twenty-one. With this bird I did not observe any exception to the regular alternation of low and high notes.

The Kingbird has a twilight song: Mrs. Olive Thorne Miller[2] tells how it was given at half past four each morning while the mate was incubating; the notes were weak and uncertain at first, but "as the days went by they grew strong and assured." "It began with a low Kingbird '*Kr-r-r*' . . . and it ended with a very sweet call of two notes, five tones apart, the lower first, . . . '*Kr-r-r-r-r-ree-be*'."

The Arkansas Kingbird may have something of the sort, for from May 28 to June 7 in the Oklahoma Panhandle, western Kansas and northeastern New Mexico, I heard an astonishing amount of clamor from this bird before dawn, but unfortunately paid little attention to it. It may be that others of the flycatchers besides these four sing "twilight songs."

I hope that some one gifted with absolute pitch will study this song of the Crested Flycatcher and give us its musical notation.—Margaret M. Nice, *Columbus, Ohio.*

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[1] *Auk*, XLIII, pp. 150-152. (April, 1926).

[2] Little Brothers of the Air, pp. 14-15. Houghton. (1897).

ORNITHOLOGICAL LITERATURE

Birds of the Eurasian Tundra. By Theodore Pleske. Memoirs Bost. Soc. Nat. Hist., Vol. 6, No. 3, Boston, 1928. Pp. 107-485. Pls. 16-38, six in color. Price, $5.00 in paper, $5.75 in cloth.

This paper by Prof. Pleske is one of the most elaborate among the faunal lists which have appeared in recent years. It is based upon the collections of the Russian Polar Expedition of 1900-1903. The history of the expedition is given in detail at the outset, and forms Part I. The ornithological work in the field was done by Dr. H. Walter, who was also the physician of the party, and by A. Bialynicki-Birula, zoologist of the St. Petersburg Academy of Science. Dr. Walter died during the second year in the field.

The tundra is defined as the alpine zone of the holarctic region. The polar region is divided into the Sylvan Zone (forests), the Subalpine Zone (brush), and the Alpine Zone (tundra), or barren lands. The Eurasian tundra described in the present work extends from the Kola Peninsula of Russia eastward over the Taimyr Peninsula to the eastern limit of Siberia. Many islands north of the mainland are included in the area of study. Seventy-one species of arctic birds are listed in Part II of the paper, which covers 231 pages. For further convenience the entire area is subdivided into twenty-one smaller portions which are treated in detail in as many sections, which form Part III, covering 76 pages. For each of the sections a list of the birds is given, and a bibliography of the literature. Part IV is a further distributional study in summary.

The plates are splendidly done by the heliotype process. There is one colored plate showing the nest and young of the Snowy Owl; another of the adult and young of the Sanderling; another of the adult and young of the Knot; another of the adult Rock Ptarmigan; all from water color paintings by B. Watagin. It is a great privilege to have such a valuable foreign work translated and published in English.—T. C. S.

The Heath Hen. By Alfred O. Gross, Ph. D. Memoirs Boston Soc. Nat. Hist., Vol. 6, No. 4, 1928. Pp. 487-588. Pls. 39-50. Price, $2.25 in paper, $2.90 in cloth.

Dr. Gross has been engaged for several years in a field study of the Heath Hen on Martha's Vineyard Island, Massachusetts. According to most accounts this species is on the verge of extinction, though Dr. Gross has rather an optimistic paragraph in his introduction. We have seen and heard during the past year considerable criticism of the Massachusetts authorities for their attitude toward the protection of the Heath Hen. For instance, it has been stated that more recently the authorities refused to grant a permit to the warden to kill birds of prey found in the Heath Hen refuge. It is hard to believe that such a statement would be made unless true, and still harder to believe that it is true. Without more complete information at hand we will refrain from expressing any further opinion.

Dr. Gross has had the very rare privilege of studying a species on its death-bed—perhaps for the first time in history. The inimical factors involved in the progressive decline in the Heath Hen population are enumerated by Gross as man, predaceous animals (cats, rats, hawks, owls, crows), diseases

and internal parasites, external parasites, excess males, sterility of males, and prairie fires.

