

XI. THE BIRD LIFE ON A FORTY ACRE TRACT IN CENTRAL OKLAHOMA

Margaret Morse Nice.

In 1919 the best place to study birds near our home was along Snail Brook, a sluggish little stream just west of Norman. On one of my visits in December I decided to make a special study of the most convenient stretch, which I called the "First Half Mile." At that time this tract† was a woods in miniature with primeval trees, a great deal of undergrowth, weeds, a creek and a small pond, bordered by a few acres of unbroken prairie and cultivated fields; at all seasons, cover, food and water were present in abundance. Hence this portion of Snail Brook was attractive at all times of the year and to a wide variety of birds. Moreover, it was comparatively isolated, yet not too much; to the north, west and east there was no cover at all; but to the south the Second, Third and Fourth Half Miles stretching nearly to the woods by the South Canadian river, formed, with their trees and thickets, a natural avenue for many birds to travel up and down. For three years I carried out almost weekly censuses of the birds on the area selected, but by 1922 the region was becoming greatly injured through the inroads of civilization. The pond had been drained in the spring of 1921 and a small house built on the prairie; the vegetation was not disturbed until the summer of 1922 when considerable cutting of trees and shrubbery took place. After this more houses were built, more clearing done, while the best woods left was turned into a hog pasture, therefore in 1923 and 1924 I ceased my visits almost entirely.

We were away from Norman from June 1924 to September 1925; on our return I found Snail Brook had regained some of its lost prestige, since the hogs had gone and their former home was a wilderness of weeds. Consequently I took up the study again.

From December 1919 to December 1926 I made 210 censuses and 90 visits; on a census I went along the stream the whole half mile recording every bird I saw, on a visit I only went part-way. Since the trees and bushes merely bordered the creek, it was possible to get fairly accurate counts as long as the leaves were off; late spring, summer and early fall censuses were less accurate than the others. In December 1919 I made 2 censuses

†The forty acres of this study are the east half of west half of southwest quarter section 31R2W: the eastern border is Pickard Avenue, the western an imaginary line half way between this and the road to the west of the section; West Boyd Street is the northern edge and Lindsay Avenue the south.

and 10 visits, throughout 1920 43 censuses and 36 visits, in 1921 40 censuses and 10 visits, in 1922 49 censuses and 2 visits, in 1923 19 censuses and 9 visits, in 1924 1 census and 1 visit, in 1925 13 censuses and 7 visits, in 1926 43 censuses and 15 visits. Thus the first three years and the last year were pretty well covered, but very little was done in 1923 except in October, and almost nothing in 1924, the observations beginning again in the fall of 1925. There have been more trips in fall and winter than in spring and summer.

The trees bordering Snail Brook (for the sake of brevity this name will be used to designate the particular half mile studied) are black willows, red and white elms, a few large cottonwoods, many hackberries, box elders, mulberries and one pecan. The chief shrubs are wild plum, dogwood, elderberry and coral berry; the vines are woodbine, green briar, bittersweet, poison ivy and wild grapes, while the commonest weed is giant ragweed. Corn, oats, wheat and cotton are the crops raised on each side of the stream.

Mammals that might serve as food to birds are a few cotton-tail rabbits, wood rats, cotton rats, and meadow mice; before the prairie was broken up there were a number of thirteen-lined spermophiles. As to enemies, one fox squirrel and one opossum have been seen; a few house cats used to be encountered and these have increased. Frogs and crayfish are common; snakes are rare.

The Birds

One hundred and twenty species have been recorded on Snail Brook during the six years; if collecting had been done a number of sub-species would doubtless have been added since two or three sub-species of many transients occur here. One hundred and fourteen species were seen during the first three years, 62 of these having been recorded each year; 90 different kinds were observed from 1923 to 1926. Thirteen of the total number have been residents, 23 summer residents, 34 winter visitors and 50 transients.

Thirty-five species of native birds have probably nested on the area during the period of observation. The results of the nesting census taken for the United States Biological Survey are given in Table I.

Table I.
Native Birds on Snail Brook.

Year	No. of Species Seen	No. of Species Nesting	Individual Nesting
1920	94	22	32
1921	86	23	37
1922	83	18	23
1926	78	22	41

Birds that have nested five years (from 1921 through 1925 and again in 1926) are the Mourning Dove, Orchard Oriole, Lark Sparrows, Cardinal, and Mockingbird; those nesting four years, 1920, to 1922 and 1926 are the Yellow-billed Cuckoo, Bronzed Grackle, Blue Grosbeak Thrasher and Plumbeous Chickadee. One nested the first three years,—the Blue Jay; five nested three years including 1926—Crested Flycatcher, Baltimore Oriole, Bell Vireo, Yellow Warbler, and Robin. Birds nesting the first two years only are the Bobwhite, Meadowlark and Dickcissel; those nesting two years including 1926 are the Red-headed Woodpecker, Cowbird, Indigo Bunting, Maryland Yellow-throat and Catbird. Birds that have bred one year only are: in 1920, Downy Woodpecker, Red-winged Blackbird and Bluebird; in 1921, Kingbird, and Carolina Wren; in 1922, Scissor-tailed Flycatcher, Wood Pewee, Painted Bunting and Texas Wren; in 1926, Hairy Woodpecker and Flicker.

