

I INTRODUCTION

PAST AND PRESENT IN OKLAHOMA BIRD LIFE

A vivid picture of the wealth of bird life in Oklahoma a hundred years ago was given by Edwin James of Major Long's expedition. In his account of conditions near the western border of the state he wrote:

"It is difficult to conceive whence such numbers of predatory animals and birds, as exist in every part of the country where the bison are present, can derive sufficient supplies for the sustenance of life; and it is indeed sufficiently evident their existence is but a protraction of the sufferings of famine."

The following day, August 18, 1820, he noted, "Throughout the night the roaring of immense herds of bisons, and the solemn notes of the hooting owl were heard, intermixed with the desolate cries of the jackal and the screech owl."

When near the junction of the North and South Canadian rivers, September 5, he wrote:

"We listened as we rode forward to the note of a bird, new to some of us, and bearing a singular resemblance to the noise of a child's toy trumpet; this we soon found to be the cry of the great ivory-billed woodpecker (*picus principalis*), the largest of the North American species, and confined to the warmer parts. The *picus pileatus* we had seen on the 25th of August, more than one hundred miles above, and this with the *picus erythrocephalus* were now common. Turkeys were very numerous. The paroquet, chuck-will's-widow, wood-robin, mocking bird, and many other small birds, filled the woods with life and music. The bald eagle, the turkey buzzard, and black vulture, raven and crow were seen swarming like blowing flies about any spot where a bison, an elk, or a deer had fallen a prey to the hunter. About the river were large flocks of pelicans, with numbers of snowy herons, and the beautiful *ardea egretta*" ('05: 171-172).

Abert's bird notes twenty-five years later are full of interest. All along the Canadian he found Turkeys and Prairie Hens, the latter in great flocks in central and eastern Oklahoma. "Turkey buzzards," he wrote, "show the wary hunter the remains of butchered buffalo, when on inspection, he discovers that the animal has come to its death by the bullet of the white man, or by the arrow of the Indian, and thereby judges of the vicinity of friend or foe." ('46:55).

On October 5, he "noticed on the backs of some of the buffalo the common cow-bunting (*Eberiza pecoris*) sitting quite composedly. Large flocks of these birds have been our fellow travellers throughout the journey, and were quite familiar, lighting on the ground immediately in front of our mules and sometimes attempting to find perching places on the heads and ears of our animals. They oftentimes amused us by their antics while engaged in catching grasshoppers that were started up from the prairie grass by the caravan. This employment called forth all their ac-

tivity, and caused them to throw themselves into the most ludicrous attitudes while endeavoring to catch their prey, which in myriads surrounded them on all sides."

And finally, October 19, near the mouth of the Canadian, "After a long march through misty low lands where sycamore trees seemed to arch the heavens and gaudy paroquets were circling around with rapid flight and screaming loudly among their lofty branches, we forced our way through the tangled undergrowth of spicewood and smilax, and at length reached the banks of the Canadian just as the last rays of the sun were disappearing."

The last observer to record the bird life of Oklahoma in its glory was Woodhouse in 1849 and 1850. Paroquets were "quite numerous," Passenger Pigeons "common," Swallow-tailed Kites, Wood Ducks, Prairie Chickens, and Ravens were "very abundant," while Raptores and water and shore birds ocured in countless hordes.

In 1876 McCauley in northwestern Oklahoma noted in regard to the Wild Turkey that "numbers were observed at Wolf Creek, Indian Territory, but not in the abundance in which it was found as lately as two years ago."

The closing chapter of primitive conditions in regard to bird life is marked by Cooke's experience in 1883 in Bryan county ('14b). Prairie Chickens and Wild Turkey were very common, while both Vultures were abundant, but at this period they feasted on the carcasses of cattle that perished in the severe winter. He gives one of the last accounts of the Paroquet and the very last of the Ivory-billed Woodpecker.

Catlin wanted the Great Plains set aside as a refuge for the bison and the Indians. Marcy considered that the Cross Timbers "seem to have been designated as a natural barrier between civilized man and the savage" for they divided "the country suited to agriculture from the great prairies, which for the most part are arid and destitute of timber" ('53:85) After four days of "breaking a painful pathway with many a tear, scratch and grumble" through these same Cross Timbers, Latrobe decided that "with the exception of the rich alluvial lands of the Arkansas and a few strips of like character along the tributary streams, the district we had passed over was in fact, a desert, with an ungrateful soil and stunted vegetation" ('35:243).

Most unappreciative of all was Long who concluded: "We have little apprehension of giving too unfavorable an account of this portion of the country. Though the soil is in some places fertile, the want of timber, of navigable streams, and of water for the necessities of life, render it an unfit residence for any but a nomad population. The traveler who shall at any time have traversed its desolate sands will, we think, join us in the wish that this region may for ever remain the unmolested haunt of the native hunter, the bison, and the jackal." ('23:174).

Nevertheless, undeterred by all these warnings, on April 19, 1889, the white man swarmed down on the land, much of whose wild life was still undisturbed.

"The opening of Oklahoma" wrote Frederick S. Barde ('12:16) "to homestead settlement was as though the lightnings of heaven had fallen

upon its wild life. Fires swept the country in all directions; armies of horsemen penetrated to remote places; wagons rumbled over the hills and down the valleys; there was a tumult of shouting and the roar of guns, and violence reigned, where until that day had been the peace of a primeval solitude. The slaughter had begun." No wonder that James speaks of man as "the enemy and destroyer of all things." ('05:153).

The buffalo, elk, and antelope which had served as food for the birds of prey had for the most part disappeared before this. Since then in eastern Oklahoma the primeval forests have been largely cut down, while in western Oklahoma the prairies have been turned into farms, towns, and cities. More recently oil has been the cause of the pollution of water, the death of vegetation, and destruction of sandpipers and water birds (Pemberton '21b; Phillipps and Lincoln '30:215).

What of our bird life now in comparison to eighty years ago? The Passenger Pigeon and Paroquet are entirely extinct; the Ivory-billed Woodpecker, Trumpeter Swan, Whooping Crane, and Eskimo Curlew are nearly so, while the White-tailed and Swallow-tailed Kites have disappeared from the state. Birds whose numbers have greatly diminished are all kinds of Raptores, Shorebirds, Upland Plovers, Herons, Cranes, Ravens, Turkeys and Prairie Chickens. Some of the prairie nesting birds have evidently become fewer, as Meadowlarks, Horned Larks and Grasshopper Sparrows. Moreover, there are two new birds, one probably more abundant than any of our native birds—the English Sparrow, the other with even worse traits—the Starling. Such has been the effect of man's occupation, of the tilling of the land, of meddling with nature's balance, and worst of all, of wanton destruction.

Fortunately there are some compensations. Thanks to the planting of trees and shrubs over what was formerly treeless prairie, many of the smaller birds have multiplied. This is true of Mourning Doves, Orchard and Baltimore Orioles, Mockingbirds, Catbirds, Brown Thrashers, and others. The Robin has extended its range west in the last twenty-five years, while the Western Kingbird is now engaged in the same process in the opposite direction. The Chimney Swift that used to nest only in great hollow sycamores in the eastern forests of the state, now avails itself of chimneys in central Oklahoma. The Purple Martin has enlarged its range in response to boxes put up for its use. It is true that several undesirable species have thriven unduly upon the farmer's crops, as the Bronzed Grackle and Crow. Nevertheless we have much to be thankful for in the increase of many birds that assist us by their insectivorous food habits and rejoice us with their songs and beauty.

Thus, while most of the large, conspicuous, or unadaptable species have been partially or wholly exterminated by man, many small and adaptable species have prospered. What may we expect in the future?

Many birds are gone beyond recall. Yet much may be hoped from education, from increased respect for law, from the development of greater love of nature and beauty. If farmers and hunters can be brought to realize that most of the Hawks and Owls are their best friends, if the bag limits of game birds are reduced and more refuges established, if

the illegal killing of Turkeys and Prairie Chickens is stopped, and also the slaughter of the picturesque and harmless Herons, Cranes, and Pelicans, these birds should gradually become less rare. The English Sparrow will probably always be common as the small grains raised here offer such excellent provender. The Starling will affect our native birds adversely by consuming their winter food supplies. With further planting of trees and shrubs many song birds can be attracted into new regions and their numbers multiplied, especially if they are protected from their enemies.

We of the present generation have been deprived of some of the most marvelous sights in nature—the gorgeous happy Paroquets, the wonderful great Ivory-billed Woodpeckers, the Swans with their grace and beauty, the Whooping Cranes with their strange wild cries and the incredible flights of the finest of the pigeons. These beautiful and gentle birds were wantonly, cruelly killed, so that life on the earth is forever poorer.

We have been greatly wronged by those who went before us. We are still being wronged by many men who keep up the ugly work of extermination. Let us rather love nature, befriend the wild things still left—bird and plant and animal—so far as we can, so as to bring back some of the charm of this country as it used to be. Let us leave to our descendants a richer heritage than came to us.

PHYSICAL FEATURES

Oklahoma is an unusually interesting region in its bird life because of the large size of the state, the diversified character of its surface, and particularly on account of its position, for, since it lies midway between East and West, it exhibits a great variety in flora and avifauna from one border to the other.

The area of Oklahoma comprises 69,414 square miles which is larger than all of New England. Its greatest extent is 468 miles along its northern border, its greatest breadth 234 miles; the length of the southern border is 318 miles, the distance from the southeastern corner to the northeastern is 522 miles. It extends from 94° 29' west longitude to 103°, the 100th meridian marking the western border of the main body of the state, and from 33° 37' north latitude to 37°. In elevation it ranges from 300 feet in the southeastern corner to 4978 feet at the summit of the Black Mesa at the northwestern corner of the Panhandle. The gradual rise from southeast to northwest is interrupted by four mountain systems. The Ouachita Mountains in the southeast reach an altitude of 2850 feet; the Ozarks in the northeast rise to 1700 feet; the Arbuckles in the south central portion range from 750 to 1400 feet, while the Wichitas in the southwest rise from a level plain at an altitude of 1200 feet to a height of 2480 feet.

The temperature in general is rather mild, although extreme temperatures of 25° below zero and 116° above have been recorded. Periodic "northers" in fall and winter have a decided effect on the migration of water fowl. The mean annual temperature of Oklahoma City is 59.4°;

the mean temperature for the coldest month (January) is 37.1°, for the hottest month (July) 80.2°. The average rainfall in southeastern Oklahoma reaches 45 inches; in central Oklahoma it ranges between 35 and 30 inches, in western Oklahoma between 30 and 20, coming to a minimum of 15 inches near the end of the Panhandle.

Oklahoma is the meeting ground of eastern and western floras, the main body of the state falling within the Atlantic North American region, the Panhandle in the Pacific North American region. "The Atlantic North American region is represented in Oklahoma by: (1) the coastal plains province which includes the bald cypress swamps and forests of yellow pine in the southeastern corner of the state; (2) the Ozark district of the Appalachian province represented by oak-hickory woodlands occupying the rest of the eastern third of the state; and (3) the prairie province (tall grass) of the western two-thirds of the main body of the state. The Pacific North American region in Oklahoma consists of (1) the Great Plains district (short grass) of the Rocky Mountain province occupying almost all of the panhandle and (2) the southern district of the Great Basin province represented by the pinyon-juniper forest of the extreme northwestern portion of the panhandle in Cimarron county."^{*}

THE BREEDING BIRDS OF OKLAHOMA

About 50 per cent of the breeding birds of the state are eastern forms, about 8 per cent middle western, 28 per cent western, and about 15 per cent of country wide distribution. There is a striking difference between the bird life of the eastern and western sides of the state, particularly when the two most distant corners—the southwest and northwest—are considered.

The eastern third of the state, which is wooded and well-watered, has an almost exclusively eastern avifauna. Some characteristic birds are the Black Vulture, Red-cockaded Woodpecker, Acadian Flycatcher, Wood Thrush, Yellow-throated and White-eyed Vireos, Black and White, Prothonotary, Pine, Prairie, Hooded, Parula and Cerulean Warblers, Scarlet Tanager, and Chipping Sparrow. There are no distinctively western birds among the breeders and only a few middle western species.

