THE FLICKER

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The Flicker

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VOLUME 22 MARCH, 1950 NUMBER 1

Woodcock Studies at Cloquet Forest Experiment Station, Minnesota[1]

by

Edgar W. Dangler and William H. Marshall[2]

Although the Lake States region is apparently an important part of the breeding range of the woodcock (**Philohela minor** Gmelin) very little information is available on the ecological requirements of the bird during the spring and summer season in this area. Studies in Maine, New York, and Pennsylvania indicate clearly the character of these requirements in the eastern part of the country. In order to obtain information more applicable locally woodcock studies were carried on at the Cloquet Forest Experiment Station near Duluth, Minnesota in 1947 by Dangler. The junior author has continued censuses in the same area in the spring of 1948 and 1949.

The Cloquet station is a tract of some 3,200 acres lying in the coniferous forest region of Minnesota and is probably representative of much of the "Jack pine" areas of the Lake States. Approximately two-thirds of the station is in upland types and one-third has swamp or marshy vegetation.

Field work on woodcock has been concentrated on the eastern part of the station which is traversed by Otter Creek, a small stream that is bounded by most of the brushy and open acreage of the station.

The acreages of timber types in the two tiers of sixteen forties along the eastern boundary as determined from surveys made in 1949 are as follows:

Upland types

Hardwoods		**195.8**
Aspen	154.9	
Aspen-birch	39.0	
Birch	1.9	
Conifers		**178.1**
Jack pine	99.3	
Red pine	46.5	
Mixed pine	24.5	
Plantation	7.8	

1 Journal Series No. 2534 of the Minnesota Agricultural Experiment Station.

2. The authors wish to express their appreciation to Professor J. H. Allison and T. Schantz—Hanson of the School of Forestry for providing many facilities and data during the study.

Mixed Conifer-Hardwoods		36.4
Brush		22.5
Old Fields		7.4
Total		440.2
Lowland types		
Conifer Hardwoods		0.6
Conifers		66.9
Mixed Conifers	52.6	
Spruce	14.3	
Brush		51.9
Meadow		26.6
Muskeg		30.1
Total		176.1

The 1947 field work consisted of intensive observation on woodcock activities and occurrence from April through August with a detailed study of seventeen singing grounds. Later work has been census taking of singing males in early May by forestry students.

Spring Arrival

Woodcock apparently arrive in this area in April. In 1947 the first bird noted was on April 24 when the aspen **(Populus tremuloides)** was in full flower. Their arrival followed a steady increase in the daily minimum temperatures for six days. In 1949 the birds were already active at singing grounds on April 8.

Singing Ground Requirements

Immediately following arrival the males began their courtship activities. These activities were observed morning and night to enable location of "singing grounds" for analysis of their character during other periods of the day. The seventeen areas intensively studied during 1947 represent all those grounds regularly used for periods of over a week and form the basis for the following data. Four other areas are known to have singing males but only for short periods of time. In 1948 and 1949 additional singing grounds were located which while not examined in detail, seemed similar in character.

All singing grounds were on flat or slightly undulating topography although similar areas on slopes were available. The size of the clearing apparently varied with the height of adjacent cover. Three, located in areas of low brushy cover of less than 10 feet , were less than 70 feet in diameter; nine, in areas surrounded by aspen and jack pine up to thirty feet in height were 70-130 feet in diameter, and five in areas where surrounding trees were over thirty feet in height were more than 130 feet in diameter.

Table I summarizes information on type, density, and maximum height of cover while Table II indicates the occurrence of cover by species on the singing grounds themselves. These data may be combined descriptively by stating that the actual singing grounds are a mixture of low growing shrubs chiefly Blueberry **(Vaccinium canadense)**, willow **(Salix spp.)**, **Aspen**, Beaked Hazel **(Corylus rostrata)**, Speckled Alder **(Alnus incana)**, Raspberry **(Rubus sp.)**, and Serviceberry **(Amelanchier sp.)**, with grasses, bracken ferns, **(Pteris aquilina)**, strawberry **(Fragaria virginiana)**, and Canada Mayflower **(Maianthemum canadense)** occurring commonly as low ground cover. It should be emphasized that the vegetative parts of the grasses and bracken are dead and prostrate during most of the mating period as a result of snow packing of the previous winter. Thus they represent scattered openings and runways throughout the shrubby growth. Although there are several open grassy areas in the eastern part of the station and extensive fields along the border outside the station these were not used as singing grounds.

The past history of land use of these areas is as follows: 10 in recently

logged areas, 3 in old fields, 2 in woods roads and 2 in stream meadows. All but the latter were on upland sandy soils and represent plant growth following disturbance by man.

Comparison of these data with previously published literature on woodcock indicates a very close similarity to conditions in Maine as described by Mendall and Aldous (1943). In fact a knowledge of the latter publication and its illustrations would almost suffice to guide the newcomer to established singing grounds at Cloquet.

TABLE I. SINGING GROUND CHARACTERISTICS

(Summarized from 17 Singing Grounds)

Type of Cover			Density of Cover			Maximum Height of Cover		
Grasses	Herbs	Shrubs	Sparse	Medium	Heavy	1 ft.	3-5 ft.	6 ft. & over
16	6	14	7	8	13	4	10	3

TABLE 2 SUMARY CHART OF PLANT SPECIES

(Based on 17 Singing Grounds at Cloquet)