In the following list the status of the bird in Cleveland County is given first, then its manner of occurrence on Snail Brook. The sub-species are based on specimens taken in the county or in the general region; these have been identified by Dr. H. C. Oberholser of the U. S. Biological Survey.

Annotated List of the Birds Seen on the Forty Acres from December 1919 to December 1926.

Nettion carolinense. Green-winged Teal. Transient and winter visitant. A flock of four males and one female were observed at close range March 15, 1920. A single male was recorded February 8, 1921.

Botaurus lentiginosus. American Bittern. Transient. Single birds have been seen October 27, 1920; September 27, 1921, and October 15, 1925.

Butorides virescens virescens. Green Heron. Summer resident. An irregular visitant, three having been seen May 25 and one June 1, 1920, and one on May 15, 1921.

Gallinago delicata. Wilson Snipe. Transient. An early spring and late fall transient, two being recorded March 17, 1920.

one March 20, 1920, one on February 20, 1922 and five November 17, 1923.

Totanus flavipes. Yellow Legs. Transient. Two seen May 2, 1920, one May 3, 1920 and one May 15, 1921.

Tringa solitaria solitaria. Solitary Sandpiper. Transient. Formerly a regular transient, from one to four birds being seen from April 21 to June 4 and from August 11 to September 29, 1920; from April 14 to May 1, 1921 and from April 28 to May 8, 1922. The only record since then was a single bird September 15, 1925.

Actitis macularius. Spotted Sandpiper. Transient. Two were observed April 30, 1922.

Oxyechus vociferus vociferus. Killdeer. Summer resident. On Snail Brook a spring and fall transient. In 1920 and 1921 they used to feed on the prairie and catch crawfish from Snail Pond; they were recorded from April 21 to May 12, and October 14, 1920; April 4, 25, 1921, and a single bird May 0, 1923. Since then they have been seen flying over in flocks, in spring and fall, on one occasion—October 17, 1923—as many as 50 being together.

Podasocys montanus. Mountain Plover. Rare transient. Four of these birds, distinguished by their size, markings and call notes, flew over Snail Brook March 15, 1926.

Colinus virginianus virginianus. Bob-white. Resident. Formerly a resident on Snail Brook, apparently nesting in an oat field in 1920 and 1921; not recorded since August 1922.

Zenaidura macroura marginella. Western Mourning Dove. A common summer resident arriving in early March and recorded till the last of October, in 1922 until Nov. 25. There have been two winter records on Snail Brook: Jan. 19, 1920 and Jan. 3, 1923. Nests have been found May 12 and June 4, 1920 and May 12, 1926.

Cathartes aura septentrionalis. Turkey Vulture. Seen occasionally in spring, summer and fall. One observed flying over Snail Brook March 31, 1920 and another Oct. 15, 1926.

Circus hudsonius. Marsh Hawk. A late fall and winter visitor, having been seen on Snail Brook in January and February 1920, in January and on November 19, 1921, and in January and on April 24, 1922; the only recent record being Oct. 7, 1926. All hawk records on Snail Brook have been of single birds.

Accipiter velox. Sharp-shinned Hawk. Winter visitant.

Accipiter cooperi. Cooper Hawk. Resident. On Snail Brook the Accipiters are fall and winter visitors, being seen occasionally from mid October till the last of February.

Buteo borealis borealis. Red-tailed Hawk. Winter visitant

Recorded only four times: Jan. 6, 19, Oct. 13, 1921 and Oct. 12, 1925.

Buteo lineatus alleni. Florida Red-shouldered Hawk. Winter visitant. One bird was seen Oct. 4, and 27, 1920 and another Nov. 17, 1923.

Archibuteo lagopus sancti-johannis. American Rough-leg. Winter visitant. Occasionally seen flying over or sitting in a tree from late October through January, the dates are Jan. 14 and Dec. 5, 1921, Oct. 18, 1925 and Jan. 23, 1926.

Falco columbarius columbarius. Pigeon Hawk. My only record of this rare hawk in Cleveland county was one bird in immature plumage observed for some fifteen minutes Oct. 5, 1926.

Cerchneis sparveria phalaena. Desert Sparrow Hawk. Transient, occasionally wintering. On Snail Brook it has been seen Sept. 29, 1920; Oct. 20, 1922; Sept. 29, 1923; Oct. 12 and 15, 1925 and Oct. 15, 1926; it was also recorded from Jan. 13 to March 30, 1922, Dec. 6, 1922, and April 4, 1923.

Tyto alba pratincola. Barn Owl. Rare resident. One bird was seen May 3, 1922.

Asio flammeus. Short-eared Owl. Winter visitant. This owl has been recorded during one winter only—from Dec. 12, 1921 to March 1, 1922.

Otus asio asio. Screech Owl. Resident. Only two birds have been seen, one on April 19 and the other Dec. 12, 1921.

Coccyzus americanus americanus. Yellow-billed Cuckoo. A summer resident. One pair has nested each year. They arrive the latter part of May and have not been recorded on Snail Brook later than Aug. 11 in 1920 and 10 in 1922.

Ceryle alcyon alcyon. Belted Kingfisher. Probably a rare summer resident. Only two of these birds have been seen, both flying up stream, one on June 12, 1922 and the other Nov. 2, 1926.