The avifauna of the central portion shows a loss of many eastern forms and yet has few really western birds; many of the subspecies, however, are different from those on the eastern border. Certain middle western birds are more common than further east, as the Scissor-tailed Flycatcher, Bell Vireo, and Dickcissel, while a few western forms find their eastern limit here, as the Swainson Hawk, Burrowing Owl, Road-runner, Western Kingbird, and Western Meadowlark. Some of the birds that nest both in eastern and central Oklahoma are the Chuck-will's-widow, Ruby-throated Hummingbird, Yellow-shafted Flicker, Red-bellied Woodpecker, Crested Flycatcher, Phoebe, Wood Pewee, Crow, Tufted Titmouse, Carolina Wren, Catbird, Robin, Blue-gray Gnatcatcher, Red-eyed Vireo, Sycamore and Kentucky Warblers, Eastern Meadowlark, Summer Tanager, Cardinal, Indigo and Painted Buntings, Eastern Goldfinch, and Field Sparrow.

At the very end of the Panhandle there is a preponderance of western

^{*}Jeffs, R. E. and E. L. Little, Jr., 1930. A Preliminary List of the Ferns and Seed Plants of Oklahoma. Pub. Uni. Okla. Biol. Survey 2 (2): 40.

birds; of the breeders about two-thirds are western forms, one-fifteenth middle western and one-fifth eastern. Some of the nesting birds are the Scaled Quail, Mountain Plover, Road-runner, Red-shafted Flicker, Lewis and Texas Woodpeckers, Say Phoebe, Woodhouse and Pinyon Jays, Lead-colored Bush-Tit, Rock and Canyon Wrens, Bullock Oriole, Brewer Blackbird, Canyon Towhee, Lark Bunting, and Cassin Sparrow.

Birds that breed over the entire state are the Turkey Vulture, Bobwhite, Western Mourning Dove, Yellow-billed Cuckoo, Kingfisher, Red-headed Woodpecker, Eastern Kingbird, Blue Jay, Bluebird, Cowbird, and Dickcissel. Other species that range over the whole state, although with a difference of subspecies, are the Screech Owl, Horned Lark, Mockingbird, Shrike (*Lanius ludovicianus*), and Lark Sparrow.

The numbers of nesting birds in eastern Oklahoma probably compare favorably with those in the eastern part of the country, where "the average bird population to the 100 acres on farms in the Northeastern States is 111 pairs, and in the North Central States 112 pairs" (Cooke, M. T. '23:9). Near Copan Mr. Kirn estimated that 34 species and 116 pairs nested on 80 acres in 1916 and 36 species and 146 pairs in 1917—an average of 1.4 to 1.6 pairs an acre.

In central Oklahoma the birds as a rule are less common: eight censuses that I took on 40 acres along Snail Brook west of Norman varied from 18 to 25 species and 23 to 57 pairs, averaging 1.1 pairs to an acre. (In all these estimates only native birds are counted.) The campus of the University of Oklahoma is a concentration point for nesting birds; there are probably more than three pairs to an acre here. Mr. S. W. Mellot, Jr. at Nash in Grant County in 1915 recorded 19 species and 95 pairs on 40 acres or 2.4 pairs an acre; this must have been an unusually favorable locality.

In western Oklahoma Mr. R. R. Anderson at Buffalo in Harper County in 1914 found 18 species and 38 pairs on 40 acres. Mr. Stilwell wrote from Thomas, Custer county, in 1904 "birds with a few exceptions are not over 50 per cent as common as in my home near Kansas City. Of 3 quail, 4 meadowlark and 5 dove nests only 2 produced young last season—1 quail and 1 dove. The rest were destroyed by snakes, skunks, rats or opossums. These make it hard for the old birds to produce young on the ground, and the high wind adds to the trouble of those building in trees."

At Kenton at the very end of the Panhandle, Mr. Tate estimated 25 species and 199 pairs on 80 acres in 1916 and 249 pairs in 1926—an average of 2.5 and 3.1 pairs an acre. This is a striking example of concentration of nesting birds around trees and water in a generally dry and treeless region.

As to successes and failures of nests in Norman we found consistent results with doves and other species if we leave out of account the remarkably favorable fall of 1925 when 32 out of 39 broods of doves were raised to maturity—82 per cent. Our figures for 383 nests (omitting these 39) from 1920 to 1927 stand thus: doves—88 successes, 102 failures; other species—87 successes, 106 failures—a total of 45.5 per cent of success, 54.5 per cent failure.

In 1920 when most roads in Oklahoma were bad and cars were comparatively slow, we took our first field trip; our average rate was 20 miles an hour, which gave us time to identify the birds we passed, and thus the "Roadside Census" was evolved. Now in the era of good roads (for the

most part) and fast cars, the roadside census is out of date, for there is small chance to study birds as one whizzes along. A brief summary of our results from 1920 to 1923 may be of interest. On 775 miles in all parts of the state in the early morning and late afternoon we saw from the car an average of 6.1 native birds per mile. On 780 miles from about 10 A. M. to 4 P. M. we found an average of 3.1 birds a mile. English Sparrows were more abundant than any native bird. The most common roadside birds in eastern Oklahoma were Mourning Doves, Mockingbirds, Dickcissels, Bluebirds, and Eastern Meadowlarks in order of abundance. In central Oklahoma the most common were Dickcissels, Doves, Mockingbirds, Lark Sparrows, and Scissor-tailed Flycatchers. In southwestern Oklahoma the most numerous were Doves, Dickcissels, Mockingbirds, Horned Larks, and Lark Sparrows. In the Panhandle Horned Larks were by far the most abundant birds; Western Meadowlarks, Lark Buntings, and Western Kingbirds being fairly numerous.

WINTER BIRD LIFE IN OKLAHOMA

Oklahoma is fortunate in its wealth of winter birds, particularly because of the fine singing to be heard in all parts of the state. In Kenton there are the House Finches, in eastern Oklahoma the Carolina Wren and Eastern Meadowlark, and in central Oklahoma the Western Meadowlark, the Fox Sparrow and—crowning delight of all—the Harris Sparrow.

In order to give a picture of the winter bird life of the state, I have compiled the results of 29 "Christmas censuses" from four chief regions of Oklahoma. These are four to eight hour trips taken near Christmas time within a diameter of 15 miles, both species and individuals being recorded; the majority of the censuses have been published in *Bird-Lore*. The ten censuses from northeastern Oklahoma were taken in Creek, Tulsa, Okmulgee and Muskogee counties from 1919 to 1929 by Messrs. Beard, Little, Koons and Phillips and Miss Force and her co-workers. From central Oklahoma there are three censuses taken by Mr. Saunders in Oklahoma County from 1925 to 1927, and seven taken by us in Cleveland County from 1919 to 1923, 1925, and 1926 and one by Dr. and Mrs. Bird in the same region in 1929. From south central Oklahoma we have two records of bird life on or near Christmas day. From Dr. Cooke's article ('14b) on the birds seen near Caddo in Bryan County in 1883, it is evident that 55 species were present December 25. Mr. Saunders sent me a list of the birds he saw in the Arbuckles Dec. 28-30, 1927, totalling 38 species. Since these are the only accounts of winter bird life we have from southern Oklahoma, I am including them for comparative purposes, although neither list is really a census, and neither gives numbers of birds seen. In Cimarron County Mr. Tate has taken censuses from 1924 to 1929 and kindly sent them to me.

The following table gives the list of birds with the number of censuses in each region on which each was recorded, and the average number of birds in each census in each region, also the number of regions and the number of the 29 censuses in which it occurred. Thus an idea may be gained of the width of each bird's distribution in the state, the regularity of its occurrence, and the numbers in which it has been found. It must be remembered that these censuses are comparable only in a general way, for

some were taken by one person, others by several, some were all day, others half day trips, and very different amounts of territory were covered.

TABLE I

Birds Recorded on Twenty-nine Christmas Censuses in Oklahoma
10 Censuses in East, 2 in South, 11 in Center, 6 in West.

Species	Number of Censuses by Regions in which Each Bird was found; also Average Number seen per Census				Total No. of Cen- suses in which each Bird was found
	East	South	Central	West	
White Pelican				1-2	1
Great Blue Heron			1-1		1
Canada Goose			3-28	1-3	4
Mallard	4-30		3-360	4-8	11
Gadwell			1		1
Pintail	1-4		1		2
Green-winged Teal			1		1
Redhead			2		2
Canvasback			2		2
Lesser Scaup			1		1
American Merganser			3		3
Turkey Vulture		2		1-3	3
Black Vulture		2			2
Goshawk			1-1		1
Sharp-shinned Hawk	1-1	1	3-1	3-2	8
Cooper Hawk	2-1	1	4-1	5-4	12
Red-tailed Hawk	7-4	2	9-2,4	1-1	19
Red-shouldered Hawk			2-1		2
Swainson Hawk				3-2	3
American Rough-leg	4-2		9-2	1-2	14
Golden Eagle				5-2	5
Bald Eagle				2-1	2
Marsh Hawk	6-4	2	9-4	3-2	20
Prairie Falcon				1-1	1
Sparrow Hawk	4-3	1	7-2	1-9	13
Prairie Chicken		1			1
Lesser Prairie Chicken				1-2	1
Bobwhite	7-18	1	7-10	3-5	18
Scaled Quail				6-30	6
Wild Turkey		1			1
Wilson Snipe	1-1		4-1		5
Herring Gull			1-40		1
Mourning Dove	1-1		5-5		6
Road-runner		1	3-1	5-5	9
Barn Owl			2-1	1-1	3
Screech Owl	1-1	2	3-1	1-1	7
Horned Owl		1		3-3	4
Snowy Owl				1-1	1
Burrowing Owl				2-3	2
Barred Owl	1-1	1	2-1,5		4
Long-eared Owl				1-2	1
Short-eared Owl			2-1		2
Kingfisher		2	2-1		4
Flicker	8-16	2	11-25	5-2	26
Red-shafted Flicker		1	9-3	6-8	16
Pileated Woodpecker	2-1	2	1-1		5
Red-bellied Woodpecker	8-3	1	11-5		20
Red-headed Woodpecker	9-12	1	1-1	5-3	16

Lewis Woodpecker				4-1.5	4
Yellow-bellied Sapsucker	3-1	2	6-2		11
Hairy Woodpecker	5-4	1	10-2		16
Downy Woodpecker	8-3	2	11-8	1-2	22
Phoebe		1			1
Horned Lark	1-4	1	3-25	2-63	7
Blue Jay	10-14	1	11-7	6-2	28
Woodhouse Jay				6-24	6
Magpie				1-10	1
American Raven				1-1	1
Crow	10-10	2	11-6854		23
Pinyon Jay				3-53	3
Chickadee	10-25	2	11-46		23
Tufted Titmouse	8-17	2	10-10		20
Gray Titmouse				1-1	1
White-breasted Nuthatch	7-8	1			8
Pygmy Nuthatch				2-3.5	2
Brown Creeper	1-1	1	6-3	1-1	9
Winter Wren	1-5	1	1-1		3
Texas Wren	1-4	2	11-5		14
Carolina Wren	5-3	2	11-6		18
Mockingbird	6-3	1	8-2		15
Brown Thrasher	1-1		1-1		2
Robin	5-73	1	8-150		14
Hermit Thrush	1-1	1	2-1		4
Eastern Bluebird	9-9	2	10-16		21
Mountain Bluebird				6-6	6
Townsend Solitaire		1		2-1.5	3
Golden-crowned Kinglet	1-10	2	1-1		4
Cedar Waxwing	2-77	1	5-18		8
Shrike (<i>L. ludovicianus</i>)	6-3	2	11-4	5-4	24
Myrtle Warbler		2	4-10		6
English Sparrow	10	1	11	6	28
Eastern Meadowlark	8-37		3-35		11
Western Meadowlark		2	11-52	4-16	17
Yellow-headed Blackbird				1.31	1
Red-winged Blackbird	8-27	2	7-500	2-30	19
Brewer Blackbird	2-50	1	5-115		8
Rusty Blackbird	2		2-60		4
Cowbird	3	1			4
Cardinal	9-8	2	11-52		22
Purple Finch	1-1		3-3		4
House Finch				6-21	6
Pine Siskin	1-11		3-33	1-6	5
Goldfinch	8-21	2	11-80		21
Red-eyed Towhee	1-2	1			2
Arctic Towhee		1	11-12		12
Canyon Towhee				6-20	6
Savannah Sparrow	2-3	2	5-6		9
Grasshopper Sparrow		1			1
Leconte Sparrow	1-2				1
Rock Sparrow		1			1
Fox Sparrow	5-8	1	8-13		14
White-winged Junco	1-7			6-7	7
Slate-colored Junco	10-100	2	11-76	6-18	29
Shufeldt Junco				1-10	1
Montana Junco	2-23				2
Pink-sided Junco				6-13	6
Gray-headed Junco				2-7	2
Tree Sparrow		5-14	1	10-71	16
Field Sparrow	3-35	2	11-33		16
Harris Sparrow	9-24	2	11-232		22