	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	18	20	
Grasses (dead)	x		x	x	x	x	x	x		x	x	x	x	x	x	x	x	15
Blueberry	x	x	x	x			x	x	x	x	x	x		x	x	x	x	14
Strawberry	x	x	x	x	x	x	x	x	x	x		x				x	x	13
Willow	x	x	x	x				x	x	x	x	x	x		x		x	13
Trembling Aspen	x	x	x			x	x	x	x	x	x	x	x		x		x	13
Beaked Hazel	x		x	x		x	x	x		x	x	x				x	x	11
Speckled Alder	x	x	x				x	x	x			x			x		x	9
Bracken Fern (dead)	x		x	x						x	x	x			x		x	8
Raspberry				x	x	x		x		x			x			x	x	8
Canada Mayflower		x	x	x			x	x		x				x		x		8
Norway Pine	x	x		x	x			x								x	x	7
Amelanchier	x	x	x				x			x	x	x						7
Rose	x	x					x		x	x							x	6
Jack Pine	x	x			x			x	x									5
Mosses	x						x				x	x		x				5
Black Cherry	x						x	x			x		x					5
Black Spruce									x			x	x	x				4
Labrador Tea	x								x					x				3
Mountain Fly Honeysuckle	x								x					x				3
Sweet Fern (dead)		x													x	x		3
Wintergreen							x			x	x				x	x		3
Anemone			x									x	x					3
Lichens	x						x											2
White Spruce	x			x														2
Bearberry		x	x															2

	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	18	20	
White Pine								x	x									2
Spirea								x	x									2
Choke Cherry				x														1
Red-osier Dogwood								x										1
Currant								x										1
Balsam Fir														x				1
Leatherleaf														x				
Bog Rosemary														x				1
Swamp Laurel														x				1
Hepatica	x																	1
Panicled Dogwood									x									1

Although Mendall and Aldous (1943) consider the diurnal territory of the male and nesting territory should generally be found close to the singing ground little information was obtained on these factors. The distance of three diurnal territories was thought to be up to 500 yards but since the birds were not marked this point cannot be definitely established. On May 8, 1948, a woodcock nest was found by students approximately 350 yards from an active singing ground. This nest was located in a thin strip of several high hazel bushes in the center of a 10-acre cut-over area which had been scarified for planting purposes the previous fall. The nest contained four eggs which apparently hatched by June 1.

Brood Cover

Three broods classed as early (since they could not fly) were found on May 26, 28, and June 3 on well-drained sites in pole stands of the mixed hardwood-conifer type. Of three brood observations made in late June two were flushed in lowland brush (alder) and one in a pole stand of mixed conifer-hardwoods on the upland.

Summer cover

Field work during July, August and early September, 1947 yielded fifty-six observations of individual woodcock. These were distributed in cover types as follows: lowland brush (alder) —42, upland hardwoods—8, upland herbaceous, willow, and woods road 2 each.

In early September it became very difficult to find birds. Thus on September 8 only two and on September 10, one bird could be found in the alder areas that previously yielded six to eight birds per trip.

These areas were again partially traversed on October 18 when four birds were found, and on the next day three birds were flushed again in the alders. During these two field trips only one bird was found on the adjacent uplands although they were searched intensively.

In summary a great majority of woodcock seen were in alder cover from July through October 20. This is in substantial agreement with data for Maine although indicating a more decided preference for the alder of the stream bottoms.

Occurrence of food

Since existing literature (Mendall and Aldous 1943; Sperry 1940; and others) showed that the earthworm is the principal food of the woodcock, a study of the distribution of earthworm was attempted in order to obtain information on the availability of this food. Forty-five samples of one square foot each were taken during June and July. Thirty-four contained one earthworm or more; 21 contained none (Table 3).

The samples were most easily obtained by partially clearing the litter on the plot and then applying a solution of corrosive sublimate. This causes the worms to crawl from their burrows and try to leave the area.

With regard to soil type alluvium and sandy-loam supported one earthworm or more in twenty-six of twenty-seven samples. The highest concentration (37+) occurred in an alluvium sample. Peat supported these animals in seven of twelve samples but loamy-sand in only one of sixteen. The data indicated higher numbers of earthworms in soils having a p.h. value above 6.4.

Areas with no cover (in the alder), alder, and hazel were found to have earthworms in twenty-nine samples while eight samples contained none. Conversely eight samples in pine or aspen-birch contained no earthworms.

TABLE 3. EARTHWORM HABIT CHARACTERISTICS

(Based on data from 55 one foot square sample plots)

COVER (KEY SPECIES)

	No Cover	Alder	Hazel	Herbs & Grasses	Pine or Aspen or Birch	Total
Number of Plots with Earthworms	4	16	9	5	0	34
Number of Plots without Earthworms	0	6	2	5	8	21

	Soil Type				Hydrogen-Ion Concentration* p.H.		
	Alluvium	Sandy Loam	Peat	Loamy Sand	Below 5.4	5.5-6.4	Above 6.4
Number of Plots with Earthworms	11	15	7	1	2	8	7
Number of Plots without Earthworms	0	1	5	15	4	10	3

*Hydrogen-ion concentration indeterminate or not taken in 21 samples.

Since the alder stands supporting earthworms occurred chiefly along Otter Creek in alluvium soils of nearly alkaline character these data may indicate the reason for the high degree of utilization of this cover type by woodcock during the summer months. Conversely the forest stands on upland sandy soils were unattractive to woodcock.

Populations

Mendall and Aldous (1943) in reviewing the distribution and abundance of woodcock by states indicate the woodcock is an "uncommon summer resident" in eastern Minnesota. However, they cite Swanson to the effect that the bird is a "fairly common breeder" in some sections north of Lake Superior just north and east of the Cloquet Forest.

Since 1947 it has been possible to conduct censuses of singing males through the cooperation of forestry students. These students are "briefed" on woodcock activities and then taken to known active singing grounds in the evening where they observe activities at close hand and become acquainted with the various calls of the male birds. On a subsequent evening when there was no wind or precipitation each student was assigned a one-half mile census route to cover in a thirty minute period. In this way the area is covered simultaneously at distances of three hundred yards or less between observers.

The total known singing grounds in the entire forest for the three years, 1947, 1948, and 1949 was seventeen, twenty-seven, and forty-one respectively. However, the coverage each year was uniform only in the eastern two tiers of forties—an area one-half mile wide and two miles long. Therefore, specific population comparisons will be based on this area.

In 1947 Dangler found ten singing grounds in this area.