Dryobates villosus villosus. Hairy Woodpecker. Resident. A fall, winter and early spring visitor on Snail Brook, but in 1922 a male was seen drumming on May 18, and in 1926 a pair must have nested because a female was seen May 24 and June 1, on the first date having insects in her bill.

Dryobates pubescens pubescens. Southern Downy Woodpecker. resident. Seen at all times of the year on Snail Brook. On Mar. 17, 1921 a pair was observed excavating a hole in a dead tree which was cut down two days later. Downy Woodpeckers are often observed working on giant ragweed stalks.

Sphyrapicus varius varius. Yellow-bellied Sapsucker. Winter

visitant. Three birds in immature plumage have been recorded as follows: Oct. 12, 1921, Feb. 4 and Oct. 14, 1926.

Melanerpes erythrocephalus. Red-headed Woodpecker. Summer resident. In 1920 the first Red-head was recorded May 2; on May 12 a bird was busy throwing chips out of an old hole. In 1921 they were not seen at all, nor did they appear on Snail Brook the following year until August 30; two immature birds were seen at nearly every visit from then until Oct. 11. In 1926 two Red-headed Woodpeckers were seen May 4; one or more of these birds noted at every visit except that of May 12 until Sept. 11; on Aug. 19 there were three young as well as two adults.

Centurus carolinus. Red-bellied Woodpecker. Resident. This bird nests in the deep woods near the South Canadian river, but at Snail Brook is chiefly a fall visitor. It has been recorded once in September, during three Octobers, three Novembers, in December 1921, in March 1922 and 1924, on May 31, 1924 and July 31, 1923.

Colaptes auratus luteus. Northern Flicker. Yellow-shafted Flickers are abundant in this region during fall, common in winter, fairly common in spring and uncommon in summer; this has also been their manner of occurrence on Snail Brook. Only once have I had evidence of their breeding there; on July 20, 1926 an adult was recorded and on July 29 a pair were seen followed by two bob-tailed young. (The Flicker—*Colaptes auratus auratus* doubtless occurs during migrations.)

Colaptes cafer collaris. Red-shafted Flicker. This handsome bird is an uncommon but fairly regular visitor in fall and winter. Earliest dates of arrival on Snail Brook have been October 8, 1920; September 27, 1921; (not recorded in 1922 and 1923); September 28, 1925; October 16, 1926.

Antrostomus carolinensis. Chuck-will's widow. Summer resident in the eastern part of Cleveland county. Recorded only once on Snail Brook—April 30, 1926 at 10 a. m.

Chordeiles virginiaus howelli. Howell Nighthawk. Summer resident. On Snail Brook recorded flying over May 1, 11, June 1, 5, 22, October 16, 1920; June 8, 12, September 18, 26. October 1, 1922; July 4, September 30, 1926. The spring and summer records involved from one to three birds, as did that of October 16, 1920. and September 26, 1922; the other fall records were of migrating flocks numbering about twenty birds.

Chaetura pelagica. Chimney Swift. These birds are uncommon summer residents in Norman; they are sometimes seen flying over Snail Brook in May and June.

Archilochus colubris. Ruby-throated Hummingbird. An uncommon summer resident in the region. This bird has been recorded but twice at Snail Brook—on May 25, 1920 and June 9, 1921.

Muscivora fortificata. Scissor-tailed Flycatcher. These beautiful birds stay with us for a longer season than any other flycatchers. Arriving in early spring, they gather into flocks in September and do not leave until the middle of October. The latest dates of occurrence on Snail Brook have been October 21, 1920; October 5, 1921; October 16, 1922; October 17, 1922; October 16, 1925; October 23, 1926. In 1922 a pair nested in a small persimmon tree; on July 17 they were feeding young.

Tyrannus tyrannus. Kingbird. Summer resident. This bird has been recorded each spring and summer on Snail Brook nesting there in 1921.

Tyrannus verticalis. Western Kingbird. A rare summer resident in this region. This species has been seen but once on Snail Brook—May 8, 1920.

Myiarchus crinitus. Crested Flycatcher. This bird has probably nested each year from 1920 to 1922 and again in 1926. Arriving usually the third week in April, it leaves early; on Snail Brook I have not recorded it later than July 17, but in other places in the region a few are to be found in August and occasionally in early September.

Sayornis phoebe. Phoebe. A spring and fall transient. Single birds have been recorded on Snail Brook September 30, October 4, 10, 21, 1920, and March 27, 1922; two were seen October 14, 1922.

Myiochanes virens. Wood Pewee. Summer resident. On May 11, 1920 four were seen on Snail Brook and on May 12, two, but no other were recorded that summer but a singing male June 1. In 1921 they were recorded May 6 and June 9, and in 1922 they probably nested, having been seen May 8, June 8, 12, July 17, and August 10.

Empidonax flaviventris. Yellow-bellied Flycatcher. This rare transient has been recorded twice on Snail Brook—Single birds on August 11, 1920, and September 27, 1921.