The Heath Hen was first recognized as distinct from the Prairie Chicken by William Brewster in 1885, at which time it had become restricted to Martha's Vineyard Island. Its exact range prior to this time is not definitely known. The history of the species on Martha's Vineyard is one of constant decrease. In 1898 two mated pairs of Western Prairie Chickens were liberated to intermingle with the Heath Hens. About 1906 a closed season was put on the Heath Hen, and $100 fine fixed for violation. In 1907 a Heath Hen reservation was established near the center of Martha's Vineyard Island. In 1916 a prairie fire swept over the island destroying much of the cover and perhaps many of the birds.

Dr. Gross began his investigations in 1923 on the basis of a fund raised privately under the leadership of Dr. John C. Phillips. In 1925 a Heath Hen conference was held and plans were formed to continue the effort to prevent extinction. Additional money was subscribed and a warden was put to work. The report of Dr. Gross shows that the wardens did destroy some "vermin," including five owls and forty-four hawks. From 1907 to 1926 more than $60,000 has been expended in an effort to save this species from extinction. In March of 1927 it was estimated that there were less than thirty birds in existence, only thirteen being counted.

From such information as we have, from Dr. Gross' paper and other sources, we have formed the impression that the State Division of Fisheries and Game of Massachusetts has been very niggardly in its financial support of these efforts. And we do not find that the wealthy National Association of Audubon Societies has participated in the effort at all. The coming season may add an important chapter to the history of the Heath Hen. A very extensive bibliography is a valuable feature of Dr. Gross' paper.—T. C. S.

Field Book of Birds of the Panama Canal Zone. By Bertha Bement Sturgis. Published by G. P. Putnam's Sons, New York, 1928. Pp. i-xxxix+ 1-466. Pls. I-XIV (8 in color). Figs. 1-107. Price, $3.50.

This work is a carefully prepared descriptive catalogue of the birds which inhabit the Canal Zone and a few neighboring islands, including approximately 434 species. The book may probably be regarded as a popular handbook of American tropical birds. Perhaps there has been no treatise previously available to the amateur ornithologist on the bird life of the American tropics which is so clear and comprehensive.

To illustrate the richness of this region we note that twenty different hummingbirds are described; twenty-two warblers; nineteen tanagers; fifty-two flycatchers; while, on the other hand, only sixteen finches are listed.

The book belongs to the series, and has the same compact format, which began with Mathew's "Field Book of Wild Birds and Their Music." The colored plates are reproduced from paintings by Mr. F. L. Jaques. It has not been our privilege to see any other work by this artist, but we feel sure that his skill in portraying birds will receive wider recognition as it becomes better known. Several of the plates are from the excellent photographs by Dr. Willard G. Van Name.—T. C. S.

The Status of the Great White Heron (Ardea occidentalis Audubon) and Wurdemann's Heron (Ardea wurdemannii Baird). By Ernest G. Holt. Sci. Pub. Cleveland Mus. Nat. Hist., Vol. I, No. 1, 1928. Pp. 1-35. Pls. I-VI.

The long discussion concerning the status of *A. occidentalis*, *A. wurdemannii*, and *A. wardi* is an interesting history. The gist of the discussion is pretty well stated by the author in the opening paragraph, where he proposes three questions, viz., a) is *occidentalis* a distinct species, or only a white phase of *wardi;* b) is *wurdemannii* a colored phase of *occidentalis*, a light phase of *wardi*, or a hybrid between the two; c) must *wardi* be retired to the synonymy of *occidentalis?* After reviewing very carefully the history of the discussion, beginning in Audubon's time, and examining the evidence from animal behavior, study of eggs, plumages, and distribution, the author concludes that *A. occidentalis* is a distinct species, immaculately white, and without a colored phase; that *A. herodias wardi* possesses no white phase; and that *A. wurdemannii* is a hybrid of the other two, which is found only in the restricted area where the breeding ranges overlap. It is a scholarly paper of fascinating interest.—T. C. S.

Wild Animal Interviews and Their Opinions of Us. By William T. Hornaday. Published by Charles Scribner's Sons, New York, 1928. Pp. i-xiv+1-310. Price, $2.50.