In 1948 the student census, which was run on May 11 located fifteen singing males. Eight of these were on old grounds and seven at new locations. Two of the 1947 singing grounds were not used.

In 1949 the student census, run on April 26, located twenty-four singing grounds. Six of these were used in both 1947 and 1948, four had been new in 1948, and two had been used in 1947 but not 1948. Twelve were new in 1949. One ground which had been used in both 1947 and 1948 was not occupied and two which had been used in 1948 were not used in 1949.

The concentrations of twenty-four singing males on six hundred and forty acres or one bird per twenty-six acres compares with a ratio of "one singing male per twenty-three acres" of land reported by Mendall and Aldous for "the peak year of 1939."

Based on these field censuses it would appear that breeding males have increased greatly in the area during the past three years. These data are comparable to reports for Maine and Ontario as released by the Fish and Wildlife Service in 1949.

SUMMARY

1. Field studies on ecological requirements of the woodcock during the spring and summer of 1947 were carried on at Cloquet Forest Experiment Station, Cloquet, Minnesota. Censuses of singing males have been conducted in the same area in 1948 and 1949.

2. Woodcock arrive in this area during April.

3. Seventeen "singing grounds" of male woodcock intensively studied were on flat or undulating ground, the size of the clearing varied with height of surrounding cover, the grounds were a mixture of low growing shrubs with grassy openings which were found on recently logged areas, old fields, woods roads, or stream meadows.

4. Broods were found to use pole stands of the hardwood conifer types.

5. During July, August and early September a majority of woodcock

were found in older stands along the stream.

6. A study of the distribution of the earthworm indicated that they were widely distributed in alder and hazel stands. Alluvium and sandy-loams were the more favorable soil types. This distribution was thought to explain the summer distribution of woodcock.

7. Censuses indicate an increase in woodcock singing male populations during the three year periods to a level comparable with more eastern populations as previously reported.

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Busy? Try It Our Way

by

Ruth Self

Last spring ('49) Dorothy Mierow and I, as two busy but fun-loving, vaguely-scientific girls, took on a project of studying a definite area near White Bear Lake during our few off-working moments. If you have read in the **Flicker** about the Cloquet and Houghton Lake Census, the Basspond Census and the Palmer Slough Census, you know that studies such as those mean time and energy put in each day which I suspect few amateur "birders" can afford. There is, however, another kind of census anyone can make —our kind —which when combined with the efforts of others, could give us additional knowledge of our wildlife. And alone, such a project could bring forth a new observation for record.

In our study we merely kept a record on paper of what we saw during our occasional opportunities to observe the birds. As a result we are looking forward to this spring with more anticipation than last as we will have comparisons to make. We will say about April 24, "The Myrtles should be in the Manse Woods this weekend." or "Our Broad-winged Hawks came back at this time last year. Let's go and see if they are around!"

Even in our small study we are becoming increasely engrossed and are discovering how much there is to look for. We try to note the dates our birds first arrive and when they leave, how high the grass or rushes are when tne birds build in them and the various vegetations or woods preferred by each species. We watch to see if they nest and lay eggs on the approximate dates of the previous year and if they are consistent in the number they lay, as is the case of our Broad-winged Hawk We have watched her for two years and each year she has laid only three eggs even though her second and third eggs were removed (both years) soon after being laid. For several days after these eggs were removed she sat on only one egg but apparently did not feel moved to replace her full quota. The reason for the removal of these eggs is explained later in this article.

By jotting down what we saw we now can compare the activities of one season with the following. Should the water level change this year or fire creep into the area or DDT be sprayed, it will be interesting to watch and notice if such changes will affect the activities of the birds or cause them to leave our area. The tree in which our Pileated Woodpeckers nested last year was cut for fire wood this February ('50) and we are watching to see if they will re-excavate nearby or desert the area.

Over a six-week period we made occasional check-ups including four early morning walks and frequent evening stops for brief moments enroute home from work. During this time a total of 58 species including the nests of

ten species were found in or very near our area which is approximately one half mile square and is made up of bits of woods, marsh, water, grass and gravel. This same territory had been our favorite hiking spot for two years, yet we had not been aware of such an extensive and varied bird population.

We suspected Killdeer lived in the old deserted gravel pit but didn't find their nest until this season when we waited in hiding watching for the parent to sit down on her camouflaged nest so that we might know where to spot her imitation stones. We found the eggs in a hollow depression and followed their development through to the hatching of four well-developed, handsome chicks. These young are precocial and are out and away almost as soon as they dry off. The first little fellow to hatch pecked his way through in the rain the evening of May 16. The next morning all were scurrying over the grounds already attempting the use of their funny little miniature wings and showing off their long blue legs. Since the gravel pit is beside the road we travel each day, we found it easy to keep track of this Killdeer family up to the time the young were able to leave for the marsh with the adults.

Near this same gravel area my husband, Morrie Self, made a lucky discovery. While lying on the ground at the crest of a cut, looking down on many dozens of Bank Swallow nest entrances, his foot broke through the sod roof of a Kingfisher's nest cavity. Like the swallows, the Kingfishers excavate their tunnels back and usually up into a bank to a point where they choose to hollow out chambers for the nests. The point at which our pair dug their nest chamber was just under the grass and inches short of reaching the outside world. We removed the sod and found a clean, rather spaciously rounded cavity containing four glossy white eggs laid on bare earth. Morrie replaced the damaged sod roof with a large boulder which we lifted each day to inspect the nest. Three days later, May 6, there were 7 eggs. On this day one parent began incubating and blinked bewilderedly up at us with raised crest when we took her roof away, but she remained quiet as we quickly put her in the dark again. On May 10 we found the tunnel had caved in and the birds had left the nest. We made certain that the nest was deserted by pushing a tiny ridge of earth over the tunnel floor at the entrance to the cavity and after we found this ridge left undisturbed for several days, we removed the eggs for the Museum collection. Just a short time later we saw our same Kingfisher pair tunneling to a new home in the bank close to the old hole.