Empidonax virescens. Acadian Flycatcher. Each spring and fall small flycatchers are seen, but as they rarely sing it is impossible to tell whether they are the Least or Acadian. Once on May 9, 1923, an Acadian Flycatcher sang. The other dates for these small flycatchers are May 2, 8, 11, and 17, 1920; May 10, 15, and 31, 1921; August 10, 1922; April 30, May 12, September 11, 1926.

Otocoris alpestris. (subsp?) Horned Lark. Horned Larks of three subspecies (*praticola*, *leucolaema*, and *enthymial*) occur here irregularly in winter; the breeding bird is *leucolaema* (Desert Horned Lark). From January 16 to February 12, 1920 there was a flock of Horned Larks numbering from 7 to 20 but finally reduced to two on the prairie to the east of Snail Brook.

Cyanocitta cristata cristata. Blue Jay. Although Blue Jays winter in some groves nearer the South Canadian, it is only as a summer resident that they have occurred on the forty acres studied, having been recorded between March 31, and November 5. They probably nested there from 1920 to 1922.

Corvus brachyrhynchos brachyrhynchos. American Crow. These birds are present in this region in enormous numbers in fall, winter and spring but only a few remain to breed. On the first half mile of Snail Brook they have been recorded during every month of the year but July and August, sometimes a few perched in the trees, sometimes a flock in the corn fields and sometimes a flock flying northeast to roost. They have not nested here, although in 1920 and 1921 they did so on the next half mile.

Molothrus ater ater. Cowbird. Summer resident. These birds have been recorded from March until October, usually two or three birds together, but in late fall they congregate into large flocks.

Xanthocephalus xanthocephalus. Yellow-headed Blackbird. An irregular spring and fall migrant; there are only two records for Snail Brook, a flock of ten April 9, 1922, and 3 females April 24, 1926.

Agelaius phoeniceus phoeniceus. Red-winged Blackbird. A common resident, often occurring in great flocks in winter. In 1920 two pair nested by Snail Pond, but since this was drained, they have been seen only occasionally on the forty acres; one female on September 18, 1921; a large flock on December 24, 1922; a few females from February 4 to 20, 1926, and a flock of a dozen males and females October 13 and a pair October 16, 1926.

Sturnella magna magna. Eastern Meadowlark. This is a summer resident often present in winter too. In 1920 and 1921 they nested on the prairie; and during the next three winters they were heard occasionally. In 1926 they were recorded only on February 26.

Sturnella neglecta. Western Meadowlark. These birds are with us from the second or third week in October until late March; their singing is one of the delights of our winters.

Icterus spurius. Orchard Oriole. These birds have nested each year and have increased from one to three pairs. They arrive about April 22 and leave in August, the last date of their occurrence on Snail Brook being August 11. On June 19, 1926 two or three young just out of the nest were being fed by their parents.

Icterus galbula. Baltimore Oriole. Arriving usually a day or two later than the last bird, this oriole stays until mid-September. In 1920 and 1922 one pair bred on Snail Brook but in 1926 there were three pairs. On June 19, 1926 parents were feeding young in a nest in an elm; a late date was that of July 17, 1922 when young out of the nest were being fed by their mother. On August 19, 1926, a loose flock of about 35 females and young was seen on Snail Brook.

Euphagus carolinus. Rusty Blackbird. These are winter visitants arriving in flocks in November; there is only one record for Snail Brook—a single bird February 20, 1926.

Euphagus cyanocephalus. Brewer Blackbird. These are winter visitants. They have been seen at Snail Brook in October, December and January.

Quiscalus quiscula aeneus. Bronzed Grackle. A common summer resident arriving in March and recorded as late as November 1. A few pairs have bred on Snail Brook each year; in 1926 a female carrying food was seen June 19 and 20.

Carpodacus purpureus purpureus. Purple Finch. A winter visitant, recorded on Snail Brook as follows: single birds November 29, 1920 and November 4, 1922; small flocks January 1, 19, and 23, 1926.

Astragalinus tristis tristis. American Goldfinch. A resident, far more abundant in winter than at any other time of the year except October.

Spinus pinus. Pine Siskin. A winter visitant. The only records for Snail Brook are a flock of 15 seen January 1, 1926, and two birds October 16, 1926.

Passer domesticus. English Sparrow. Snail Brook enjoyed a happy immunity from these invaders until late in 1922; now they nest commonly about the barns and even in the old woodpecker holes in the dead trees; there are throngs of them in the trees and weeds from May till October.

Poocetes gramineus (subsp?). Vesper Sparrow. Both Eastern and Western Vesper Sparrows are common spring and rare fall transients here. On Snail Brook they have been recorded only in springs as follows: April 7, 13, 1920; March 9, 14, April 8,

1921; March 27, April 4, 1922; March 21, 1923; March 20, April 22, 1926.

Passerculus sandwichensis nevadensis. Nevada Savannah Sparrow. A fairly common spring and fall transient, less common in winter. On Snail Brook it has been seen March 15, April 13, to May 2, 1920; February 13, 23, March 9, 14, November 19, December 12, 1921; January 24 to April 13, November 13, 1922; March 3, 1923.

Ammodramus savannarum bimaculatus. Western Grasshopper Sparrow. A summer resident in prairie pastures. I have only seen it twice on this tract, a single bird February 20, 1921, and two birds, April 8, the same year.