Another volume by Dr. Hornaday! And this time he chooses the medium of humor with which to convey the lessons on animal protection. He knows about as well as anyone does what his animal friends would say if they could talk, and these fictitious interviews are not only good fiction, but are prepared in good Hornaday style. Interviews are given with thirteen species of birds, four of reptiles, and twenty-four of mammals. It makes very pleasant reading for the naturalist as well as others.—T. C. S.

An Introduction to the Birds of Pennsylvania. By George Miksch Sutton. Published by Horace McFarland Co., Harrisburg, 1928. Pp. i-x+1-169. One colored plate, 153 text figures. Price, $1.00.

We are glad to welcome another piece of work by Dr. Sutton and another state catalogue of birds. Two hundred and twenty-nine species are described in the text proper, but a number of other less common ones are mentioned under related forms. The account of each species includes a Description of Plumages, Range in Pennsylvania, Nest and Eggs, and general remarks which usually contain some description of song or call. The book is illustrated by one colored frontispiece of the male and female Baltimore Oriole and 153 pen sketches of 197 species. The printers have not produced a good color in the male Baltimore Oriole, we think. Such a list is convenient in form, complete and up-to-date, concise and inexpensive, and will, without doubt, be of great value in assisting beginners in bird study, and will promote the science of ornithology by stimulating a wider interest and activity in the subject, and by guiding it along safe lines. Every state needs some such authentic list, and the more description which can be included, the better.—T. C. S.

Our Great Outdoors: Mammals. By C. W. G. Eifrig. Published by Rand, McNally & Co., Chicago, 1928. Pp. i-xiii+1-257. Figs. 1-177; 2 col. pl. Price, $1.25.

Professor Eifrig, our fellow-member, has prepared a most excellent brief textbook on mammals, and we understand that a book on birds is to follow in the series. Typical representatives of all the important groups are discussed. And the material is so arranged that the reader is given a comprehensive survey of the mammalian group as a whole. It tends to unify the beginner's knowledge of natural history rather than scatter it. It is a book that should be added to the library of every school.—T. C. S.

The Ring-necked Pheasant—Its History and Habits. By Dana J. Leffingwell. Occasional Papers, No. 1, of the R. Conner Museum at the State College of Washington. April, 1928. Pp. 1-35.

This is a paper which deals with the distribution, life-history, incubation, young, calls, habits, enemies, food, and economic importance of the species in question. And it makes a valuable contribution, the collection of which must have afforded the author much pleasure.—T. C. S.

Birds of the Wild. By Frank Chapman Pellett. Published by A. T. De La Mare Co., Inc., New York. August, 1928. Pp. 1-118. Price, $1.75.

We are here presented with a new and delightful book by Mr. Pellett, in which he recounts in his usual interesting style his intimate acquaintances with birds. The greater part of the book deals with the habits and behavior of wild birds in relation to human habitations. The last chapter discusses plants that are useful in attracting birds. Many original photographs are used for the first time.—T. C. S.

An Ornithological Survey of the Serra Do Itatiaya, Brazil. By Ernest G. Holt. Bull. Amer. Mus. Nat. Hist., Vol. LVII, Art. V. Pp. 251-326. New York, 1928.

This paper is a list of 187 species of birds found by the author during a period of four and a half months on Itatiaya, the second highest mountain east of the Andes. Especial attention is given to the plant regions and life zones, which are given as three, viz., tropical, subtropical, and temperate—all being defined by altitude and forest.—T. C. S.

Variations in the Fox Sparrows (Passerella iliaca) with Reference to Natural History and Osteology. By Jean M. Linsdale. Univ. Calif. Pub. in Zool., Vol. 30, No. 12. Pp. 251-392. Pls. 16-20. Price, $1.85.

This paper is an elaborate study of the variation in the species and subspecies of the Fox Sparrow. The variations especially considered were in the osteological system. The author did not find that enlarged bill and skull had particular survival value: but that a longer sternum seemed to have such value. Much natural history of the various races of Fox Sparrows is included in the paper.—T. C. S.

Practical Color Simplified. By William J. Miskella, M. E. Published by the Finishing Research Laboratories, Inc., Chicago, 1928. Pp. i-xiv+1-114. Figs. 1-20. Col. Pls. I-VII. Price, $3.50.