White-crowned Sparrow	1-3	1	4-3	6
Gambel Sparrow			6-13	6
White-throated Sparrow	4-28	1	2-13	7
Song Sparrow	4-28	2	11-40	17
Lincoln Sparrow	2		5-3	7
Swamp Sparrow	2-2			2
Smith Longspur	1-1	1		2

Of the 117 birds recorded, 14 were found all over the state: Bobwhite, Sharp-shinned, Cooper, Red-tailed, Marsh and Sparrow Hawks, Screech Owl, Yellow-shafted Flicker, Red-headed and Downy Woodpeckers, Brown Creeper, Migrant or White-rumped Shrike, Red-winged Blackbird, and Slate-colored Junco. Twenty-seven others were listed in all regions but the west, giving eastern, central, and southern Oklahoma 41 winter birds in common. The Slate-colored Junco has the distinction of being the only bird appearing on every single census. The Blue Jay and English Sparrow come next with 28 occurrences each, both having been absent from Bryan County, the latter because it had not reached that point in 1883. The next highest records are those of the Yellow-shafted Flicker—26 censuses, Shrike, 24, Crow and Chickadee, 23, Downy Woodpecker, Cardinal and Harris Sparrow, 22, Eastern Bluebird and Goldfinch, 21, Marsh Hawk, Red-bellied Woodpecker, and Tufted Tit, 20.

Five species in the list decrease in numbers from east to west—Bobwhite, Blue Jay, Tufted Tit, Slate-colored Junco, and White-throated Sparrow. Four diminish from west to east—Cooper Hawk, Road-runner, Red-shafted Flicker, and Horned Lark. Thirteen reach their greatest abundance in central Oklahoma—Yellow-shafted Flicker, Crow, Chickadee, Robin, Bluebird, Red-winged and Brewer Blackbirds, Cardinal, Goldfinch, Fox, Tree, Harris, and Song Sparrows.

The eastern censuses have a total of 64 species with three found nowhere else, the southern, 65, with five found nowhere else, the central, 74, with nine found nowhere else, the western, 55, with 23 found nowhere else. The total number of species seen varied from 17 to 46 on the northeastern censuses, from 33 to 47 on the central, and from 14 to 52 in Kenton. The numbers of individuals ranged from 270 to 1125 in the east, from 800 to 52,000 in central Oklahoma, and from 105 to 800 in Kenton.

In eastern Oklahoma the winter birds are practically the same as those in Arkansas, Tennessee, and North Carolina (except the coast). There is only one middle western bird found regularly—the Harris Sparrow, and that in small numbers; twice Brewer Blackbirds have been seen, and twice Montana Juncos, and once White-winged Juncos. Hawks, crows, and blackbirds are not usually noted in large numbers. Red-headed Woodpeckers and White-breasted Nuthatches are regular winter residents.

The winter bird life in central Oklahoma is quite similar, yet it lacks two woods-loving species—Nuthatch and Redhead, and boasts of three middle western visitors—Red-shafted Flicker, Western Meadowlark, and Arctic Towhee. The censuses run higher, due usually to great flocks of Crows, sometimes blackbirds. Hawks, Texas Wrens, and most sparrows are more common than in eastern Oklahoma, the White-throat and Swamp Sparrow being exceptions.

The censuses in Cleveland County varied from 33 to 45 species, from 800 to 3350 individuals. The commonest birds were Crows three times,

Red-winged Blackbirds, and Harris Sparrows twice each. Others seen in very large numbers were Cardinals, Brewer Blackbirds, Juncos, Tree Sparrows, and Song Sparrows. From 1919 to 1926 our censuses showed an increase in Road-runners, Blue Jays, Crows, and Harris Sparrows, a decrease in Bobwhites, Bluebirds and hawks. Most of the water birds on the censuses in central Oklahoma were seen on the Oklahoma City Reservoir. Mr. Saunders' censuses ranged from 43 to 47 species, 2000 to 52,000 individuals. In two counts Crows led with flocks of 20,000 to 50,000, but in 1927 Mallards were the most abundant birds, 800 of them being seen.

The accounts from Bryan and Murray Counties show much the same birds as northeastern and central Oklahoma, with the Red-headed Woodpecker, White-breasted Nuthatch, and Red-shafted Flicker near Caddo, the Arctic Towhee in the Arbuckles, and the Western Meadowlark in both localities. The Wild Turkey and Prairie Chicken are no longer to be found in Bryan County, but the English Sparrow flourishes. The Black Vulture is the only distinctively southern bird in the two lists, the only one not found occasionally in winter in eastern and central Oklahoma.

A very different bird life is met at the far end of Cimarron County with its Rocky Mountain avifauna. Bird lovers in that region are fortunate in the variety of Raptores still to be seen, including both eagles. The regular winter residents are such interesting birds as the Scaled Quail, Red-shafted Flicker, Woodhouse, Pinyon, and Blue Jays, Mountain Bluebird, House Finch, Canyon Towhee, five kinds of Juncos, and the Gambel Sparrow.

The list of 117 birds is representative of the regular winter visitors and a great many irregular ones throughout the eastern two-thirds of the state and also the extreme west. The winter bird life in western Oklahoma excluding Cimarron County is intermediate between that of central and far western Oklahoma, Western Meadowlarks, Horned Larks, Alaska and other Longspurs occurring commonly on the plains.

MIGRATION IN OKLAHOMA

One of the delights of bird study is the fact of the constant change in the bird population for every month brings new arrivals and new departures, particularly, of course, in spring and fall. We do not have in Oklahoma the multitudes of warblers that make spring migration such a spectacular event in the east; on five all day walks in Cleveland county during the height of migration the following numbers of species of transient warblers were seen—3, 2, 1, 0, 0; even in Cherokee county a similar tramp resulted in only six. This lack of warblers means that very large spring lists are not achieved in Oklahoma, unless perhaps in some particularly favorable spot for shore birds. In eastern Oklahoma I saw 66 species near Tahlequah May 6, 1923; Mr. Koons recorded 59 May 8, 1924 and 64 Apr. 30, 1925 near Tulsa. In central Oklahoma my highest lists between Apr. 28 and May 5 run from 59 to 67 species. At Gate one of Mr. Lewis' pupils recorded 60 species May 9, 1923. These 9 lists are curiously alike, none being lower than 59, none higher than 67, the average of all being 63.

In Cleveland County I have devoted considerable study to the seasonal changes in bird life. So far as the birds are concerned, there are seven sea-

sons in this region, for spring falls into early and late portions, and autumn into three divisions.

Winter lasts from the first of December to about February 20, the arrival of the first scattering spring birds and sometimes the swelling of the numbers of the winter residents by additions from the south marking the beginning of "early spring." This season lasts two months during which time the early transients and early summer residents arrive and certain of the winter residents leave.

The height of spring migration falls between April 21 and May 5 for most of the summer residents and many of the transients come between these dates; by the middle of May almost all the transients have left; I have called this period "late spring."

Summer lasts from mid May to mid August, a few transients being recorded in each month. "Early fall," from late August to late September, sees the departure of nearly all the summer residents and the arrival of a few transients. "Mid fall" is a period of about two weeks usually occurring from the last of September to about the 12th of October; it marks the lowest point of bird life throughout the year, for practically all the summer birds have left and few of the arrivals from the north are as yet here. A great change comes the middle of October or a few days earlier, for the bulk of the fall migrants begin to arrive; from October 12 to December 1 I have designated "late fall."

Killdeer are our first spring birds (except sometimes Robins); they almost always reach us in February. Wilson Snipe, Cowbirds, and Mourning Doves come in late February or early March. The next to appear are the Grackles, Purple Martins, and Phoebe; near the end of the month we may expect Blue-gray Gnatcatchers, Ruby-crowned Kinglets, and Vesper Sparrows. Brown Thrashers and Lark and Chipping Sparrows sometimes come in late March, on other years in early April. Scissor-tails may be looked for in early April as well as Lincoln Sparrows; by the middle of April, Crested Flycatchers, Eastern Kingbirds, Red-eyed Vireos, House Wrens, and Oranged-crowned Warblers are usually here. The geese, ducks, and Yellow-crowned Night Heron, Swainson and Sparrow Hawks come in March; many of the shorebirds in April. The winter birds that leave are Fox and Tree Sparrows in early March, the last of the Song Sparrows and Juncos about the middle of April.

In late spring there are usually three groups of arrivals—those from Apr. 20 to 24 are the Yellow Warbler, both Orioles, and the Dickcissel: Lincoln Sparrows are at their height of abundance. From about April 27 to 30 the Chat, Maryland Yellow-throat, Bell Vireo, Blue Grosbeak, Night-hawk, Catbird, Wood Pewee, Painted Bunting, and Olive-backed Thrush make their appearance. About May 3 to 5, Least Flycatchers come, while White-crowns and White-throats are most abundant; a few winter residents—Harris and Lincoln Sparrows and Arctic Towhees—still linger. About the 10th the Yellow-billed Cuckoos and Least Terns—last of the summer residents—arrive.

In June Black Terns, Solitary, Semipalmated and White-rumped Sandpipers, and Cedar Waxwings have been seen; in July a few of the shorebirds return, but most of the birds are the summer residents.

In early fall a few birds are still occupied with families—Doves regularly, Cardinals, Blue Grosbeaks, Mockingbirds, and Catbirds sometimes,

but most of the summer residents leave in late August or in September. The transients are scattering: an occasional Bittern, Red-shafted Flicker, Redstart, and flocks of Swallows.

Mid fall is a curious time because of the striking lack of birds; since all summer birds but a few Doves, Scissor-tails, and Brown Thrashers have left and the transients are few and far between, the population is reduced almost to the permanent residents—the opposite condition from that obtaining five and six months earlier when all four categories of birds are present. Not only are the species few, the individuals are even more reduced proportionately. However, interesting transients sometimes appear, Red-tailed, Red-shouldered, Pigeon and Sparrow Hawks, Phoebe, both Kinglets, and once a Rock Wren.

A great change occurs from the 12th to the 16th of October, for then the fall sparrows come; the thickets are full of birds, many of which pass on, but their numbers are filled by later arrivals. The first to come are Lincoln and White-crowned Sparrows and Arctic Towhees about Oct. 12; by the 16th Orange-crowned and perhaps Nashville Warblers, House Wrens and Western Meadowlarks should be here, by the 19th Song Sparrows, by the 25th Juncos. The last two days of October to the first of November marks the coming of Fox and Harris Sparrows.

This has been the regular schedule of five fall migrations, but the sixth (1926) was quite different, for all the October migrants (except Fox and Harris Sparrows) arrived together Oct. 13. For six days there were multitudes of birds, many of them seldom seen in fall—Clay-colored, Chipping, and Swamp Sparrows, Pine Siskins, and Nashville Warblers; after this there were almost none for a while.

Some years there is a decrease in birds in late October and early November, but in other years the number of species stays much the same throughout late fall, the number of individuals fluctuating somewhat but increasing toward the end of November. By this time the winter population is well established.

From December 1919 to December 1922 I took 128 censuses of a half-mile stretch of wooded creek bed near Norman; from Jan. 1 1926 to May 4 1927 I took 18 eight-mile censuses over a tract of diversified country; (Nice '27d, '28 b, '29b). From the results of these two studies the following conclusions can be drawn as to the seasonal fluctuations of bird life in Cleveland county.

1. The number of species present increases gradually from its winter level to a maximum in late April or early May, decreases somewhat in summer, more in early fall and very markedly in early October, increasing again rather suddenly in mid-October to the winter level.

2. Individuals are most abundant from December to March, gradually decreasing until they reach a very low point in early October; from the middle of October through November they regain the winter numbers.