Passerherbulus lecontei. Leconte Sparrow. Winter visitant. It has been identified on Snail Brook on the following dates: October 29, 1920, December 6, 12, 1921; January 17, March 1, 1922; October 19, 1923.

Chondestes grammacus strigatus. Western Lark Sparrow. A summer resident arriving in late March or early April and staying till the third week in September. We have one winter record on Snail Brook, a single bird on January 6 and 13, 1921. A pair have bred each year on the area.

Zonotrichia querula. Harris Sparrow. Arriving the last of October or first of November and staying until the first week in May, these fine birds with their sweet singing are among the greatest pleasures of our winters. They occur in large flocks on Snail Brook.

Zonotrichia leucophrys leucophrys. White-crowned Sparrow. A spring and fall transient, sometimes wintering. They have been recorded as follows on Snail Brook: April 21 to 25, 1920; January 13, May 1-10, October 18 to November 19, 1921; February 1 to April 25, October 11 to November 13, 1922; October 17 to November 7, 1923; October 15-29, 1925; October 11-19, 1926.

Zonotrichia albicollis. White-throated Sparrow. Uncommon transient and winter visitor. It has been seen on Snail Brook as follows: April 27 to 29, 1920; October 20, November 1-3, 1921; October 20, November 1-6, 1922; November 3, 1923; October 30, 1926.

***Spizella monticola* (subsp?)**. Tree Sparrow. A winter visitor from November till March, rare during some winters. They were present, in numbers varying from 8 to 40 on Snail Brook in all winters but 1921 to 1922 when but two birds were recorded—one on December 12, and the other January 24, and in 1923 to 1924 when none were seen.

Spizella passerina passerina. Chipping Sparrow. A common

spring and rare fall transient. They have been seen on Snail Brook as follows: April 29 to May 2, 1920; April 25 to May 10, 1921; April 9 to 30, 1922; October 12 to 16, 1925; April 22 to May 4, October 15 and 16, 1926.

Spizella pallida. Clay-colored Sparrow. An irregular transient. Their dates on Snail Brook have been: April 30, May 8, 1920; April 13, 25, November 13, 1922; October 29, 1923; October 19, 1925; October 13 to 16, 1926.

Spizella pusilla arenacea. Western Field Sparrow. A winter resident from late October through March, (all five specimens taken in winter in this county have been referred to this subspecies by Dr. H. C. Oberholser). Field Sparrows were recorded on this half mile of Snail Brook as follows: February 12 to April 17, 1920; October 27, 1920 to April 14, 1921; November 8, 1921, to April 4, 1922; November 18, 1922, to March 21, 1923; February 23, 1924; October 24, 1925, to March 31, 1926, and October 13 to November 29, 1926. The breeding bird in this region is the Eastern Field Sparrow; a pair usually nests on the second half mile of Snail Brook. It may well be that some or all of these birds seen in April are migrating members of this sub-species.

Junco hyemalis hyemalis. Slate-colored Junco. A common winter resident from late October till late April, recorded on Snail Brook as follows: December 1919 to April 19, 1920; October 29, 1920, to April 14, 1921; November 8, 1921 to April 4, 1922; October 30, 1922 to March 21, 1924; October 24, 1925 to March 31, 1926; October 13 to November 29, 1926.

Melospiza melodia juddi. Dakota Song Sparrow. Common winter resident from the middle of October to late April. In 1920 they were seen on Snail Brook till April 25; from October 27 to April 14, 1921; from October 18, 1921 to March 18, 1922; from October 11, 1922 to April 13, 1923; from October 17, 1923 to March 21, 1924; from November 17, 1925 till March 31 1926; from October 13 on. (The spring dates in 1924 and 1926 are not represented because of the few visits; in the fall of 1925 Song Sparrows were seen in another locality on October 19).

Melospiza lincolni lincolni. Lincoln Sparrows. Common in spring and fall, usually rare in winter. Their dates on Snail Brook have been: April 15 to May 3, October 16 to 29, 1920; January 13 to May 10, October 12 to December 12, 1921; January 17, February 1, 20, March 18 to May 3, October 11 to November 18, 1922; October 17, 1923; October 12 to 25, 1925; October 5, October 11 to 30, November 29, 1926.

Melospiza georgiana. Swamp Sparrow. Rare transient and

winter visitant. One bird was seen on Snail Brook November 22, 1920, three November 23, 1923, six October 14, and one October 16, 1926.

Passerella iliaca iliaca. Fox Sparrow. Winter resident from late October to March. It has been seen in small numbers on Snail Brook on the following dates: March 6, 1920; January 28, October 20, November 1 to 28, 1921; January 4, February 20, March 8, 14, November 25, 1922, and November 13, 1926.

Pipilo maculatus arcticus. Arctic Towhee. Common transient less common winter residents, arriving the second week in October and staying till early May. It has occurred in small numbers on Snail Brook as follows: February 29, April 17 to May 2, 1920; October 16, 1920 to May 6, 1921; October 18, 1921 to May 3, 1922; October 11, 1922 to November 4, 1922; October 29, 1923; October 16 to 19, 1925; October 16 to 19, 1926.

Cardinalis cardinalis cardinalis. Cardinal. Resident. Three pairs nested on the area in 1920 and 1921, one pair the two following years and two in 1926. The earliest nest found contained one egg April 24, 1920, while on August 22, the same year we saw a bob-tailed baby just out of the nest.