Not 50 yards from this same bank in an oak-wooded lot we found our Broad-winged Hawk's nest and repeatedly disturbed the peace of the pair by climbing and checking for eggs. Long before we reached the foot of the tree the parents flew about in alarm calling their "squeaky-gate" cry (and to think we have seen strangers walk by that tree and never look up to discover what made the peculiar noise). The Museum of Natural History used this pair in an experiment to determine whether or not the Broad-winged could incubate the eggs and rear the young of the Red-shouldered Hawk. The eggs from the nest of a Red-shouldered Hawk in Pennsylvania were flown here and placed in the nest after all but one of the Broad-winged eggs had been removed, and the Broad-winged eggs were sent to Pennsylvania to be placed in a Red- shouldered nest. The experimental work involving this nest began in 1948 for the purpose of

finding a means to reestablish the Swallow-tailed Kite in Minnesota. It was hoped that Kite eggs taken from nests in the south could be mailed from the far Gulf States to Minnesota and placed in a local Broad-winged nest to be hatched and the young reared by the foster parents. The rare Kite eggs are too valuable to be used in the preliminary experiment so the eggs of a Red-shouldered Hawk from Pennsylvanian and the local Broad-wings are serving the purpose. If any other easily accessible Broad-winged Hawk nests are found, we would be glad to give this poor pair a rest from their two years' of helping with this experiment. Out of a clutch of three eggs on two successive years they have been allowed to hatch one young successfully each year as it has not been possible so far to transport successfully the eggs of the Red-shouldered Hawks.

Early in the morning on April 29 Dorothy and I saw a pair of Wood Ducks fly out of a wooded area. We suspected that they might be nesting so searched for their tree house. Dorothy discovered a dead oak stump about ten feet high with a large opening at the top. The stump was on a slope about 50 feet from the pond. A breast feather stuck to the bark at the edge of the hole caugth our eye, and we excitedly investigated further. We found a nest in the stump cavity with down covered eggs. May 23 we counted 17 eggs under the down. We tried to calculate the day the eggs would hatch for we knew that as soon as the young dried off the female would bring her ducklings out and we hoped to be on hand to watch the jump off. After the female had incubated for 24 days we discovered that all eggs taken out for testing were infertile. Later with the aid of Dr. Breckenridge, we opened the remaining ones only to find all the embryos dead. Perhaps this resulted from two females having laid in the same nest thus interrupting proper incubation. Maybe next year we will find out.

For two winters we had seen Pileated Woodpeckers about our yard so we were not surprised to discover a male entering a hole in the top of a tall dead, barkless poplar pole on the edge of a swamp in our study area. Although Dorothy and I were lucky to have Morrie as official tree climber, not even he dared to climb to the top of this aged spire. We could only be satisfied with wondering what was going on in the lofty nest to attract the Pileated. We often saw the male or female looking out. Finally on the evening of June 17 our hopes were confirmed, for as I drove slowly by from work, looking the poplar over as usual, a smaller Pileated head with a gaping mouth was looking out. My supper was late that night. I waited 45 minutes to see this young one get its supper—a noisy business. During my long wait I was cheered on by the frequent and very loud, rasping, Flicker—like call of the young. There must have been other young, but I never saw more than one. As I sat under a thicket nearby the next morning, I watched this one leave his hole and fly about making a fuss for several hours. The adults were in the area returning the calls and bringing food.

The area I have spoken of is not isolated but near houses and busy roads. Many of us know of some territory near our homes which we could check periodically. In this article, we may not have contributed any new facts to science, but if we have pointed out to some readers how they can better enjoy their bird watching and if we have inspired some to send in notes of interest to the **Flicker**, we will be pleased . . . **Minnesota Museum of Natural History, Minneapolis.**

Christmas Count 1949-1950

by

Bruce Hayward

Again this year many of the ornithologists of the state donned their winter coats, earmuffs, wool socks, parkas, mittens and other means of keeping warm and took to the woods to make the annual Christmas count. December 25—January 1 was set as the official period for the count. Seven groups saw a total of 50 species and 4319 individuals.

Ten species—Common Loon, Canvasback, Bufflehead, Old-squaw, Hooded Merganser, Red-tailed Hawk, Ring-billed Gull, Mourning Dove, Short-eared Owl and Oregon Junco—were not report in the Christmas counts of 1947 and 1948.

It is interesting to note that despite the Snowy Owl influx this year, only one individual of this species was reported. Another interesting fact was that none of the groups saw Mallards in any of the localities censused.

If all persons or groups which conducted censuses would, in the future, send their reports to the museum during the first three weeks of January a much better report could be written. Then, too, a few moments spent recording temperature, time spent in the field, wind direction and velocity, conditions of environment and size of area censused increases the value of the report considerably. This information is particularly valuable in comparing the censuses of different years.

The following reports were received:

Ron Andersen censused the locality around Swan Lake (Nicollet Co.) from Nicollet landing along the shore line, throughout peninsulas and islands. The area consisted of: 80% deciduous woodland, 10% cattail marsh and 10% meadowland. The census was conducted between the hours of 7 a.m. and 4:15 p.m. on December 26, 1949. Weather: sky—clear to slightly cloudy; temperature—3° to 15° to 11°F.; wind—SW 13-18 m.p.h. Ground covered with ½ inch of powder snow, some drifts, some bare ground. The lake was covered with 8-10 inches of ice. He observed 17 species and 217 individuals.