The 249 birds recorded in Cleveland county may be roughly divided into 27 residents, 55 summer residents, 53 winter visitants, 114 transients. Many of the winter visitants are more common as transients, while some of the latter occasionally occur in winter. On the 8 mile censuses 142 different birds were seen. The following numbers were found on the 13 censuses in 1926, the species being given first, individuals second.

Jan. 1, 39: 2400; Feb. 1, 35: 1400; Mar. 20, 45: 600; Apr. 24, 61: 460; May 4, 66: 450; June, 54: 460; July, 55: 550; Aug., 55: 460; Sept. 18, 44: 340; Oct. 2, 32: 200; Oct. 16, 44: 950; Nov. 13, 37: 550; Dec. 4, 36: 860. In 1927 five censuses resulted as follows: Jan. 8, 33: 760; Feb. 22, 36: 1600; Mar. 28, 47: 900; April 24, 59: 500; May 5, 67: 600.

The two Januaries differ a good deal, largely because of the great abundance of blackbirds in 1926 and their entire absence in 1927; besides, twice as many sparrows were recorded in the former year as in the latter. The really surprising agreement of the findings in March, April, and May—the main migration months—gives additional evidence of the relative stability of the bird population in this region due to the comparatively small number of transients. The composition of the avian population in Cleveland county throughout the year according to the censuses is shown in the accompanying graph (Fig. 1) where the numbers of species of the different categories are shown for each month.

ATTRACTION AND PROTECTION OF BIRDS

Essential factors for the prosperity of bird life are the presence of food, water, nesting sites, and cover, and also protection from enemies.

The preservation and increase of trees, vines, and shrubbery serves a three fold benefit with regard to bird life, for it provides food, nesting sites, and refuge from enemies. Our forests must be carefully cherished, cut on the basis of permanent production, and above all, protected from fire. Shrubby, trees, and vines should be left wherever possible along roadsides, creeks, and fences, for their shade and beauty as well as for the sake of the birds. Dead trees and branches must not be too thoroughly cleared out, for they serve as nesting sites for those guardians of the woodland—the Woodpeckers, and afterwards for Bluebirds, Chickadees, and Crested Flycatchers.

New trees should be planted in generous numbers, especially in central and western Oklahoma. The State Forestry Department at Oklahoma City has issued a number of excellent bulletins on the subject and also maintains nurseries where trees may be obtained at small cost.

When planting especially with the birds in mind, berry bearing varieties of trees and shrubs may be selected. Mulberries, which are favorites with a great number of birds, serve to protect cultivated fruit by offering a counter-attraction. By a judicious choice some kind of berries may be available at all seasons: elder, sassafras, Juneberry, and honeysuckle for the summer; spice bush and sour gum for the fall; dogwood, Virginia creeper, pokeweed, persimmon, china berry, buckthorn, and Mountain ash for the fall and winter; while snowberry, black alder, sumac, hackberry, and cedar hold their fruit the year around.

Some birds can be attracted to our homes by the erection of bird boxes—Purple Martins, Bluebirds, Texas Wrens, Chickadees, Crested Flycatchers, and Carolina Wrens. In general bird boxes should be placed in the open on poles or on buildings; the entrance should be near the top; no perch is necessary; a tin can should never be used, for the young birds will be apt to die of heat. For wrens and chickadees the box should be about $3\frac{1}{2}$ inches square by 6 inches in height with an entrance $1\frac{1}{8}$ inch in diameter; for Bluebirds and Crested Flycatchers the box should be about $4\frac{1}{2}$

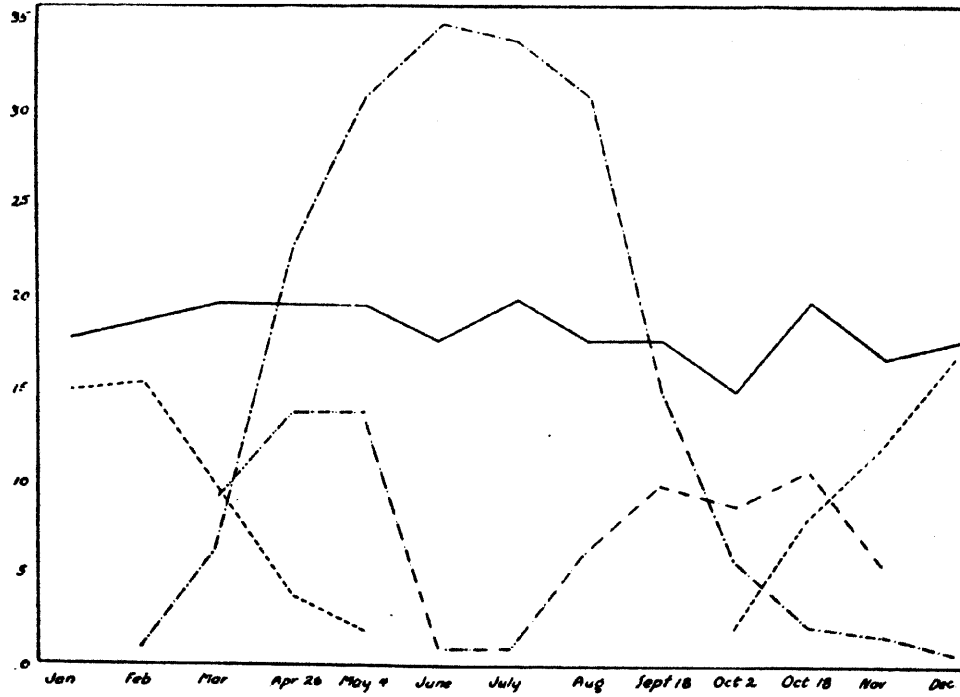


Figure 1

— Residents - - - Summer Residents
 - · - · - Winter Residents ····· Transients

Composition of Bird Population by Species in Cleveland County Throughout the Year According to the Eight Mile Censuses

inches square and 9 inches high with an entrance $1\frac{1}{2}$ inches in diameter. Purple Martins prefer a house with many compartments, each of which should be about 6 inches square and 7 inches high with an entrance near the bottom $2\frac{1}{2}$ inches in diameter. Barbed wire, metal guards, or climbing rose bushes around the poles afford protection from cats; sometimes hanging nest boxes prove successful.

Additional sources of water are particularly important in the dry climate of central and western Oklahoma. Bird baths or shallow basins of water are a boon to birds at all times of the year. On many farms ponds could be made and stocked with fish, their borders being planted with trees and shrubs; they would prove of much benefit to the owners and a mecca for birds. Prof. Sanborn ('21: 46) strongly recommends the installation of such ponds, stating that 25 pounds of copper sulphate to the acre of water will make them available for the raising of fish.

The question of food for birds largely takes care of itself if cover is left, and trees and shrubs planted. In case of deep snow, winter feeding will save many Bobwhites. A feeding shelf stocked with bread crumbs, raisins, sunflower seeds, grain, nuts, and suet attracts a variety of bird visitors particularly in cold weather.

The worst enemies with which our native birds have to contend are cats, English Sparrows, and certain people.

Cats have been known to kill from ten to fourteen birds a day and as many as 58 in a season. They are scavengers in all sorts of filthy places and in consequence are carriers of disease, probably of scarlet fever, small pox and diphtheria, certainly of ringworm and rabies. Some people have lost their eyes as a result of cat scratches while others have suffered loss of life or limb from blood poisoning resulting from bites of these animals.

It is not necessary to keep cats. A rabbit is a much safer pet for a little child and a dog a much more affectionate and intelligent one for older children and adults. As for mice, they can be easily controlled by traps. Rats are a more difficult problem, but it is only the exceptional cat that will kill them; often a bull snake about the premises is more effective. Methods for destroying rats are given in one of the Farmers' Bulletins. People should be encouraged to keep no cats, or at most one male. Every cat should be shut up at night and not let out of doors until it has had a good breakfast, while during the nesting season it should be tied up or kept in a roomy cage.

It is a heart-rending experience to have a nestful of one's trusting bird friends destroyed by a neighbor's cat. Bird lovers must have the courage of their convictions and not tamely submit to an intolerable situation. They should kill cats found doing damage on their grounds (taking care to observe laws and ordinances regarding cruelty, shooting, trespassing, and poisoning). Vagrant cats should be trapped in box traps baited with fish or catnip, and shot when found in the woods.

It is not good sense to punish a person for destroying a bird or nest and yet allow one with impunity to keep carnivorous animals that slaughter many birds a year. Each person is held responsible for the depredations of his other domestic animals on other people's or public property; why should the most destructive creature of all be exempt? If the owner should be made to pay the stipulated fine—\$25.00—for each insectivorous bird

killed by each of his cats, the problem would be in a fair way towards solution.

English Sparrows have done incalculable harm to our native birds directly by driving them away, and indirectly by inciting people's dislike towards all "sparrows." And now it has been discovered that they are not sparrows at all but weaver birds! The offering of bounties has brought death to more native birds than to the culprits themselves. Poisoning is not safe in Oklahoma where many other seed eating species winter. Local relief may be obtained by trapping and destruction of the nests; at times a .22 rifle is useful in protecting a bird box before the rightful tenants come.

The most effective method of destruction of Starlings appears to be capturing them at night in the roosting places—barns or towers of public buildings.

People who love birds must band together to save many species from extermination. There should be an active Audubon Society in every city. The members should inform themselves of the game laws and when violations come to their notice see that the offender is punished. All of our insectivorous migratory birds and their nests are protected by both Federal and State law, also Bitterns, Curlews, Gulls, Herons, Cranes, Swans, Plovers, and practically all shore birds. Junior Audubon Societies under the guidance of enthusiastic teachers can do much in rousing children's interest in protection rather than persecution. Other worthy projects for bird clubs are bird house contests, solution of the cat problem and establishment of wild life refuges. Birds most in need of earnest championship in Oklahoma at present are the Hawks, Owls, Road-runners, and game birds.

Birds do not belong merely to one class of people who take it upon themselves to kill everything that has aroused their prejudices. All citizens have an equal share in them, those who rejoice in the splendor of the living bird fully as much as those who wish to destroy. It is my earnest hope that this book, pointing out the irretrievable losses of the past, and telling of the riches still remaining, will inspire people to protect our wild life before it is too late.

SUGGESTIONS AS TO BIRD BOOKS AND MAGAZINES

Books recommended for Eastern and Central Oklahoma

Chapman, Frank M. Handbook of Birds of Eastern North America. Appleton. \$5.00. Standard book for eastern North America, includes practically all the birds of eastern and central Oklahoma.

Reed, Chester A. Bird Guide—Land Birds East of the Rockies. Water Birds, Game Birds and Birds of Prey East of the Rockies. Garden City. Doubleday Page. \$1.50 each. Pocket guides, fair colored pictures.

Plates of the Birds of New York. Albany. Director of Publications Bureau, Education Bldg. \$1.25. Fuertes' illustrations; practically all the birds of eastern and central Oklahoma included.

Sutton, Geo. M. An Introduction to the Birds of Pennsylvania. Harrisburg, Pa. Horace McFarland Co. \$1.00. Excellent guide for beginners; pen drawings; includes most of the birds of eastern Oklahoma.

Skinner, M. P. A Guide to the Winter Birds of the North Carolina Sandhills. N. Y. Science Press \$4.00. Colored pictures, good for beginners

and also has many original observations on winter habits of birds; includes practically all the winter birds of eastern Oklahoma.

Forbush, Edward H. *Birds of Massachusetts and Other New England States*. 3 vols. Boston. Mass. Dept. Agriculture. \$5.00 a volume. Splendid colored plates, largely by Fuertes; beautifully written life histories; of wide general interest.

Simmons, Geo. F. *Birds of the Austin Region*. Univ. of Texas. \$3.00. Useful compendium of information as to range, voice, habits, field identification, etc., of most of the birds that occur in eastern and central Oklahoma.

Books Recommended for Central and Western Oklahoma

Bailey, Florence M. *Handbook of Birds of Western United States*. N. Y. Houghton. \$5.00. The standard book for western United States.

Taverner, P. A. *Birds of Western Canada*. Ottawa. Victoria Museum. \$2.00. Field marks emphasized; many colored plates.

Books for Far Western Oklahoma

Bailey, Florence M. *Birds of New Mexico*. N. M. Dept. of Game and Fish. \$5.00. Beautiful colored plates by Allan Brooks; interesting life history material.

Hoffman, Ralph. *Birds of the Pacific States*. N. Y. Houghton. \$5.00. Excellent for field identification.