The biologist and ornithologist can not be disinterested in color. The title of this book first suggested to us that it might be of some service to the biologist

in color nomenclature, or to the lantern slide colorist, or in color photography. It does not give much help directly in these fields. It is, nevertheless, a book which makes very clear many fundamental principles of color. Until we began to look over this book we did not know that the old seven-color spectrum, so necessary a part of our college physics, had become obsolete. Now, with a six-color spectrum the author of this book presents some very simple rules for color and shade combinations. Artists will probably find the color charts for complementary color mixing very unique and useful.—T. C. S.

Bird Rhymes and Field Songs. By Bert Dayton. Published by The Palisade Press, 125 Church St., New York, N. Y., 1928. Pp. 1-47. Price, 35 cents.

We are not a connoisseur of poetry and therefore hesitate to undertake a review of this pamphlet. We are quite willing, however, to accept this literary work as "rhyme." Though not indicative of the author's best lines we select the following to the Bobolink:

"Be careful in the rice fields, that you're not shot by foe"
[By edict of the United States Biological Survey]
"As over the Carolinas, you passing on will go."

We know of two or three of our W. O. C. members who give themselves up now and then to the jingle fever, and we think that all such will enjoy these verses by their fellow amateur.—T. C. S.

Natural History Notes on the Journals of Alexander Henry. By Russell Reid and Clell G. Gannon. No. Dak. Hist. Quart., Vol. 2, No. 3, April, 1928.

Alexander Henry was a trapper in the north country in the early part of the 19th century. He kept a journal and made incidental references to the mammals and birds, many of these notes being now referable to North Dakota. The authors have republished many such notes in the present paper.—T. C. S.

Notes on Birds of Lake Maxinkuckee Region. By Samuel E. Perkins III. Proc. Ind. Acad. Sci., Vol. 37, 1927. Pp. 461-466.

The author presents a list of fifty-nine species, of which nineteen are reported as additions to the Everman and Clark list of 1920.—T. C. S.

Returns Received Prior to January 1, 1927, Upon Birds Banded by Mr. Jack Miner at Kingsville, Ontario. Reprinted from the Can. Field Nat. for November and December, 1927, and January, 1928.

This report includes a great many records of banded ducks and geese taken, but many of the records are indefinite as to time, place, or species.—T .C. S.

Bird Banding in America. By Frederick C. Lincoln. Separate from the Smithsonian Report for 1927. Pp. 331-354. Pls. 1-9. Washington, 1928.

A history of banding in this country, and a statement of the results of this method, with a resume of what has been learned concerning the migration of certain species.—T. C. S.

Wild Birds Introduced or Transplanted in North America. By John C. Phillips. Tech. Bull. No. 61, U. S. Dept. Agric., Washington, April, 1928. Price, 10 cents.

This pamphlet gives a very valuable history of the intentional and accidental introduction of exotic birds into this continent, recording successes and failures. Cases of transplantation of native species are also presented. Practically every exotic species is discussed more or less fully.—T. C. S.

THE MOLTS OF THE LOGGERHEAD SHRIKE, LANIUS LUDOVICIANUS LINNAEUS. By Alden H. Miller. Univ. Calif. Publ. Zool., Vol. 30, No. 13, pp. 393-417. Berkeley California, 1928. Price, $1.85.

This paper makes a valuable contribution to the discussion of the phenomena of molt which is not easily condensed in a few lines.—T C. S .

A DISTRIBUTIONAL SUMMATION OF THE ORNITHOLOGY OF LOWER CALIFORNIA. By Joseph Grinnell. Univ. Calif. Publ. Zool., Vol. 32, No. 1, pp. 1-300. Text figures, 1-24. Berkeley, California, 1928. Price, $3.75.

The paper here listed is essentially a catalogue of the birds of Lower California, with a bibliography. The list includes 475 forms, of which 354 are full species. A check-list of all the forms is first given (pp. 33-52); then follows the annotated list, making up the bulk of the paper (pp. 53-246), including a hypothetical list of 53 forms. An extensive bibliography of 461 titles (pp. 247-286) would seem to be exhaustive, though the author modestly fears he has missed some. The usual complete index concludes the paper. Those who are interested especially in the Pacific Coast avifauna will undoubtedly find this careful work of great interest and value. Our interest is chiefly one of admiration.