Minnesota Bird Club

As usual, the observations were made in about four square miles of Cedar Creek Game Refuge and the land adjacent to the road leading to the area for a distance of about 13 miles. Composition of area: 35% open farmland, 30% white pine and hardwood, 30% white cedar, tamarack and alder, 5% cattail marsh. Time: January 1, 1950, 9:00 a.m. to 4:00 p.m. Weather: sky—overcast all day; temperature— varied from 38° at 9:30 a.m. to a high of 39° at noon to 34°F. at 3:30 p.m.; wind—S at 14 m.p.h., turning to WSW at 9 m.p.h. at 3:30 p.m. There was no snow except for remnants left after recent thaws. All water areas were frozen. Eighteen observers split into five parties. Total hours, 74 (68 on foot, 6 by car); total miles, 370 (120 on foot,

250 by car). A total of 19 species and 341 individuals was observed. This was a decrease in number of species but an increase in number of individuals over last year's figures. Members participating were: Lewis Barrett, Thomas Bergerud, W. J. Breckenridge, Thomas Breckenridge, William Carlson, Amy Chambers, Mrs. A. D. Corneia, W. R. Hiller, Harold Johnson, D. K. Lewis, Mary I. Lupient, Theodora Melone, Mr. and Mrs. Jerry Paul, John Rehbein, Mrs. Ruth Self, Dana Struthers, Arthur Wangaard and Dorothy Wangaard.

St. Paul Audubon Society

This club undertook two separate counts this year. The first trip was made to Lake Vadnais and the St. Paul Sewage Disposal Plant on December 26, 1949. Eight hours were spent observing between 9 a.m. and 5 p.m. The temperature ranged from 0-10°F. and there was no noticeable wind velocity. A total of 25 species and 993 individuals was seen in these localities this year. The tally for last year was 25 species and 451 individuals. Observers: A. C. Rosenwinkle, Jack Bardon, Herman Brown, John A. Hall Sr., James Haner, G. A. Kibler, R. A. Kortmann, Caroline Larson, Genevieve Pearson, Charles Reed, Robert Smith, Dorothy Sundry, Dr. Vernon Whipple.

The second trip was conducted on December 31, 1949, and covered the Mississippi River between the Armour Plant in South St. Paul and Prescott, Wisconsin. Since complete details were lacking at the time that this paper was prepared, I will only mention it here. However, the report will be published in the Christmas census edition of "Audubon Field Notes."

Minneapolis Bird Club

The census route extended from Minneapolis (Camden Park) to Anoka, including a 10 mile radius on either side of the Mississippi River. The area composition was: 40% deciduous wooded river banks and valleys, 30% farmland, 15% deciduous wooded farmland, 15% suburbs. Time: December 26, 1949, 9:00 a.m. to 5:00 p.m. Weather: Clear, becoming overcast about 10:30 a.m.; temperature—2° to 18° to 10° F.; wind —SE 5-12 m.p.h. Ground frozen and bare of snow. All fresh water was frozen except for a few open spots in the Mississippi River. There were six parties with a total of 22 observers. Total hours, 8; total miles, 221½ (200 by car, 21½ on foot). A total of 21 species and 2106 individuals was seen by the groups. These totals are above those of last year. Observers: Lewis Barrett, Arthur P. Boe, Barbara Boe, Amy Chambers, Dorothy Faber, John Futcher, Brad Gilbert, Peggy Hartfiel, David Himrod, Boyd Lien, Helen Lien, JohnPavek, Wm. Pieper, George Rickert, Mrs. M. H. Rosien, Marvin Rosien, Glen Shirley, Mrs. Victor Smith, Major Charles Snyder, Mildred Snyder, Vera Sparkes, Milton Thompson, Ted Warren.

Duluth Bird Club

This census was conducted from Duluth, along the North Shore to the Encampment Forest on December 31, 1949. A total of 30 species and 1544 individuals was seen on that day. These totals show a distinct decrease as compared with last year's figures.

St. Cloud Bird Club

This group censused the area along the Mississippi River north of St. Cloud, east through Sauk Rapids and near the state teacher's college on December 31, 1949. The weather was sunny and the wind blew hard in open areas. They tallied a total of 11 species and 77 individuals which was less than last year's totals for that area.

The Sisters of St. Benedict who are also members of St. Cloud Bird Club conducted a separate census at St. Joseph, Minnesota.

Table 1.

List of Birds Seen on Christmas Count in 1949-50.

	Minnesota Bird Club	St. Paul Aud. Soc.	Minneapolis Bird Club	Anderson Swan Lake	Duluth	St. Cloud	St. Joseph	Total
Common Loon		1						1
Black Duck						3		3
Canvasback						8		8
Lesser Scaup		1			1			2
Am. Golden-eye		130	350		192			672
Bufflehead					1			1
American Merganser					4			4
Hooded Merganser		1						1
Old-squaw					100			100
Red-tailed Hawk				1				1
Golden Eagle					1			1
Ruffed Grouse	27				10			37
Ring-necked Pheasant	1	18	80	33	2			134
Glaucous Gull					3			3
Herring Gull					663			663
Ring-billed Gull					7			7
Mourning Dove				1				1
Snowy Owl					1			1
Barred Owl		1		1				2
Short-eared Owl				1				1
Flicker			1	1				2
Pileated Woodpecked	1	1	2	1	1			6
Red-bellied Woodpecker			1					1
Red-headed Woodpecker			3					3
Hairy Woodpecker	1	7	12	13	4	2	1	40
Downy Woodpecker	1	6	25	37	40	6		115
Canada Jay					1			1
Blue Jay	66	23	72	7	7	16		191
Raven					3			3
Crow	6	5	15	1				27
Black-capped Chickadee	75	60	124	83	71	5	1	419
White-breasted								

	Minnesota Bird Club	St. Paul Aud. Soc.	Minneapolis Bird Club	Anderson Swan Lake	Duluth	St. Cloud	St. Joseph	Total
Nuthatch	14	6	43	21	1		1	86
Red-breasted Nuthatch	3	2	1		3			9
Brown Creeper	2	2	3	5				12
Golden-crowned Kinglet	3							3
Robin		1			3			4
Northern Shrike	1				2			3
Starling	24	400	20		111	20	3	578
English Sparrow	10	250	1235		138			1633
Meadowlark				1				1
Cardinal		8	10	5		4	2	29
Evening Grosbeak		1			96		14	111
Pine Grosbeak					35	2		37
Common Redpoll	27				8			35
Pine Siskin	45		4		1			50
Goldfinch	27	20	17			1		65
Oregon Junco		1						1
Slate-colored Junco	8	20	25	5		10	12	80
Tree Sparrow	2	25	63					90
Snow Bunting					64			64
Totals	341	993	2106	217	1544	77	34	

Museum of Natural History, U. of Minnesota

Seasonal Report

by

Mary Lupient

Minnesota experienced severe winter weather during January. At times snow and sleet made driving hazardous and the thermometer dropped to as low as 50 below zero in northern sections of the state. It was the coldest January in several years.