Ornithological Journals

The Auk. Editor, Dr. Witmer Stone, Acad. Nat. Sci., Philadelphia. Standard ornithological journal for the whole country. \$3.00.

The Condor. Editor, Dr. J. Grinnell, Mus. Vert. Zool., Berkeley, Calif. Standard ornithological journal for western North America \$3.00.

The Wilson Bulletin. Editor, Dr. T. C. Stephens, Sioux City, Ia. Especially for the middle west. \$1.50.

Bird-Lore. Editor, Dr Frank Chapman, Am Mus. Nat. Hist., N. Y. Popular. \$1.50.

Government and State Bulletins

Many valuable bulletins may be obtained free or at small cost from various State Agricultural Departments and from Washington. A list of free publications of the Biological Survey will be sent on request from the Bureau of Biological Survey, U. S. Department of Agriculture, Washington, D. C. A list of government publications on birds for sale by the Superintendent of Documents may be obtained from the Government Printing Office, Washington, D. C.

ITINERARIES AND REPORTS OF FIELD WORKERS IN THE STATE

For full reference to writings see bibliography.

1719 BERNARD DE LA HARPE

The first record of Oklahoma birds was given by the French trader, La Harpe, who travelled in 1719 from the southeastern corner of Oklahoma to Muskogee county and back again. On August 28 in what is now Pittsburg county he mentioned partridges, woodcocks and plover. (*Nous y aperceusmes aussi beaucoup de perdrix, de becasses et de vanneaux.*) On September 25, "we began to see bustards (wild geese) coming from the north and going south." September 27, "I killed a bustard and a wood rat which we ate."

1819 THOMAS NUTTALL

The botanist and ornithologist, Nuttall made a journey from May 16 to June 20, 1819, into southeastern Oklahoma as far as the Red River, and from July 6 to late September in northeastern Oklahoma reaching the Cimarron; birds appear only twice in his narrative. On July 7 he noted the Swallow (or Hirundel) rocks about ten miles up the Arkansas from Fort Gibson, where there were caverns "scattered over with clusters of martin nests;" on June 6 he gave a beautiful description of a Mockingbird's song. In his "Manual" ('32:275) he speaks of the "Swallow-tailed Flycatcher—I found these birds rather common near the banks of Red River, about the confluence of the Kiamesha." The very interesting account of his trip from Philadelphia to Oklahoma and back again through Arkansas to New Orleans with descriptions of the plains in the Kiamitia regions "beautiful almost as the fancied Elysium," has been reprinted in Thwaites' *Early Western Travels*.

1820 STEPHEN HARRIMAN LONG, EDWIN JAMES, AND THOMAS SAY

This expedition from Pittsburgh to the Rocky Mountains, divided forces on the Arkansas River in Colorado, July 24. One party including Major Long, Edwin James, botanist and geologist, and Titian R. Peale entered New Mexico and followed the South Canadian, crossing into Oklahoma August 16 and reaching Fort Smith September 13. Birds receive a good deal of attention in the account, which was written by Edwin James from the notes of Major Long and other members of the party; 25 species are mentioned in Oklahoma.

The narrative of the other party under Capt. Bell was written by the naturalist Thomas Say. They entered Oklahoma along the Arkansas River on August 19 and reached Fort Smith September 9; 10 species are mentioned. These records have been made available in Thwaites' *Early Western Travels*.

1832 WASHINGTON IRVING

From October 10 to November 10 Irving joined a party of troopers on an exploring trip from Fort Gibson nearly to the South Canadian not far from Moore in Cleveland county. Irving gave a fascinating account of his adventures in his volume *The Crayon Miscellany*, in which 8 kinds of birds are mentioned. An abridged account entitled *When This Land Was Young* appeared in *Outdoor Oklahoma* from August 1925 to October 1926; a map of his route was shown in the September, November, December, January, and July numbers, and an itinerary given in October.*

1832 CHARLES J. LATROBE

This English traveller was on the same trip with Irving but remained at Fort Gibson until November 23. In *The Rambler in North America* (vol. I) 8 kinds of birds are noted; "countless bands of waterfowl and flights of pigeons," near Fort Gibson; "numerous bands of snow white cranes" in central Oklahoma, and on the way home "as we lay around our fires at night, we heard the whistling of innumerable geese and ducks, winging their way from the north to a more genial climate." ('36:1, 241.)

1839 JOSIAH GREGG

Dr. Gregg, a Santa Fe trader, journeyed from Fort Smith to the Antelope Hills from April 25 to June 5; a few birds were noted.

1843 NATHAN BOONE

Capt. Boone, with a company of soldiers, marched from Fort Gibson to the Salt Plains and returned between Little River and the Canadian from May 14 to July 31. His journal which is in the archives of the War Department at Washington has been reprinted by the Iowa State Historical Society and also in *Chronicles of Oklahoma*. May 24 in northeast Noble county he wrote "Deer and turkies plenty, hundreds of the latter being on the open prairies" ('29:68). On May 27 in what is now Grant county he noted "Game—Deer, Antelope, Turkies, Partridges, Grouse, scarce; observed plenty of Turtle Doves and Plovers." ('29:71).

1845 JAMES WILLIAM ABERT

Lieutenant Abert followed the Canadian, crossing the 100th meridian September 21 and reaching Fort Smith October 21. He tells in some detail of 20 kinds of birds; his interesting narrative is Senate Document VIII, No. 438, 29th Cong. 1st sess.

*Also published under the title *A Tour of the Prairies*.

1849-1850 SAMUEL WASHINGTON WOODHOUSE

Dr. Woodhouse was in Indian Territory in 1849 under Capt. Sitgreaves, and in 1850 attached to the Creek Boundary Survey. In 1853 he published a list of birds in Sitgreaves *Report of an Expedition down the Zuni and Colorado Rivers*; of these he states that 151 occurred in Indian Territory. In the catalog of the National Museum at Washington 45 specimens of 26 species are listed from Woodhouse or Sitgreaves or R. J. Pollard, 1849 to 1850 from Indian Territory (Nos. between 12140 and 12664). From the dates and localities on these and a few notes in the list of birds we find that in 1849 Woodhouse was in the Cherokee Nation from June 25 to July 27, in the Creek Nation August 3 to October 27, in the Cherokee Nation November 2. The following year he was at Fort Gibson in May, on the Cimarron and the prairies beyond it in August, and on the North Canadian September 6 to 19. The Cross Timbers are mentioned in his reports in connection with the "Red-shouldered Swallow-tailed Flycatcher" and "*Ectopistes marginellus*—the small Long-tailed Dove;" hence the type locality for the Western Mourning Dove is "the cross timbers, on the north fork of the Canadian River." His observations were evidently confined to the northeastern quarter of the state.

1849-1852 RANDOLPH BARNES MARCY

In 1849 Capt. Marcy travelled from Fort Smith to Antelope Hills from May 6 to 31; in his report on the *Route from Fort Smith to Santa Fé* he mentions turkeys twice, in one instance telling how one of these birds was run down by a hunter on horseback. ('50:33). In 1852 he explored the sources of the Red River; from May 12 to 27 he was in southwestern Oklahoma, having crossed Red River from Texas near the mouth of the Big Wichita and marching thence through the Wichita mountains. On May 18 he speaks of the "meadowlark, *S. ludoviciana*, prairie hen, Virginia partridge and Killdeer." May 23 they "occasionally see turkeys and grouse." On May 26, "Turkeys are becoming scarce as we go west; grouse or quail are also occasionally seen here." ('53:15).

1850-1854 RODNEY GLISAN

Dr. Glisan was stationed at Fort Arbuckle as army surgeon from September 1850 to November 1854. In his *Journal of Army Life* he speaks of birds a number of times, chiefly from the standpoint of the hunter. He states: "The birds and animals most common to this country, that are good for food, are teal, summer, and mallard duck; plover, lark, robin, prairie grouse, quail, snipe, wild geese, brant, swan, wild pigeon, wild turkey, grey and white crane, white and black tail deer, antelope, beaver, black bear, hare, racoon, opossum, the grey, black and fox squirrel, and buffalo within fifteen miles; of the birds and animals not usually eatable, there are the bird of paradise, red-winged and rusty-winged blackbird, blue-bird, buzzard, crow, dove, dipper or di-dipper, eagle, owl, prairie and fish hawk, English mockingbird, hummingbird, kingfisher, pewee, redbird, raven, sparrow, swallow, sap-sucker, woodpecker, whip-poor-will, bull-bat, wren, yellow-bird, mouse, gopher, prairie-dog, panther, skunk, grey and black fox, wild-cat, coyote, black and grey wolves, rat, and mustang." ('74:88-89).

1853 CALEB B. R. KENNERLY AND A. W. WHIPPLE

Dr. Kennerly, naturalist to Lieutenant Whipple's expedition which surveyed the route for a Pacific Railroad from Fort Gibson to near the thirty-fifth parallel did not join the party until they reached Albuquerque. The only Oklahoma specimen mentioned in his report is that of a Green Heron taken on San Bois creek by H. B. Möllhausen. Lieutenant Whipple's narrative speaks of birds but once: August 8 near Shawnee Hills they came upon "a flock of wild turkeys, the largest we had seen. There must have been many hundreds." ('56:15).

1860 CHARLES S. MCCARTHY AND JOHN H. CLARK

An important collection of 57 skins and 139 sets of eggs, "including several species previously unknown to science" (*An Rep. Smithsonian Inst.*, 1860:67) was made between April 26 and July 9, chiefly by McCarthy, but also by Clark, Commissioner of the Survey of the Northern Boundary of Texas. These were sent to the National Museum. Five sets came from the Choctaw Nation between May 3 and 20. The other dates and localities follow: April 26, Fort Cobb; May 9-17 Arbuckles and Washita River; May 20-28, Fort Cobb; May 29, 18 miles west of Cobb; June 1, 40 miles west; June 2, 55 miles west, also Turkey creek; June 3 and 4, 88 miles west of

Cobb; June 7, 8, Antelope Hills; June 9-11, Corral creek; June 12, North Fork Canadian, Pond and Corral creeks; June 14-18, Adalene creek; June 20, Trout creek; June 21, Union creek; June 25, Skull creek (Major county), Corral creek; July 9, Rabbit Ear creek. Most of these creeks unfortunately have changed names, making the location of the collections rather indefinite.

The specimens are listed between 17306 and 17704, 19065 and 19111; the eggs between 2918 and 2938, 3893 and 4014 in the catalogs of the National Museum. The most important of the birds were a White-tailed Kite—the only record for the state—four Paroquets and a Western Kingbird—the earliest proof of its occurrence in Oklahoma. Of the eggs the most interesting are the Western Kingbird, White-necked Raven, Cassin Sparrow, Virginia Rail, Mountain Plover, White-tailed Kite, and Lesser Prairie Chicken, the type specimen of each of these last species having been selected from these sets.

1867 EDWIN PALMER

From March 14 to June 27, 1867, Dr. Palmer sent to the National Museum 80 bird skins from Kiowa Agency, 17 miles southeast of Fort Cobb. The most important of these are a Townsend Solitaire and Road-runner—first records for the state—and two Swallow-tailed Kites. These birds are numbered from 52996 to 53066 in the catalog.

1875 LUDOVIC KUMLEIN

In December Prof. Kumlein, a Wisconsin naturalist, went through Oklahoma on the M. K. and T. railroad, stopping apparently at North Fork in Okfuskee county. He reported a great many Raptores—American Rough-leg, Sparrow Hawk, and Turkey Vultures abundant, a number of Red-tails and Red-shouldered Hawks, and Short-eared Owls, also Pigeon, Sharpshin, and Cooper Hawks, and Golden Eagle. Prairie Chickens were seen on the prairies, Crows were very common, but no Ravens were seen. He gives the only record of the Palm Warbler for the state.

1876 C. A. H. McCauley

In early May 1876 and again in late June Lieut. McCauley travelled through the northwestern corner of Oklahoma, crossing the North Canadian above Supply, and also Wolf creek, the Canadian and Washita rivers. In his *Notes on the Ornithology of the Region about the Source of the Red River of Texas* he notes 38 species, as having been seen in Oklahoma. He gives the first record for the state of the Osprey, Poor-will, and Bullock Oriole, and the first published notice of the Mountain Plover and Western Kingbird.