Guiraca caerulea caerulea. Blue Grosbeak. Two pairs nested on the area in 1920, 1921, and 1926, one pair in 1922. Arriving the last day of April or first of May it has not often been seen after August; only in 1926 have I recorded it in September. On June 20, 1926 I found a nest made mostly of newspapers; it contained two eggs but later was robbed. On the same day I saw a male feeding a young bird that had left its nest. Other dates on which parents were seen with insects in their bills were July 17, 1922 and August 22, 1920.

Passerina cyanea. Indigo Bunting. Summer resident, nesting on Snail Brook in 1921 and 1926. Arriving somewhat earlier than the Blue Grosbeak, it remains longer, having been seen on Snail Brook as late as October 17, 1923.

Passerina ciris pallidior. Pale Painted Bunting. Summer resident; arriving about the time that the two preceding species do, it leaves earlier; I have never seen it later than August 10. In 1922 a pair, the male of which was in immature plumage, nested on the area.

Spiza americana. Dickcissel. Two pair nested on Snail Brook in 1920 and one in 1921, but since then this bird has been recorded only twice; August 6 and September 29, 1923.

Progne subis subis. Purple Martin. Summer resident; occasionally seen flying over from April to July.

Petrochelidon lunifrons lunifrons. Cliff Swallow. Transient.

On Snail Brook flocks have been seen flying over on September 27, 1921, and September 30, 1926, when a few were seen in the flocks going south.

Hirundo erythrogastra. Barn Swallow. Uncommon transient and rare summer resident; on Snail Brook recorded only on September 27, 1921, and September 30, 1926, when a few were seen in the flocks going south.

Iridoprocne bicolor. Tree Swallow. Transient. Recorded on Snail Brook on the same dates as the two preceding species.

Bombycilla cedrorum. Cedar Waxwing. Winter and spring visitant. Flocks have been seen on the area March 6, April 24, May 1, 1920; May 10, 1921, and February 20, 1926.

Lanius ludovicianus excubitorides. White-rumped Shrike. A resident. On Snail Brook one or two birds have been seen irregularly in fall, winter, and spring; it has not been recorded during the three summer months, although it nested in 1921 on the second half mile.

Vireosylva olivacea. Red-eyed Vireo. Summer resident in deep woods near river. In 1920 it was recorded four times on Snail Brook, April 29, May 1, 12, and 17; the only other record was July 17, 1922.

Vireosylva gilva gilva. Warbling Vireo. A transient, breeding locally. Only one bird has been seen on Snail Brook on April 24 and 25, 1920.

Vireo belli belli. Bell Vireo. Summer resident. One pair nested at Snail Brook in 1920, 1921 and 1923, while three did so in 1926. On May 24, 1926 I found two nests, the first contained two eggs and the other four. In 1922, there were no breeding pairs but a singing male was heard there June 9 and two on August 30 besides two birds seen September 18.

Protonotaria citrea. Prothonotary Warbler. Uncommon transient and rare breeder; seen only once on Snail Brook, April 13, 1920.

Vermivora ruficapilla ruficapilla. Nashville Warbler. Uncommon transient; one seen May 11, 1920, four October 14, 1926, three October 16 and two October 19.

Vermivora celata celata. Orange-crowned Warbler. Common transient; seen on Snail Brook as follows: May 8, October 16, 21, 1920; May 1, 1921; May 8, October 16, 1922; September 28 to October 15, 1925; April 24, October 13 to 16, 1926. Usually from one to three birds would be recorded, but on October 15, 1925, there were six and in October, 1926, there was really a "wave" for about twenty were seen on the 13th, ten on the 14th, six on the 15th, and sixteen on the 16th.

Dendrocia aestiva aestiva. Yellow Warbler. A pair of these birds nested in 1921, 1922, and 1923, while two did so in 1926. A male feeding young was seen July 17, 1922. Yellow Warblers arrive quite regularly about April 21 and leave in August; I have not seen them later than the 10th.

Dendroica coronata. Myrtle Warbler. Transient, a few wintering. They have been recorded on Snail Brook February 29, October 29th, and November 5, 1920; May 1, 1921; October 19, 1926.

Dendroica striata. Black-Poll Warbler. Transient; one seen May 16, and three Nov. 5, 1920; one November 8, 1921, and three November 4, 1922.

Dendrocia virens. Black-throated Green Warbler. Rare transient. Single birds were seen September 28 and October 6, 1925.

Oporornis philadelphia. Mourning Warbler. Rare transient. Single birds were seen September 28 and October 6, 1925.

Geothlypis trichas trichas. Maryland Yellow-throat. A pair nested on Snail Brook in 1920 and again in 1926. They arrive from the 17th to 24th of April and are last recorded in the fall in late September and early October; these late birds are probably transients for the breeders seem to leave earlier. The latest fall dates on Snail Brook have been September 27, 1921, September 28, 1925 and October 14, 1926.

Icteria virens longicauda. Long-tailed Chat. Summer resident. On Snail Brook single birds were seen April 29, May 2 and July 31, 1920.

Steophaga ruticilla. Redstart. An uncommon transient. Single birds have been seen on Snail Brook May 2, 1920, and August 30 and September 18, 1922.