We do find in the introduction a few comments of general interest wherein Dr. Grinnell expresses himself in the matter of subspecies. Since these remarks probably represent a pretty full and authoritative defense of the subspecies concept, it will be of sufficient interest to many of our readers to present them here in full.

"Much objection has been registered of late from many lay, and curiously some professional, sources against the recognition of subspecies in nomenclature, on the ground that they are difficult of discernment; and their recognition, it is urged, is therefore of no practical utility. But, I ask, is the histologist, or the embryologist, or the bacteriologist expected to confine his labors within limits easily comprehended by the laity? Why, then, should the faunal zoologist be expected to keep *his* investigations within any such bounds? Personally, as a student of vertebrate speciation I am only mildly interested in the full, Linnaean species, because the full species has passed the really significant stage in its career; I am intensely interested in the barely discernible subspecies, because *it* is in the critical formative stage, and there is a good chance that I may learn something of the causes and essential conditions of its differentiation.

"To my mind, then, in the study of subspecies as contrasted with the so-called full species we are dealing with the earliest stages in the phylogenetic process. In other words, subspecies are the fundamental elements which, in any really significant systematic and faunistic investigation, must receive primary recognition. The more accurately and acutely we can train our senses and instruments upon the detection of subspecies, the better understanding will we gain of their nature and the processes producing them." (Page 14).

On a previous page (page 2) after commenting on the "inexactness and many outright errors" often found in amateur studies, Dr. Grinnell says, "Nevertheless, it must immediately be said that without the amateur very much of the information now available in regard to Lower California would be absolutely wanting." This is just the frank concession which we would expect Dr. Grinnell to make, and which indicates that the "amateur" is entitled to consideration. We may probably assume that this is generally conceded.

Very few people are working in the fields of histology, embryology, and bacteriology other than those who are professionally engaged therein; these sciences

have very little to attract the layman. The embryologist goes right on with his investigation, and the question of whether he is a layman or professional is seldom asked; and we really do not see just why that should be a question in ornithology. If a man makes a *contribution* to ornithology is he not an ornithologist? Whether he makes his bread and butter by ornithology or in some other way does not greatly affect the status of his contribution. The importance of the contribution is determined in the crucible of science, which asks no questions as to caste, creed, color or servitude of the worker. Therefore, when an amateur, or layman, in ornithology makes a contribution to ornithology he is as good as other ornithologists in proportion to the value of his contribution. All of which, if true, should mean that an ornithologist's standing depends upon his research, scholarship, judgment, and other similar attributes. Well, this is all preliminary to the asseveration that a layman in ornithology should not be excluded from the discussion of the problem of subspecies because he *is* a layman.

Now, there are many other important biological problems besides evolution and the origin of species. The study of variation is important, but it need not occupy the whole stage. The thought of a good many is that trinomialism is confusing in its effect upon many other branches of biology, and upon the workers in other lines than taxonomy. This argument would not prevail against it, however, if trinomialism could be fully justified on other grounds. Trinomialism is a sign of taxonomic senescence. We will always need a few broad-minded taxonomists to "keep the books . . . . in order" as Chapman once put it. But surely the job is narrowing down to a point where its results are open to question. With all of the biological problems that are still unsolved why should brilliant minds be devoted to scarcely perceptible shades of color and dimensions when the gain is so doubtful and uncertain? But we will also grant that this is a personal matter unless and until such results are published to the confusion and handicap of other workers on other biological problems. Of course, evolution is going right on at its snail pace. Some hundreds of years from now present forms will have changed, undoubtedly. But we venture to assert that the written descriptions of subspecies and the trinomial terms will play very little part in discovering the evolutionary course and results. Folks then will have to rely on comparison of specimens, just as they do today.

When Dr. Grinnell affirms that in the subspecies "we are dealing with the earliest stages in the phylogenetic process" we believe that he is slightly in error. While the subspecies may be one of the stages in the origin of species there can be little doubt that the individual is the first stage. Now if we are to study phylogenesis will we not have to take into account all stages, including the species, the subspecies, the sub-subspecies, and the individual? But, is it necessary to attach names to all these stages of variation? And is there any greater reason for naming the subspecies than for naming any other recognizable intergrading form?