1878 S. KITCHING

Dr. Kitching sent 44 specimens from Camp Supply to the National Museum collecting them between January 14 and March 13, 1878. They are numbered from 74385 to 74429. This collection includes the only specimen of Richardson Pigeon Hawk of which we have any record for Oklahoma, and the only specimens of Eskimo Curlew; also an Avocet, Lesser Prairie Chicken, Gambel Sparrow, Lark Bunting, and Northern Shrike.

1879, 1889, 1891 GEORGE HENRY RAGSDALE

This Texas ornithologist made a number of field trips into southern Love county to Blue and Turner's Lakes. His Oklahoma dates range between August 20 and October 21, 1879, March 1, 1889, February 13 to June 28, 1889, and March 7, 1891. He collected some eggs and specimens of marsh birds and made sight records of a number of others; he gives us the only breeding record of the Florida Gallinule for the state. The manuscripts are in the possession of Dr. H. C. Oberholser.

1880 TICHKEMATZE

Four specimens in the National Museum were taken by "Tichkematze" May 20 and 21, 1880 in Indian Territory. The most interesting is a White-necked Raven No. 79982.

1883-1884 WELLS WOODBRIDGE COOKE

The ornithologist, Dr. Cooke, was stationed at the Indian School at Caddo in the Choctaw Nation, now Bryan county, from August 27, 1883 to April 8, 1884. Several hundred birds were collected for purpose of identification, but unfortunately none of these are still in existence. Notes on the occurrence of 110 birds were given

in *The Auk* in 1914. Dr. Cooke's account marks the closing chapter of primitive conditions in regard to bird life. Prairie Chickens and Wild Turkeys were very common, while both Vultures were abundant, feasting on carcasses of cattle that perished in the severe winter. He gives one of the last accounts of the Carolina Parquet and the very last of the Ivory-billed Woodpecker.

1889 JENNESS RICHARDSON

Four Passenger Pigeons collected by Richardson, a taxidermist, on the Canadian river in January were bought by the National Museum. In the American Museum there are 58 specimens of 9 species taken by Richardson in October and November 1889, mostly on Beaver river and Teepee creek in the "Mutual Strip," now the Panhandle. There also is a pair of Passenger Pigeons taken by him November 10, 1889 on the Canadian river.

1890 JAMES CUSHING MERRILL

Dr. Merrill was stationed at Fort Reno as army surgeon from November 1889 to February 1891. He sent a migration record to the Biological Survey for the spring of 1890, and 14 sets of eggs of 7 species and 4 skins to the National Museum.

1891-1914 GEORGE W. STEVENS

Prof. Stevens while teaching in Oklahoma studied and collected birds in 1891 in Caddo county, 1898-1900 near Guthrie, and 1904-1914 near Alva, visiting Cimaroon county in 1913. Barde's list of Oklahoma birds is based largely on Prof. Stevens' information. He contributed a few items to *The Oölogist*, mostly on Mississippi Kite eggs, and has given information on several rare species by letter. In the J. M. Carroll egg collection in the University of Oklahoma Museum of Zoology 29 sets were taken by Prof. Stevens in Woods county, mostly Mississippi Kite's.

1892, 1894 BASIL HICKS DUTCHER

Col. Dutcher, when with the Biological Survey, spent August 9, 1892 at Orlando, Logan county, and April 26-27 at Fort Gibson, sending a report of the birds seen to the Biological Survey.

1892 EDWARD ALEXANDER PREBLE

Mr. Preble of the Biological Survey was at Ponca City August 3-6, Dougherty August 12-17, Hartshorne August 24 to September 1, Red Oak (Latimer county) September 2-14, 1892; some birds were collected and a list of all those seen sent to the Survey.

1892-1906 VERNON BAILEY AND FLORENCE MERRIAM BAILEY

In 1892 Mr. Bailey of the Biological Survey spent June 16-18 at Fort Gibson, August 3-6 at Ponca Agency, and August 29 and 30 at Woodward. In 1906 Mr. and Mrs. Bailey spent August 4-10 at the Wichita Mountains, where two Rock Sparrows were taken, and August 12-14 at Ivanhoe Lake in Woodward county near Shattuck. W. F. Adams gave them information as to water birds at the latter place.

1893-1896 HENRY N. BERRY

Mr. Berry sent in four spring migration records to the Biological Survey from Cloud Chief, Washita county.

1897 JOHN ALDEN LORING

Mr. Loring, when in the Biological Survey, was at Stilwell, Adair county March 29 to April 11 and Redland, Sequoyah county April 13-17; a few birds were collected, and a list of all seen was sent to the Survey.

1898-1902 ALBERT HEALD VAN VLEET

Dr. Van Vleet came to the University of Oklahoma in 1898 as Professor of Biology. In 1902 he published the first list of Oklahoma birds containing the names of 168 species all of which had been collected. On January 6, 1903 all of his field notes and 92 of the mounted birds were destroyed by fire.

1898-1923 C. P. WICKMILLER

Mr. Wickmiller has a collection in his drug store at Kingfisher containing a number of birds of interest, including the only known specimen for the state of White-faced Glossy Ibis.

1901 HARRY CHURCH OBERHOLSER

Dr. Oberholser of the Biological Survey was in Alva August 3-7; a list of the birds seen was sent to the Survey.

1901-1903 CHARLES D. BUNKER

Most of the birds in Dr. Van Vleet's list were collected by Mr. Bunker, taxidermist at the University of Oklahoma at that time. Many of these specimens have proved of great interest. In the summer of 1901 he and Dr. Van Vleet took a trip to the southwestern corner of Oklahoma; in May, 1901, June, 1902, and May, 1903, Mr. Bunker was in Blaine county studying Black-capped Vireos, an account of which he published in *The Condor*. Dr. A. Wetmore lent me a copy of Dr. Van Vleet's list which had been briefly annotated by Mr. Bunker in 1906; this gives interesting information on the status of many birds at that time. In 1929 Mr. Bunker sent me a list of the specimens in the museum of the University of Oklahoma before the fire of 1903—163 mounted birds and 274 skins taken in Oklahoma; most of these records give the date and locality.

1902-1904 GEORGE E. STILWELL

Mr. Stilwell sent migration records to the Biological Survey from Thomas, in northeastern Custer county 3 miles west of Crow Crossing, South Canadian river.

1904-1905 JAMES HAMILTON GAUT

Mr. Gaut when a member of the Biological Survey was in the Wichita Mountains (Mount Scott and west for 20 miles) March 11 to May 28, and at Red Fork, Tulsa county June 17 to July 9, 1904, and again January 29 to February 14, 1905. He collected a few birds in the Wichitas and sent records to the Survey of the birds seen at both localities.

1904-1905 DAVID E. LANTZ

Mr. Lantz of the Biological Survey was at Chattanooga in Comanche county October 28 to November 3 and November 21-28, 1904; at Lawton June 17-28, and Woodward July 13-23, 1905. Records of his observations were sent to the Survey.

1905 ALEXANDER WETMORE

Dr. Wetmore recorded 62 species and subspecies, taking specimens of 35 of them, from May 23 to June 2, 1905 in Minco, a small town in northern Grady county. The results of his study appeared in 1918 in *The Wilson Bulletin*.

1905-1912 URI B. WORCESTER

Mr. Worcester of Enid has collected some hawk and owl eggs and a Herring Gull, and has written three short articles for *The Oölogist*. He gave me information on Western Kingbirds, Robins, and House Wrens in his region.

1906-1914 C. W. PRIER

Prof. Prier collected and mounted 76 species of birds mostly from Ogechee and Fairland in Ottawa county; these are in the museum of the Northeastern Normal College at Tahlequah.

1908—THOMAS CHAUNCEY CARTER AND O. J. TRENTON

A *Thesis on Oklahoma Birds* by Carter and Trenton appeared in the Normal School paper—*The Northwestern*—at Alva; 162 species are mentioned, with a brief statement as to manner of occurrence. The authors give the only record for the state of the Band-tailed Pigeon and Marbled Godwit. Additional information as to the dates of some of the specimens has been given me by Prof. Carter by letter.

1908—RALPH CROMPTON TATE

Mr. Tate has studied birds in the Panhandle, chiefly in Cimarron county. From 1910-1914 he made a collection of eggs and skins which unfortunately was later destroyed by a tenant. He has published a number of articles in *The Condor*, *The Proceedings of the Oklahoma Academy of Science* and elsewhere, the most important being that on *Some birds of the Oklahoma Panhandle* ('23), in which nine species are mentioned for the first time as occurring in the state. He has also given me a great deal of information through letters.

1909—WALTER E. LEWIS

Mr. Lewis has studied the birds at Gate on the 100th meridian in eastern Beaver and western Harper counties. He has published four articles in *The Wilson Bulletin*, and one in *The Auk*, and has given me much information besides.

1910-1914, 1921-23 EDWIN DRANE CRABB

In 1910-1911 Dr. Crabb collected and mounted various birds in the vicinity of his home town, Yukon in Canadian county; some of these were purchased by the University of Oklahoma. In 1913 the Oklahoma Geological Survey started on a study of the birds of the state; with this object Dr. Crabb collected specimens in most of the eastern half of the state and in central and southwestern Oklahoma from November 1913 to December 1914, when funds for this work were discontinued. Three hundred and sixty-nine specimens were collected and a beginning made on an elaborate report. In May 1918 the building in which the skins and note books were housed was burned, 279 of the former were saved but the latter were destroyed. Unfortunately most of the specimens were labelled only with a key number, all the dates and localities being in notebooks. By means of scattered bits of information in the manuscripts, on a few of the labels, various items Dr. Crabb was able to remember, and also a nearly complete set of receipts for his railroad tickets etc., it has been possible to work out most of his itinerary, and to locate and date many of the specimens accurately, and most of them approximately. His itinerary follows by counties:

October 15-November 25, Cleveland; November 29-December 4, Murray; December 6-24, Cleveland; December 25, Canadian; January 9-20 Murray; February-March 15, probably Cleveland; March 15-April 3, Pittsburg, Latimer; April, Cleveland, Jefferson, Comanche; May, Canadian, Oklahoma; June 5-6, Jackson, Harmon; June 9, Greer; June 10-13, Dewey, Beaver, Beckham; July 2-5, Choctaw; July 5-10 McCurtain; July 12-20, Pushmataha; July 23-28, Leflore; August 10-17, Seminole, Hughes, Okfuskee, Lincoln; August 26-31, Mayes; September 2-10 Craig, Delaware, Ottawa, Mayes, Wagoner, Muskogee; September 11, Sequoyah; September 12-16 Adair, Cherokee; September 16-October 3, Cleveland, Canadian, Oklahoma; October 9-19, Love, Marshall, Bryan, Johnston, Coal; October 19-22, Pontotoc, McClain; October 24-November 4, Cleveland; November 5-11, Rogers, Pawnee; November 19, Osage; November 23, Washington; November 27-December 5, Comanche.

Dr. Crabb has made the most important of any of the collections of Oklahoma birds. He has published six short articles in *The Auk*, *Wilson Bulletin* and *Proceedings of the Oklahoma Academy of Science*, and a report on the habits and economic status of *The Woodpeckers of Oklahoma*. ('30).

1910-1919 ALBERT J. B. KIRN

Mr. Kirn collected eggs in northeastern Oklahoma; in Vinita in 1912, and in Copan in northern Washington county during the other seasons. He sent migration records to the Biological Survey in 1917 and 1918, and published 7 articles in *The Oologist* from 1912 to 1918. On March 15, 1921 he made a trip into Tillman county seeing several birds of interest. He kindly lent me a number of his note books from which I gleaned much valuable information.

1910-1912 FREDERICK B. ISELY

In July and August 1910 Prof. Isely made a mussel survey of the Red river from the Texas to the Arkansas lines; he published a brief account of the water birds noted on the trip. In 1911 and 1912 he took Christmas censuses at Tonkawa.

1911— R. O. WHITENTON

Prof. Whitenton of the A. and M. College gave me information as to the status of several birds in Weatherford in 1911 and in Payne county more recently. He has contributed two short articles on birds to *The Proceedings of the Oklahoma Academy of Science*.

1911-1912 JAMES S. CAMP

Mr. Camp sent migration records to the Biological Survey from the Camp Demonstration Farm 3 miles south of Sentinel, Washita county.