Mimus polyglottos leucopterus. Western Mockingbird. A common summer resident, a few birds wintering. One pair has nested each year and two in 1926. The only winter record for Snail Brook was of two birds on January 25, 1920.

Dumetella carolinensis. Catbird. A pair of catbirds nested on Snail Brook in 1920, 1921, and 1926; on August 22, 1920, we saw a bob-tailed baby out of the nest. Catbirds arrive about May 1 and are usually recorded until late September.

Toxostoma rufum. Brown Thrasher. Common summer resident; one pair nested on Snail Brook in 1920, two in 1921, one in 1922, and three in 1926. They arrive in late March or early April and are last seen in October and occasionally in November. In 1920, one nest contained four eggs on May 1, another three eggs on May 11; in 1921 on May 6 a nest had three eggs. In

1926, a nest was finished but empty on May 4, it contained 2 downy, blind young on May 24 and one large nestling June 1.

Salpinctes obsoletus obsoletus. Rock Wren. A rare transient. My only record for the county was the single bird seen by me on Snail Brook October 5, 1921; it was a very tame little bird, running over some logs as the best substitute for rocks that it could find.

Thryothorus ludovicianus ludovicianus. Carolina Wren. On the first half mile of Snail Brook it is a visitor at all times of the year. In 1921 a pair tried to nest for we saw them building on April 6, but the nest was later found deserted.

Thryomanes bewicki cryptus. Texas Wren. A resident. Like the preceding species, this bird may be recorded at any time of the year; it probably nested on the area in 1922.

Troglodytes aedon parkmani. Western House Wren. Recorded on Snail Brook from April 23 to May 3, and October 16, 1920; May 1, 6, 1921; April 13, 25, 1922; May 9, October 17, 1923; October 16, 1925; October 14 to 23, 1926.

Certhia familiaris americana. Brown Creeper. Transient and winter visitant. The only record for Snail Brook is of a single bird October 14, 1922.

Baeolophus bicolor. Tufted Titmouse. Resident in deep woods near the river. On Snail Brook from one to four birds have occurred irregularly in fall, winter and spring as follows: April 23, October 16 to December 26, 1920; January 4 to February 23, 1921; April 25, 1922.

Penthestes carolinensis agilis. Plumbeous Chickadee. Two pairs nested in 1920, 1921 and 1922 and one in 1926. A bird with an insect in its bill was seen April 17, 1920 and a nest with two young was found in a willow stub on May 8, 1920.

Regulus satrapa satrapa. Golden-crowned Kinglet. Uncommon transient and winter visitant. Recorded only twice on Snail Brook: Single birds October 12, 1921 and October 16, 1925.

Regulus calendula calendula. Ruby-crowned Kinglet. Common transient. Recorded on Snail Brook from April 15 to 27, 1920; March 20 to April 6, 1921; October 1 to November 4, 1922; October 17 to 29, 1923; October 6 to 16, 1925; September 30 to October 19, 1926.

Poliophtila caerulea caerulea. Blue-gray Gnatcatcher. Summer resident. On Snail Brook it has occurred only as a transient, having been seen March 30, April 27, 1920; March 27, April 4, 9, 13, September 13, 1922; April 13, 1923; October 6, 1925.

Hylocichla ustulata swainsoni. Olive-backed Thrush. Spring

transient, recorded on Snail Brook from April 25 to May 17, 1920; May 6, to 31, 1921; May 8, 1922.

Planesticus migratorius migratorius. American Robin. Resident. One pair nested in 1920, 1921, 1923 and two in 1926. On May 12, 1926, a male was seen flying with food to his nest; on May 24, a female was adding mud to her nest for the second brood; on June 20, both parents were feeding three large young in this nest. Robins have been recorded on Snail Brook from March 15 to September 17, 1920; from March 3 to November 11, 1921; February 20 to April 30, June 8, July 17 to October 14, December 7, 1922; January 11, March 29 to July 31, 1923; December 23, 1925; January 1 to February 4, March 18 to October 5, 1926.

Sialia sialis sialis. Bluebird. Resident. A pair nested on Snail Brook in 1920. The nest was found March 28 in a woodpecker's hole; on April 19, the four eggs that had been nearly ready to hatch were found deserted. Since then, they have been seen occasionally at all times of the year.

Changes in Bird Life Due to the Inroads of Civilization.

The variety of bird life was at its maximum on Snail Brook in 1920 and 1921; there was a noticeable decrease in 1922 and a sorrowful lack of birds the next two years. Now birds are returning for two reasons: first, a portion has been allowed to go wild again and in a thicket of weeds with many trees, some of which are dead and therefore attractive to woodpeckers; second, the orchards, vineyards, and blackberry plantations are getting to a size where they are useful to birds.

At present there is a small variety of visitants, but larger numbers of certain birds during the summer. Since the draining of the pond, we can no longer expect to find ducks and shore-birds as transients nor Red-winged Blackbirds nesting. Since the breaking up of the prairie and the building of house, Horned Larks and Killdeer have ceased to visit Snail Brook and Bob-whites and Meadowlarks no longer nest there.