December was mild and some species of ducks lingered on the open waters in the Twin Cities. Forty-Blue-winged Teal were observed on Lake Harriet, Dec. 4 by Lewis Barrett. A census of American Golden-eyes was taken at the Plymouth Avenue Bridge in Minneapolis by members of the Museum staff and it was estimated that about six-hundred wintered there. Several flocks of Mallards were reported living in the spring-fed open waters along the Minnesota River. A report dated January 23 by the W. E. Petersons stated that a Wood Duck and a male Hooded Merganser were seen near Lake Vadnais, St. Paul. The Duluth Club saw a Bufflehead on Lake Superior this season and the St. Cloud Club listed eight Canvas-backs for their Christmas Census.

Canada Geese wintered again at Rochester. According to observers there were about one-thousand on Silver Lake February 13.

Eighteen members of the Minnesota Bird Club and six members of the Duluth Bird Club spent February 10 to 13 along the North Shore of Lake Superior from Duluth to the Pigeon River. Several flocks of Old Squaw Ducks were seen, a few American and Red-breasted Mergansers, one White-winged Scoter, a number of Golden-eyes and some Mallards were listed. At one point a Bald Eagle harassed a flock of Old Squaws by diving at them as they came up.

During this field trip the weather was ideal, fair and about freezing. Most of the participants were of the opinion that Ravens and Old Squaws were present in larger numbers than on previous field trips in this area; otherwise, fewer species and fewer individuals were noted. There was about the usual number of Herring Gulls and at Two Harbors a Glaucous Gull was reported by the Duluth Club. Besides the above mentioned species the following were listed for the trip; Downy Woodpecker, Hairy Woodpecker, Pileated Woodpecker, American Three-toed Woodpecker, White-breasted Nuthatch, Red-breasted Nuthatch, Blue Jay, Canada Jay, Black-capped Chickadee, Hudsonian Chickadee, Redpoll, Great Horned Owl, Flicker, Evening Grosbeak, and Tree Sparrow.

Due to the fact that the mountain ash trees were denuded of berries by Robins and other species in migration, Grosbeaks were scarce in the area covered by the trip. During the winter in Duluth about seventy-five Evening

Grosbeaks came daily to a feeder. There was an influx of Evening Grosbeaks in southern, western and central Minnesota, due partly, no doubt, to the severity of the weather in January but the scarcity of food in the north was the main reason for their appearance in such unusual numbers. In St. Paul A. C. Rosenwinkel saw several flocks of Evening Grosbeaks, some of them eating sunflower seeds at feeders. One flock fed on seeds of weeds. Seven Evening Grosbeaks came to the writers yard Feb. 15 to feed on the seeds of a green ash tree. They came twice each day for twelve days until finally every seed was gone. At Mrs. Whiteford's home on the Minnesota River they fed on hackberries and the seeds of the sumac. Pine Grosbeaks were not as abundant. A flock of twenty-five was reported by Lyman Newlin at Walker and the Duluth Club listed thirty-five for their christmas Census. Otherwise, only a few small bands were seen.

Reports indicate that the Ringnecked Pheasant has increased in numbers over the past few years. This was particularly noticable within a twenty-five mile radius of the Twin Cities. Flocks of forty or fifty could be seen frequently.

This winter there was an exceptionally heavy invasion of Snowy Owls. Dr. W. J. Breckenridge stated that eighty-four records were sent to the Museum of Natural History from various sections of the state, twenty-four of them from the Red Lake area and vicinity. Dr. Breckenridge expressed the opinion that although this was a heavy invasion, it would not be possible to say it was the largest that has occurred due to the fact that observers are now more cooperative in reporting than here-tofore. Also there are more observers in the field. In Duluth Mrs. Evelyn Putnam said a dead Snowy Owl was brought in. She also reported two dead Whistling Swans, one of which was brought in last fall by a man who thought he had shot a Snow Goose. The other had died of gun-shot wounds and was found south of Fond du Lac by hunters during Christmas week.

Reports of Mourning Doves came in as follows: eleven near Red Wing, Dec. 15, two in the same locality Jan. 4, 24 at Northfield Feb. 14 reported by O. A. Rustad and the Mankato Audubon Society listed 33 at Swan Lake for their Christmas Census.

A flock of about eight hundred Snow Buntings was seen near Cooper's Corners, 30 miles north of Minneapolis, Feb. 1, by Mrs. Cora A. Corniea. Franklin Willis drove west across the state Dec. 31. He found Snow Buntings, Lapland Longspurs and Horned Larks feeding on the shoulders of the highways in Chippewa, Renville, Nicollet and Steele Counties. In January William Longley saw flocks of these birds along the way from Marshall to the Twin Cities.

Although Horned Larks were reported wintering in the State, the migration began the first week in February. O. A. Rustad stated that they had arrived in small flocks around Northfield February 6. Several observers from around the Twin Cities reported them from Feb. 10 to Feb. 15 and by Feb. 20 they were here in force. Dr. MacCarty of Rochester reports that two Fox Sparrows came to his feeder station for a time during February and that Evening Grosbeaks have appeared there in some numbers this winter.

As usual a few Robins and Meadowlarks remained for the winter. Three Robins stayed at Duluth. A Golden-crowned Kinglet was seen every day at a feeder by Sheridan S. Flaherty, Morris. This report was dated Jan. 22.