1912-1914 FREDERICK S. BARDE

Mr. Barde wrote two reports for the Oklahoma Fish and Game Department: *Field, Forest and Stream in Oklahoma* in 1912, and *Outdoor Oklahoma* in 1914. These are beautifully written and illustrated and full of appreciation of nature. In the first volume he gave a list of 227 Oklahoma birds, taken partly from Dr. Van Vleet's list but chiefly from information from Prof. Stevens; this is very briefly annotated. Other chapters are on Wild Turkeys, Bird Migration, Hawks of Oklaho-

ma, and the Prairie Chicken. In *Outdoor Oklahoma* there are several chapters on birds in general, on Prairie Chickens, and an account of four little Screech Owls raised in captivity.

1916— R. L. MORE

Mr. More of Vernon, Texas, collected eggs in Cimarron county in 1916. He has given me information in letters in regard to the birds along the Red River in southwestern Oklahoma.

1917 HOWARD O. CROSS

Dr. Cross, while in the department of Zoology in the University of Oklahoma, contributed an unannotated list of 325 birds to the *Geography of Oklahoma*, besides an excellent discussion of game birds, hawks and owls, crows, song birds, etc.

1918-1922 THEODORE R. BEARD

Mr. Beard studied birds in the vicinity of Sapulpa while in high school and to some extent since then. He published a short article and two Christmas censuses in *Bird-Lore* and has given me much information through letters on the birds of his region.

1919-1923 JOHN ROY PEMBERTON

Mr. Pemberton collected eggs and a few skins in the vicinity of Tulsa. He sent migration records to the Biological Survey, has given me nesting and migration data and has published three short articles on Oklahoma birds in *The Condor*.

1919-1927, 1929 MARGARET MORSE NICE AND LEONARD BLAINE NICE

Although we came to Norman in 1913, unfortunately we did not keep many notes until August 1919, when we began to study the nesting of Mourning Doves. We took 7 Christmas censuses in Cleveland county, 1919-1923, 1925, 1926, having been absent from the state June 1924 to September 1925. Five summers were spent in Oklahoma 1919, 1920, 1922, 1923, 1926. In June 1920 we undertook a study of the birds of the state in cooperation with the Oklahoma Geological Survey. The following field trips were made by both of us except where otherwise noted:

1920: Kingfisher, May 29-30; Wichita Reserve, June 9-16; Arbuckles, June 26 to July 2; Atoka county July 3; Cedar creek, Pushmataha county, July 3-8; 5 miles north of Talahina, LeFlore county, July 8-10; Winding Stair Mountain, July 10-12; Muldrow, Sequoyah county, July 12; Fourteen Mile creek, Cherokee county, July 13-15; Creek county July 16.

1921: Kingfisher, May 20-21. The following trip taken by L. B. N.: Miami, June 12; Salina, Spavinaw and Locust Grove, Mayes county, June 13-14; Jay and Grove, Delaware county, June 15-16.

1922: a trip taken by M. M. N. and Constance Nice: Alva, May 26-27; Texhoma, May 24; Kenton, May 29-June 2; Wichita Reserve, July 1-4.

1923: Talequah, May 6-7 (M. M. N.). Minco, Grady county, May 20; Kingfisher, May 26-27; Arbuckles, June 24-26; Mountain Fork, McCurtain county, June 21-July 2; Platte National Park, July 3; Red river, south of Altus, July 4-5; Red river, Harmon county, July 5-6; Red river, Tillman county, July 6-7; Wichitas, July 7-10.

1924: Spavinaw, June 24-25.

1926: May 9, Kingfisher and Blaine counties; May 15-16, Arbuckles; June 4-9, Wichitas; August 21, Alva; August 22, Gate; August 23-27, Kenton; September 8, Harmon, Greer, Kiowa and Caddo counties.

1927: Arbuckles, April 22-24; Kingfisher, May 22-23; Sequoyah county June 10.

1929: Norman, May 27-June 1; Kingfisher, June 2; Wichitas, June 3-6 (M. M. N.). Most of the collecting was done by Dr. Nice, most of the study of birds in Cleveland county by Mrs. Nice. The *Roadside Census* (N. & N. '21a) was written after the first series of camping trips, a *Study of the nesting of Mourning Dove* ('22d, '23a) was finished in 1921; *The Birds of Oklahoma* was published in April 1924 as a University Study; 361 forms are listed for the state.

From 1920 through 1923 a special study was made of the bird life on a half mile of creek bed west of Norman—"Snail Brook"—('28d); in 1926 and 1927 18 eight mile censuses were taken over diversified country ('27d, '29b). In the spring of 1924 a wet weather pond—"Shore-bird Pond"—southwest of the university campus afforded us excellent opportunity for studying shore-birds. Others of our best bird study places were the Olivers' woods directly south of Norman near the Canadian

river and "Persimmon Pond" a third of a mile to the northwest of this woods. A great deal of observation of nesting birds was done on the campus of the university; here our daughters—Constance, Marjorie, Barbara and Eleanor—were of much assistance in finding nests and climbing trees to examine them; a list of the birds of the campus appeared in 1930. Papers have been published on the Cardinal ('27c), Bell Vireo ('29a), Harris Sparrow ('29c) and Yellow-crowned Night-Heron ('29d).

1919—WILLIAM H. KOONS

Mr. Koons has studied birds in Tulsa, collecting a number for the purpose of painting them. He has contributed a great many migration dates to Miss Force's unpublished volume, a chapter on the weights of birds and a fascinating manuscript of nature diary. He and Miss Force have a joint paper in *The Wilson Bulletin*.

1919—FRANK C. GREENE

Mr. Greene, a geologist, has given Miss Force data on a number of birds noted in Tulsa and Osage counties.

1921—GEORGE W. MORSE

Mr. Morse, an enthusiastic oölogist, has collected eggs in the Tulsa region; he has sent me much information in letters, and contributed several chapters to Miss Force's volume, including a list of the species whose eggs he has collected in Oklahoma, several of them being the only records for the state. He has published four articles on Oklahoma birds in *The Oölogist*.

1921-1923 JEAN M. LINDSALE

Dr. Linsdale sent me his notes on birds observed near Sapulpa December 18-21, 1920; December 21-30, 1921, April 17, 1922 and December 26, 1923, also April 15, 1922 on Bird creek near Tulsa. A number of specimens were collected and sent to Washington for identification.

1924—EDITH R. FORCE

Miss Force has stimulated much interest in outdoors among her junior high school pupils in Okmulgee (1924-1926) and Tulsa (1926—); she studied birds in both regions and has also gathered together the observations of the many bird enthusiasts in Tulsa, incorporating them into a manuscript volume on *The Wild Life of Tulsa County, Oklahoma, and Vicinity, Vol. I Birds*. She has kindly given me permission to use data from this. She has published 3 Christmas censuses in *Bird-Lore*, a joint paper with Mr. Koons in *The Wilson Bulletin*, two articles on birds in the *Proceedings of the Oklahoma Academy of Science* and a *Time Table of Birds of Tulsa County*.

1924—GEORGE A. MOORE

Mr. Moore is making a study of the birds of Payne county. He has published two short articles in the *Proceedings of the Oklahoma Academy of Science* and one in *The Wilson Bulletin*. He has collected a number of specimens for the museum of the A. and M. College.

1924—GEORGE B. SAUNDERS, JR.

Mr. Saunders has made a study of the birds of Oklahoma county, especially in the spring of 1928, collecting a number of important specimens. He has made early spring trips and one winter one to the Arbuckles and spent July 1925 in the Spavinaw. At present he is making a special study of the Eastern and Western Meadowlarks in Oklahoma and Canadian counties. He has published two Christmas censuses in *Bird-Lore* and one in the *Proceedings of the Oklahoma Academy of Science*, two other articles in the latter place and one in *The Auk*. He has given me much information by letter. From October 8, 1927 to June 9, 1928 he took water fowl censuses at Lake Overholser for the Biological Survey.

1924 JAMES H. GARDNER

Mr. Gardner has contributed two chapters on Tulsa birds to Miss Force's volume.

1925 ROBERTA DEAM ORTENBURGER

Mrs. Ortenburger accompanied the first trip of the Oklahoma Biological Survey in June and July 1925 in McCurtain, Pushmataha, and Choctaw counties; she wrote a report on the bird collections of the party for the *Proceedings of the Oklahoma Academy of Science*.

1926-1927 ELBERT L. LITTLE, JR.

Dr. Little collected birds on the second trip of the Oklahoma Biological Survey in June and July 1926 in southwestern Oklahoma and also the Panhandle; his report was published in 1930. He has taken two Christmas censuses in Muskogee county.

1927—MR. AND MRS. A. E. GILMORE

The Gilmores, taxidermists, have collected skins and eggs in the vicinity of Tulsa, many of them being of much interest. They have published two short articles in *The Oölogist* and two in *The Wilson Bulletin*. Mrs. Gilmore contributed a chapter on her nesting records to Miss Force's volume.

1927 NORMAN A. WOOD

Mr. Wood, of the University of Michigan, collected 52 birds while with the third expedition of the Oklahoma Biological Survey in Hughes, Pittsburg and Leflore counties from June 18 to July 15, 1927; these specimens were identified by Dr. Oberholser and are now in the University of Oklahoma Museum of Zoology.

1927—N. P. SHOWMAN

Mr. Showman has taken monthly water fowl censuses for the U. S. Biological Survey near Broken Arrow, Tulsa county since October 8, 1927.

1927-1928 L. E. CRAWFORD

Mr. Crawford took 7 water fowl censuses for the Biological Survey on Lake Lawtonka in Comanche county and on the Red river in Cotton county.

1928-1930 T. O. MUNGER

Mr. Munger has taken the water fowl censuses for the Biological Survey near Perry in Noble county.

1929—RALPH D. BIRD

Dr. Bird came to the University of Oklahoma in February 1929; he has made observations on birds in Cleveland county, the Arbuckles and other localities. In 1929 while conducting the fourth expedition of the Oklahoma Biological Survey in eastern Oklahoma, he collected the first specimens of Common Tern and Sennet Nighthawk taken in the state. On the 1930 expedition to Cherokee, Major and Woods counties, he took the first specimen of Long-billed Dowitcher for Oklahoma. All of his bird records have been generously placed at my disposal. He has written a short article on Oklahoma birds for *The Auk* and another for *The Wilson Bulletin*.

LOCALITIES CITED

Exclusive of Counties and More Important Cities.

Arbuckles: in Murray county. (Arbuckle Mountains).

Broken Arrow: in southeastern Tulsa county.

Camp Supply: in northwestern Woodward county, near site of present Supply.

Chattanooga: in Comanche county.

Cherokee Nation: northeastern Oklahoma bounded by Osage county and the Arkansas river.

Cherokee Salt Plain: in Alfalfa county.

Chickasaw Nation: south central Oklahoma, south of South Canadian river, including Grady, McClain and Pontotoc counties and those directly south.

Choctaw Nation: southeastern Oklahoma.

Copan: in northern Washington county.

Corral creek: in western Oklahoma, possibly Roger Mills or Ellis county.

Creek Nation: between the Arkansas and South Canadian Rivers, west to and including Creek and Okfuskee counties.

Cross Timbers: areas of black jack and post oak timber, running through central Oklahoma between the Arkansas and Red Rivers.

Edith Salt Plain: in Woods county.

Fort Arbuckle: in Murray county, on Wild Horse creek, 6 miles west and 1 mile north of present town of Davis.

Fort Cobb: in Caddo county, at junction of Pond creek and Washita river, 8 miles west of Anadarko.

Fort Gibson: in northeastern Muskogee county, on the Grand river.

Fort Holmes: in Hughes county, on South Canadian at mouth of Little river.

Fort Reno: in Canadian county, west of El Reno.

Gate: on border between Harper and Beaver counties, on 100th meridian.

Indian Territory: included the Cherokee, Creek, Seminole (now Seminole county), Choctaw and Chickasaw Nations.

Ivanhoe Lake: near Shattuck in Woodward county.

Kenton: in northwestern Cimarron county.

Kiowa Agency: in southern Caddo county, 17 miles southeast of Fort Cobb.

Lake Overholser: the Oklahoma City reservoir.

M. K. & T. Railroad: passes through Vinita, Muskogee, McAlester and Atoka.

Old Greer County: southwestern corner of Oklahoma, between the Red Fork, North Fork and Red river and 100th meridian.