We are inclined to feel apologetic to Dr. Grinnell for thus discussing at length the two paragraphs in his latest work. But we see so little good in trinomialism, and we are so very skeptical of discovering the origin of species by means of the subspecies concept, and so impressed by the current abuses, that we can not let so good an opportunity for expression pass unheeded.—T. C. S.

Bird Banding Notes No. 26 from the Bureau of Biological Survey was issued on August 10. These notes are read with much interest by all who have concerned themselves with the work and results of bird banding. Our own full set of these notes will some time be bound.

COMMUNICATIONS

[Editor's Note. The following communication originated in personal correspondence, and at the Editor's request the author consented to publication. The postscript, however, is extracted from a letter of December 4, and has been added without the expressed consent of the author because of lack of time for the exchange of letters. We trust, however, that the lack of full context will not do an injustice to the author.]

Editor, Wilson Bulletin: In looking over the literature that has accumulated on my desk during a summer's absence in the field I find in a number of the Wilson Bulletin a text for a few remarks which I trust may be taken in good part.

On page 86 (and following) of the June issue we find a list of stomach contents wherein partly digested fragments of birds are fully and subspecifically identified. The *species* of birds in question are undoubtedly correct, for that is within the possibilities of even fragmentary material; but that *subspecies* can be so recognized is open to doubt, to say the least. I think we may take it for granted in this case (as in many others) that the subspecific designations are made purely on geographic grounds, not from the details of the specimens themselves. It is against this common, almost universal, practice that I have, and do still, protest. It gives a pleasing appearance of scientific acumen and accuracy that is lacking in fact. If we base our distributions on determinations in faunal lists and other records, and then make those determinations from such supposed distributions we work in a vicious circle that gets nowhere and confirms what error there is without a chance of correcting it.

Determining subspecies geographically according to any particular authority involves three assumptions, viz.,

I. That no subspecies ever occurs beyond its normal range;

II. That those ranges are perfectly known to that authority;

III. That all subspecies recognized by the authority are, *ipso facto*, valid, and none others can be considered.

I do not think that any one will subscribe to these dicta, and yet without each one no geographical identification can be reliable. In some cases the logical conclusion may lead to apparent super-caution, if such a word is allowable in science. but in others the danger to be avoided is great and obvious. Where can we draw the line?

Perhaps I have been regarded by some as an awful example of radicalism along this line. The trouble is that few have taken the pains to fully understand the points involved. Perhaps I can make my principles plainer and thereby add weight to the foregoing remarks.

I am not opposed to the principle of subspecies; they are real facts, and a very valuable concept to the biologist, but:—

I. The subspecific unit is of less importance than the specific unit, and should not be treated with equality.

II. The number of subspecies possible in a varying species may theoretically be infinite, and it is only the limitation of human observation that limits the number which it is expedient to recognize.

III. In publishing a "record" we have no more right to guess at the subspecific identity than we have to guess at the specific identity.

All of which seems to me to be undeniable, though common current practice violates every one of the above principles. The only question that can be

raised regarding them is that of just the practical and useful limits of observation. Some say they are measured by the finest shades of differentiation which only the most intensively trained specialist can detect; others affirm that they are limited by the degree that can be demonstrated with reasonable certainty by any well trained student. This is just a question of degree and expediency, and is all the difference between the "splitters" and the "lumpers".

Sincerely,

P. A. TAVERNER.

National Museum of Canada,
Ottawa, Canada, October 19, 1928.

P. S. The intergradation test of specificity is unsatisfactory and subject to many criticisms, but in our present uncertainty as to what a species is I know of no more workable one. Some sort of convention or working hypothesis seems necessary, and is valuable so long as we keep in mind its provisional nature and stand ready to abandon it as soon as something better appears.

Species and subspecies are differences of degree only. Subspecific differences produced beyond a certain point become specific.

Th critical point where a subspecies becomes a species is where a biological isolation is produced; that is, where distinct isolation is produced.

The only biological isolation is genetic. Geographical isolation is the accident of circumstance and not a racial character.

An intolerance to breeding together establishes biological isolation and establishes specific identity.

By this the presence or absence of intergrades becomes a logical criterion of specific or subspecific differentiation.