A small number of Red-tailed and Rough-legged Hawks lived through the season in southeastern Minnesota and in the valleys of the Minnesota and Mississippi Rivers. There were three records of Goshawks. Two Golden Eagles were observed by William Longley at Whitewater Valley and the Duluth Club saw one on the Christmas Census. About the usual number of Bald Eagles were present throughout the State.

That the Cardinal is still extending its range to the north and west is borne out by this season's reports. One, a male, was seen in January near Walker by Lyman Newlin. During last fall it had been seen almost daily at a feeder. Mrs. J. A. Thabes, Brainerd, wrote to say that a pair of Cardinals had been coming to her feeder all winter. Four Cardinals were listed by the St. Cloud Club at Christmas. O. A. Rustad saw twenty Cardinals at a feeding station near Carleton College, Jan. 26, which may indicate that the Cardinal population is increasing.

A rare visitor, the Oregon Junco, was seen by A. C. Rosewinkle and ten other observers, Dec. 26, at Lake Vadnais Forest near St. Paul. It was with a flock of Slate-colored Juncos and was observed again Jan. 4.

Another remarkable record was that of an American Magpie that appeared at a feeder owned by Mrs. Williams in South Minneapolis. At the time of this writing, March 1, it is still stopping at the feeder regularly . . . **Minneapolis, Minnesota.**

COOPERATIVE DOVE STUDY

Here is an opportunity to contribute observations and in so doing to add to our knowledge of an easily recognized, readily accessible and interesting bird—the Mourning Dove. Ten south-eastern states initiated an intensive study of the Mourning Dove in 1948. Each state has employed a trained biologist as dove project leader who is following an outline suggested by the Fish and Wildlife Service. Since the dove is migratory from southern Canada to Mexico, however, the complete picture of the life of this species cannot be obtained solely within those ten states. Observers in this region can help much by noting carefully such things as the following: location and number of all dove nests; number of broods raised; total production of young; nesting season; movement of juveniles and adults and wintering populations.

Anyone desiring more detailed information concerning methods of conducting these kinds of studies should write to: Harold S. Peters, Fish and Wildlife Service, Glenn Building, Atlanta, Georgia.

Observers may send their observations to the Museum of Natural History at the University of Minnesota for forwarding to the headquarters of this dove study.—**D.W.W.**

NOTES OF INTEREST

BRUSH WOLVES WERE THERE, TOO.—Not far from Soudan, northeast on Highway No. 1, there is situated a beautiful spruce-tamarack bog with a setting of sphagnum moss with dark-watered pools, and the rich heath and orchid flora with many other plants characteristic of such habitats. On the last midsummer day, June 21, 1949, as I stopped there to collect plants, I walked directly into a large colony of the rare Lapland buttercup **(Ranunculus lapponicus).** Searching the accessible parts of the bog for other species, I could not endure the attacks of the blackflies and mosquitoes long enuogh for individual collecting small plants, so I scooped them up in masses of moss and soon filled the vasculum. The sunlit enclosures, stifling still and humid, reverberated with glorious songs of Veery, Hermit Thrush, Scarlet Tanagers and White-throated Sparrows. The tall trees seemed alive with twitter and flutter, and I did recognize the songs of Blackburnian, Myrtle and Canada warblers. There were Ovenbirds and Chestnut-sided Warblers, too. Working my way toward the road I was attracted by a peculiar prolonged whistling sound as if someone were blowing breath between tightly compressed lips, but the sound was fascinating, almost musical. I thought of Woodcocks, wood frogs and the snake that buried itself in the sphagnum border of the pool on the brink of which I was standing but there seemed to be no reasonable source of the sound, so I hurried to the road.

The breeze in the open sunshine cleared the air of insects. As I worked at my car, separating plants from mosses for pressing, I became aware of a wolf on the side of the highway on my side of the swamp about seven hundred feet away. It was sitting up in dog-fashion watching the road in each direction. Assuming that it emerged from the swamp where I had been, I studied it through glasses for a better view. Suddenly it dropped out of sight into the swampy vegetation. Soon on the highway appeared a car passing the hiding wolf and me. From my position I could not see the oncoming cars due to a slight elevation on the road. Within a few moments the wolf stood up again on all four legs, looking and listening cautiously, but seemingly paid no attention to me seated on the fender of my car with an open door. As it disappeared again, a car appeared and sped on toward Ely. Twice more the wolf appeared and disappeared, each act followed by speeding motorists unaware of the drama I was witnessing. The fifth time the wolf leaped to the middle of the highway, looked and listened as before; then suddenly looked back toward its hiding place with a beckoning motion of its ears. Up jumped a half-grown cub and ran across the road on gangly legs. The parent remained on guard motionless until the cub disappeared into rocky pine woods; then the parent followed. After seeing the cub, I understood that the disappearing acts with such precaution were for the safty of the young. Naturally I speculated whether or not the whistling I had heard eariler was that of an anxious mother coyote.—**Olga Lakela, University of Minnesota, Duluth Branch.**

IVORY-BILLED WOODPECKER SEEN IN APALACHICOLA RIVER SWAMP AREA IN FLORIDA—The rare, almost-extinct Ivory-billed Woodpecker, largest of all North American woodpeckers, was observed in the Apalachicola River Swamp area of northern Florida on March 3 and 4, 1950. The field group who participated in this adventure were as follows: J. E. Rowe and Fred Dye of Fort Lauderdale, Florida, John Dennis of Gaineville, Florida, M. L. Kelso of Blountstown, Florida, Eugene Coppedge of Silver Springs, Florida, and the author of Minneapolis.

The birds were located in a 13,000 acre tract of swamp and upland timber. They were feeding on grubs beneath the bark on white ash and long leaf yellow pine. We saw one male and one female, although it is quite probable, on account of the extensive workings observed by the field group. that additional birds are living in the area studied. A pair of Ivory-bills had been seen by one member of the party in the same area in December 1949.