Ponca Agency: in Kay county.

Pond Creek: a tributary of the Washita, joining it in Caddo county.

Trout Creek: probably in northwestern Oklahoma, possibly in Ellis county.

U. O. M. Z.: University of Oklahoma Museum of Zoology.

Wichitas: (Wichita Mountains) records in this volume refer to Comanche county.

ACKNOWLEDGEMENTS

It is a pleasure to tell of the generous cooperation of many bird students whose help has made possible this survey of the birds of Oklahoma. Grateful acknowledgements are due to the Oklahoma Geological Survey under the directorship of Mr. C. W. Shannon for financing the early field trips; to Drs. E. D. Crabb, G. W. Stevens, and J. M. Linsdale, and Mr. C. D. Bunker for information regarding birds collected by them; to Messrs. J. R. Pemberton, W. H. Koons, and G. W. Morse, and Mrs. A. E. Gilmore for data on birds of Tulsa, to Dr. C. W. Richmond and Mr. J. H. Riley for courtesies extended in connection with Oklahoma specimens in the National Museum, to Dr. Witmer Stone for aid in the classification and nomenclature, and to Dr. A. O. Weese for superintending the publication of the manuscript.

I am especially indebted to the following persons who kindly sent me full lists of the birds observed in their localities: Mr. A. J. Kirn for Copan and Vinita, Mr. T. R. Beard for Sapulpa, Mr. W. E. Lewis for Gate, Mr. R. C. Tate for Kenton, Mr. Geo. B. Saunders, jr., for Oklahoma county, Miss Edith R. Force for Tulsa, and Dr. Ralph D. Bird for many different localities. For loan of illustrations I have to thank Mr. Hugh S. Davis of Tulsa, Dr. R. D. Bird of Norman, and Dr. J. M. Thuringer of Oklahoma City; for the physiographic map Dr. C. N. Gould of the Oklahoma Geological Survey, and for the Vegetation map, Dr. W. E. Bruner of Baker University and the Duke University Press.

From the United States Biological Survey I have received valuable assistance not only in the compilation of the bibliography, but also through copies of migration data, nest censuses, water-fowl censuses, and reports of their investigators in the state. Thanks are especially due to Dr. H. C. Oberholser for his continued interest and advice, for the privilege of examining the manuscript notes of G. H. Ragsdale, and for the identification of several hundreds of specimens.

Finally I am indebted to my daughters for their assistance in the study of nesting birds, and particularly to my husband, Dr. L. B. Nice for helpful suggestions and all-important aid and cooperation on many field trips.

THE LIST OF BIRDS

The aim of this book is to present a history of Oklahoma birds from 1820 to the present time, so far as this is possible. Quotations are given from historical accounts, most of which are difficult of access, from manuscripts of the observers of the United States Biological Survey, from letters, note books and articles of present day students in different parts of the state and from our own experiences. Very little life history material has been included except from Oklahoma sources. From a wealth of material I have had to choose what I believed trustworthy and significant. In the case of rare species all the known data is presented, but in most instances a selection has been made of representative material. With some birds common in northeastern or central Oklahoma enough nesting data has accumulated to be of considerable interest.

In order to make the volume as helpful as possible, suggestions are made in many cases as to field identification; and in some instances a brief description is given of western birds, so as to enable people in eastern and central Oklahoma to recognize the birds of their region if they are possessed of a book treating only of eastern birds. The sections on food have been taken from publications of the United States Biological Survey, from Mrs. Bailey's *Birds of New Mexico*, and from an article on the subject by Mr. Tate ('25c); those items were chosen that are of special importance in this region.

The classification and nomenclature of the Fourth Edition of the American Ornithologists' Union Check-List has been followed; as this has not yet appeared in print, I am indebted to the kindness of Dr. Witmer Stone for the necessary information. The only departure I have made is the omission of the possessive in English names, in this respect following the general practice of western ornithologists. The numbers of the Third Edition of the Check-List have been retained so as to assist students in finding birds in books and lists using that order which has been the standard for forty years.

There are 385 species and subspecies in the following list, 334 being full species. Nineteen species have been admitted on sight records; here the recognizability of the species in the field, plus the competence of the observer have been the chief criterions for acceptance. Of the 361 forms listed in the first edition of *Birds of Oklahoma*, three species and eight subspecies* have been dropped, three because not included in the Fourth Check-List, one because of mis-identification, the others because of lack of specimens. Thirty-five new forms have been added in the last seven years; 33 of these are transients or winter visitants, two are new subspecies of breeding birds. Seventeen are new species, 18 new subspecies of forms already known to occur. The ranges of some of the breeding birds have

*The Saskatchewan Horned Lark, Louisiana Cardinal and Pale Painted Bunting are not included in the Fourth Check-List; the Greater Snow Goose which Van Vleet informed me he had taken in the state is now known to occur only on the Atlantic coast and in the Arctic; a specimen of Bewick Wren taken in Cimarron Co. proved to be *T. b. cryptus* instead of the expected *eremophilus*; by a revision of the Screech Owls the state is left without an example of the Southern Screech Owl (*O. a. asio*); the Forster Tern, Bewick Wren (*T. b. bewicki*), Western Yellow-throat and Nelson Sparrow have been omitted because of lack of specimens, the Red-poll because of indefiniteness of data.

been revised, particularly Screech Owls and Robins, due to the taking of additional specimens.

Of the 385 birds credited to the state, 95 are residents, either non-migratory birds nesting in the state or migratory birds occurring in both summer and winter; 114 are summer residents; 64 are winter visitors, 108 spring and fall transients, and 4 of casual occurrence. Eighteen of the summer residents or transients have occasionally been recorded in December or January, which gives a total of 177 birds that have been found in winter. Two hundred and nine forms are believed to have bred in the state, (nests have been found of 192 species and subspecies, young recently out of the nest recorded in 5 other cases, while in 12 instances I know of no definite data†). Twenty-two of the transients have been noted in June and July making a total of 231 birds that have been found in summer. Ten of the 385 birds are now extinct in the state—four residents, two summer residents, three transients, one winter visitant.*

Subspecies. Oklahoma, because of its intermediate position between east and west, north and south, is the meeting ground of many subspecies both in its summer and winter birds. (In the scientific name the first word indicates the genus, the second the species, the third—if there is any—the subspecies.) Forty-two species in the state are represented by 95 subspecies; in 33 cases there are only two subspecies of each species, but in eight there are three and in one instance, four. Fifty-six of these subspecies are breeding birds, 39 transients or winter visitants. Further collecting will add more forms of both categories. With breeding birds it is a difficult matter to decide upon the dividing line between two subspecies since they intergrade; in such cases the expert takes the average of series of specimens.

Except in a very few cases it is impossible to distinguish subspecies in the field. One solution of the difficulty lies in extensive collecting, and submission of the specimens taken to a recognized authority; in this way much will be added to our knowledge of the range and occurrence of these different forms in the state. But sight records of transients and winter visitants will have to be referred to the species only, and this is now possible in most cases with the new check-list. For instance Song Sparrow now means merely the species, and not a particular subspecies as formerly. Our chief difficulty lies with the Shrikes, the Great Blue Herons and Eastern Meadowlarks also presenting problems of nomenclature.

As to breeding birds the ranges of most of the subspecies in Oklahoma are known in a general way. In the intermediate regions it is a question as to which subspecies the birds will average nearest. But here also for all ordinary purposes the species alone is sufficient. We can very well speak of Mourning Doves, Mockingbirds, and Lark Sparrows throughout the state without burdening ourselves with "eastern" and "western." In this

†Nesting records are based on young out of the nest in the following species: Pintail, Blue-winged Teal, Black and White and Hooded Warblers, and Ovenbird. The 12 forms for which I have found no definite nesting data are: Western Red-tail, Bald Eagle, Louisiana Paroquet, Whip-poor-will, Poor-will, Redcockaded Woodpecker, Florida and Brown-headed Nuthatch, Eastern Robin, Blue-winged Warbler, Maryland Yellow-throat, and Scarlet Tanager.

*The extirpated birds are: Trumpeter Swan, Swallow-tailed Kite, White-tailed Kite, Sharp-tailed Grouse, Sage Hen, Whooping Crane, Eskimo Curlew, Passenger Pigeon, Louisiana Paroquet, and Ivory-billed Woodpecker.

book with a few exceptions no mention has been made as to the differences between subspecies, anything that is said in regard to field marks or habits under one subspecies, applying equally to the other subspecies. For subspecies, as a rule, are matters for the specialist in the museum and do not need to bother the field worker.

Explanation of abbreviations, etc. In mentioning specimens, migration and nesting data, records in northeastern Oklahoma are usually given first, then south through Tulsa to Bryan County, thence to central and finally to western Oklahoma. With distinctly western birds the order is reversed.

Specimens are indicated by a star before the date, all other dates signifying sight records. When a dagger appears, the specimen has been identified, in most cases by Dr. H. C. Oberholser. (Dr. Wetmore identified his own and Mr. Pemberton's skins, while I passed on the Ward Herons and Horned Grebe). Specimens are not usually mentioned except in the case of rarer birds, unless they come in naturally under migration dates or the matter of subspecific determination is in question. In the 19 cases where no specimen has been taken, that fact is stated. In the interest of simplification some specimens are credited not to the actual taker, but to the person reporting the event; this is true in the case of Miss Force's students, Mrs. Ortenburger's list and of various hunters whose captures are reported by Prof. Whitenton, Mr. Moore and Mrs. Gilmore.

Migration is used in a rather broad sense, sometimes meaning occurrence as well. When several dates are given for one year, the year is indicated at the end of the series. A figure before a date signifies the number of birds seen. When single records are involved commas and semicolons are employed, but the use of colons means a combination of a number of records (6 to 8 in Cleveland and Tulsa Counties), as follows—Earliest date of arrival: average date of arrival:: average date last seen: latest date of last seen. Often there are enough dates of arrival to justify this scheme, but very few or none at all of departure; then only three or perhaps two dates are given as follows—Apr. 13, '13: Apr. 20:: Oct. 6, '16; Apr. 20, '23: Apr. 21.

Fifty-six observers are referred to by initial and number; a brief account of the character of each person's contributions is given under *Itineraries and reports of field workers in the state.*

OBSERVERS REFERRED TO BY LETTER AND NUMBER

- | | |
|--|---------------------------------------|
| B ¹ Bailey, F. M. | M ²Merrill, J. C. |
| B ²Bailey, V. | M ³Moore, G. A. |
| B ³Beard, T. R. | M ⁴More, R. L. |
| B ⁴Berry, H. N. | M ⁵Morse, G. W. |
| B ⁵Bird, R. D. | M ⁶Munger, T. O. |
| B ⁶Bunker, C. D. | NNice, L. B. and M. M. |
| C ¹Camp, J. C. | O ¹Oberholser, H. C. |
| C ²Carter, T. C. | O ²Ortenburger, R. D. |
| C ³Clark, J. H. | P ¹Palmer, E. |
| C ⁴Cooke, W. W. | P ²Pemberton, J. R. |
| C ⁵Crabb, E. D. | P ³Preble, E. A. |
| C ⁶Crawford, L. E. | P ⁴Prier, C. W. |
| DDutcher, B. H. | R ¹Ragsdale, G. H. |
| FForce, E. R. | R ²Richardson, J. |
| G ¹Gardner, J. H. | S ¹Saunders, G. B. |
| G ²Gaut, J. H. | S ²Showman, N. P. |
| G ³Gilmore, Mrs. A. E. | S ³Stevens, G. W. |
| G ⁴Greene, F. G. | S ⁴Stilwell, G. E. |
| IIsely, F. B. | T ¹Tate, R. C. |
| K ¹Kirn, A. J. B. | T ²Trenton, O. J. |
| K ²Kitching, S. | VVan Vleet, A. H. |
| K ³Koons, W. H. | W ¹Wetmore, A. |
| L ¹Lantz, D. E. | W ²Whitenton, R. O. |
| L ²Lewis, W. E. | W ³Wickmiller, C. P. |
| L ³Linsdale, J. M. | W ⁴Wood, N. A. |
| L ⁴Little, E. L. | W ⁵Woodhouse, S. W. |
| L ⁵Loring, J. A. | W ⁶Worcester, U. B. |
| M ¹McCarthy, C. S. | |