P. A. T.

INDEX FOR VOLUME XL, 1928

Compiled by R. D. Hissong

TO OUR CONTRIBUTORS

Our members are urged to submit articles for publication in the BULLETIN Short items are desired for the department of General Notes, as well as longer contributions, especially pertaining to life-history, migration, ecology, behavior, song, economic ornithology, field equipment and methods, etc. Local faunal lists are also desired, but they should be annotated, at least briefly, and should be based upon sufficient study to be reasonably complete. Authors are asked to include the common name, the scientific name (from the A. O. U. check-list), and annotations, and they should be arranged in this order. The annotations should include explicit data concerning unusual species. Omit serial numbering.

THE MANUSCRIPT. The manuscript, or copy, should be prepared with due regard for literary style, correct spelling and punctuation. Use sheets of paper of good quality and of letter size (8½x11 inches); write on one side only, and leave wide margins; if at all possible manuscript should be prepared with a typewriter, using double spacing and a reasonably fresh, black ribbon.

The title should be carefully constructed so as to indicate most clearly the nature of the subject matter of the contribution. Where the paper deals with a single species it is desirable to include in the title both the common and the scientific names, or, to include the scientific name in the introductory paragraph. Contributors are requested to mark at the top of the first page of the manuscript the number of words contained. This will save the editor's time and will be appreciated.

Manuscripts intended for publication in any particular issue should be in the hands of the editor thirty days prior to the date of publication.

ILLUSTRATIONS. To reproduce well prints should have good contrast with detail. In sending prints the author should attach to each one an adequate description or legend.

BIBLIOGRAPHY. The scientific value of some contributions is enhanced by an accompanying list of works cited. Such citations should be complete, giving author's name, full title of the paper, both the year and volume of the periodical, and pages, first and last.

PROOF. Galley proof will be regularly submitted to authors. Page proofs will be submitted only on request. Proof of notes and short articles will not be submitted unless requested. All proofs must be returned within four days. Expensive changes in copy after the type has been set must be charged to the author.

SEPARATES. The Club is unable, under present financial conditions, to furnish reprints to authors gratis. Arrangements will be made, however, for such reprints to be obtained at practically cost. The cost will vary somewhat with the nature of the composition, but will depend mainly upon the number of pages. A scale of rates is appended which will serve as a guide to the approximate printer's costs.

If a blank page is left in the folding this may be used for a title page, which will be set and printed at the rate indicated. If a complete cover with printed title page is desired it may be obtained at the rate shown in the last column. All orders for separates must accompany the returned galley proof upon blanks provided. Orders cannot be taken after the forms have been taken down.

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200	2.00	2.75	3.50	4.25	5.50	6.75	8.00	9.25	10.50	11.75	13.00	14.25	3.00
300	2.75	3.50	4.25	5.00	6.25	7.50	8.75	10.00	11.25	12.50	13.75	15.00	4.00
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DUES FOR 1929

ANNUAL DUES FOR 1929 NOW PAYABLE

This is the Treasurer's first notice to all members that dues for 1929 are now payable to the Treasurer,

Mr. J. W. Stack,
Michigan Agricultural College,
East Lansing, Michigan.

You are earnestly requested to remit at your earliest convenience, thus saving postage expense to the Club, and much time and effort to the Treasurer. A receipt will be returned only if requested.

Life Members	**$100.00**
Sustaining Members	**5.00**
Active Members	**2.50**
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The Club values the continued support of every member, and every resignation is received with much regret. At the recent annual meeting at Ann Arbor a very considerable list of delinquent members was reported. Some of these members had been carried for a year or longer. The number in this delinquent list was so great that the Club considered it necessary to authorize and instruct the officers that the WILSON BULLETIN may be sent only to members not in arrears for dues. Accordingly, this action will be put into effect with the mailing of the March BULLETIN. However, those who find it inconvenient to remit by that time will be gladly allowed an extension of time if they will merely communicate with the Treasurer to such effect.

The WILSON BULLETIN again extends the season's greetings to its readers. The past year has been a reasonably prosperous one and we trust that our membership feels a degree of satisfaction with our numerical growth, at least. In spite of a considerable loss by resignation and non-payment of dues our total membership is greater than ever before. And for the first time in our history we close the fiscal year with a comfortable bank balance. We hope, however, that this showing may be merely a stimulus to greater effort.

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