On the other hand, those birds that adapt themselves to village conditions are increasing in numbers: Mourning Doves, Orchard and Baltimore Orioles, Bell Vireos, Yellow Warblers, Brown Thrashers, Mockingbirds and Robins. English Sparrows are flourishing mightily.

Snail Brook is now partly wild and partly civilized; it is attractive to birds in summer, but only moderately so in winter and spring. It is still an excellent place to watch the fall migration. When the last tangle succumbs to "improvement," the variety of birds will appreciably decrease.

Seasonal Flunctuations.

One of the most interesting results of the first three years' observation on Snail Brook was the finding of the uniformity of the number of species and individuals during each season and also from year to year. The main difference was a decrease in birds starting in late spring in 1922. Snail Brook proved to be an epitome of the bird life of the region, because it attracted birds of many kinds at all times of the year, and also because of its comparative isolation. Unfortunately, this is no longer true.

In order to test my Snail Brook findings, during 1926, I took a series of eight mile censuses, one each month and two in October (on the 2nd and 16th). These trips covered varied habitats: some prairie and cultivated fields, a pond, a swamp, the South Canadian river, but mostly woods of various types. On the whole, the censuses have corroborated the Snail Brook results to a gratifying degree.

So far as the birds in this region are concerned, there are seven seasons. Winter extends from early December to about February 20th when the first spring migrants begin to appear. "Early Spring" last for two months; most of the winter residents are still here and the early spring birds gradually arrive. The numbers of birds vary more than at any other season, sometimes rising very high with sparrow transients, at other times showing a dearth of birds near the end of March and in early April if the weather has turned bleak. "Late Spring" begins about April 20th, for the bulk of our summer residents come between this date and the first of May, while all the winter residents have left in late April or early May; before the end of May all the summer birds are here. The birds in summer—from June 1 to the middle of August—are mainly the breeders, although a very few transients are passing.

"Early Fall" from late August to late September sees the departure of most of the summer birds and the arrival of scattering transients. "Mid Fall" from the last of September to the 12th or 16th of October marks the lowest ebb of bird life in this region, for almost all the summer residents have left and almost no winter birds have come. The middle of October or a little earlier brings a great change in our bird life, for the bulk of the fall transients arrive within a few days of each other. Many of these probably pass on, and there is sometimes a comparative dearth of birds in late October, but the winter birds keep coming through November, so that the late fall population gradually reaches the winter numbers.

Table II gives a summary of the 128 censuses taken on Snail

Brook from December 1919 to December 1922, and also the numbers of birds seen on the eight mile censuses in 1926.

Table II.
Seasonal Fluctuations of Bird Life in Cleveland County.

Season	Average Number of Birds Seen from 1920 to 1922 on Snail Brook.				Birds seen in 1926 on the Eight Mile Censuses		
	No. of Censuses	No. of Species	Range of Vari.	Individ.	No. of Species	No. of Ind.	
Winter							
Dec.	25	12.5	8-19	93	26-182	36	860
Feb. 19						39	2400
Early Spring						35	1400
Feb. 20 to April 19th	31	14	7-23	91	12-252	45	600
Late Spring							
April 20 to May 31	20	22	14-31	57	39-83	61	460
Summer						66	460
June 1 to Aug. 15th	10	20.6	15-26	46	25-86	54	450
Early Fall						55	550
Aug. 20 to Sept. 26	7	12.5	9-15	55	21-71	44	340
Mid Fall							
Sept. 29 to October 13	8	7.2	5-11	14	10-26	32	200
Late Fall							
Oct. 11 to Nov. 30th	25	13	7-18	73	17-167	42	950
						37	550

We have two fairly stable populations here—the winter and the summer; from mid-October to mid-April—six months—the bulk of our birds are winter residents, while from late April to late August—four months—the bulk are summer residents. During late fall, winter and early spring, the number of species averaged from twelve to fourteen on Snail Brook, and from thirty-five to forty-five on the eight mile tract; during late spring and summer it averaged twenty to twenty-two on Snail Brook and fifty-five to sixty-six on the eight miles. In early fall, the numbers dropped to twelve on Snail Brook and forty-four on the eight miles; while in mid fall they reached their lowest point of all—seven species on Snail Brook and thirty-two on the eight miles.

As to individuals, both sets of data give many more birds in winter than at any other time; they gradually decrease reaching a minimum in mid fall, when the numbers of birds seen average less than a sixth of the winter numbers. It is curious that late spring in both sets of data did not give more birds; the chief explanation seems to be that the number of migrating warblers here is very small.

Thus we can conclude that in this region we have the largest number of individuals in winter with a gradual decrease to the

lowest point at mid fall and then a rather sudden increase. As to species, the greatest number occur in late spring with a small decrease in summer, a further loss in early fall, a decided drop in mid fall and an increase again in late fall to the winter population.

NOTE: In the course of three visits and nine censuses from December 17 to May 29, 1927, two species were added to the list: a flock of 12 Chestnut-collared Longspurs on January 23, and an Upland Plover flying over on April 28. There is one new nesting bird—the White-rumped Shrike; on May 25 the parents were feeding five young that could fly well, the female meanwhile building herself a new nest. A pleasant surprise consisting in the increase in both species and individuals breeding, since two censuses in late May gave a total of 25 nesting species and 57 pairs of native birds.