The area suitable for sustaining life of the Ivory-bill along the Apalachicola River and tributaries is quite extensive. There is at least a million acres of land in this area and adjoining areas which is in part suitable habitat for the species. The timber and swamp land areas of the region are largely owned in large tracts. The lumber interests are doing an intelligent job of selective cutting, and some reforestation is being carried on. Some of the large parcels of land are set aside as private hunting grounds.

According to the Tanner Report of the National Audubon Society, published in 1942, there were four areas mentioned as being capable of supporting Ivory-bills; i.e., the Singer Tract in Louisiana, the Sentee River Swamp in South Carolina, the Big Cypress Swamp in Florida and the Apalachicola River Swamp country in Florida. The author, together with Edward Rowe, Fred Dye and George Espenlaub of Clewiston, Florida, studied the Big Cypress Swamp area in March 1949 but found no evidence of Ivory-bills.

It is the author's opinion after spending a week in the Apalachicola River region that the area is large enough to support several pairs of Ivory-bills. The real menace to the Ivory-bills in this region is the promiscuous shooting for food by the irresponsible and uninformed natives. The natives do not seem to realize that the Ivory-bills are near the point of extinction.

If a sufficient number of the larger lumber tracts in this area can be set aside as game preserves or protected sanactuaries to prevent hunting, it seems reasonable that this area is capable of supporting a substantial number of Ivory-bills for some years to come.— **Whitney Eastman, Minneapolis, Minnesota.**

BALD EAGLE "STOOPS" ON OLD SQUAW DUCK.—One of the highlights of the Minnesota Bird Club's annual winter expedition to the North Shore of Lake Superior occurred on February 12, 1950 near Casacade State Park. Eariler in the day we had favorable opportunities to study Ravens, Canada Jays, Herring Gulls, Pileated Woodpecker, Golden-eyes, Red-breasted Mergansers, and American Mergansers. North of Grand Marais we spotted a Bald Eagle along the lakeshore. We saw this bird several times at some distance so that it could not be observed to advantage. Many of us were hoping to get a better view of our national bird

After leaving Cascade State Park we traveled south about a mile along the lake when we stopped to observe some Old Squaw ducks. There was a concentra-

tion of approximately 800 Old Squaws in a bay that was open or free of ice in close to shore. This was the seventeenth flock of Old Squaws that we had observed on our two day birding expedition. Here was a splendid opportunity to make some studies of the diving and flock behavior of these intriguing waterfowl. We observed these ducks for possibly a half hour through a 20 power spotting scope. Suddenly from the north a Bald Eagle appeared on the scene Through the spotting scope we had an excellent view of this majestic bird. The white head and tail and the yellow feet could be observed to advantage. As the eagle circled over the Old Squaws, flocks of the ducks took off from the water in flight. Suddenly the eagle plunged swiftly downward toward an Old Squaw that remained on the water. However, before the Bald Eagle could seize its intended victim the Old Squaw had submerged. The bird of prey reconnoitered and made another circle, but most of the remaining Old Squaws took to the wing and moved out into the lake. After the unsuccessful "stoop" upon the Old Squaw the Bald Eagle departed, and in our car we followed it for several miles as it flew parallel to the highway.—**Lewis L. Barrett, Minneapolis, Minnesota.**

A MOCKINGBIRD AT FARIBAULT.—Shortly before Christmas I had my first glimpse of a mockingbird in this locality. This observation was made on December 22, 1949, when the bird came to our feeding station. My husband had been seeing the bird regularly during the previous week. Throughout the Christmas holidays it was a frequent visitor to the food tray and, although I have not seen it since, I am not at home between 8:00 and 5:00 p.m., the hours in which it usually makes its appearance.—**Mrs. Charles MacKenzie, Jr., Faribault, Minnesota.**

The Wilson Ornithological Club Library

Many members of the affiliated clubs of the M O. U., many of whom are or should be also members of the Wilson Club, are not aware that the Club maintains an excellent library of some 400 books and more than 4000 pamphlets. These are housed in the Museum of Zoology at Ann Arbor, sharing a part of the Library of the Division of Birds. Members of the Wilson Club have the privilege of using these library facilities, either at the Museum, or by borrowing books or needed items through the mail. The library is particularly helpful to persons who do not have ready access to such facilities, and who need a special paper for some investigation, or who merely want to read a new book they cannot afford.

In addition to sharing in the benefits provided by the library, members of clubs in Minnesota can help the Wilson Club in several ways. Be sure, first of all, that the library receives a copy of all your publications on birds. Advise your friends to donate ornithological items to the library. There is also a book fund for the purchase of new books, and any donations in money, large or small, help to keep the library up to date. Details regarding borrowing or donating can be found in the June, 1949 Wilson Bulletin. Let's keep this really worthwhile library service functioning.

Dues to the Wilson Club are only $2.00 per year. You may join easily. For correct procedure or details about the Club and its publication write to: Dr. Olin Sewall Pettingill, Jr., President, Carleton College, Northfield, Minnesota or to Dr. W. J. Breckenridge, Second Vice-President, Museum of Natural History, University of Minnesota, Minneapolis.— **D. W. W.**

State Bird Election

Your attention is called to the voting in progress on an official state bird for Minnesota. School children during the past winter have been studying the qualifications of the 20 birds comprising the preliminary list of candidates. Recently the following final list of eight candidates was publicized:

Loon	Mourning Dove	Scarlet Tanager
Wood Duck	Belted Kingfisher	Rose-breasted Grosbeak
Killdeer	Pileated Woodpecker	————(Additional Choice)

Voting by sportsmen's groups, garden clubs and other organizations as well as interested individuals is invited although the balloting by the schools will be kept segregated in the final report. Ballot forms have appeared in many state newspapers during the past few weeks. All the clubs affiliated with the M.O.U will certainly want to express an opinion on this subject. Summaries of voting should be sent to the Minnestoa Museum of Natural History, University of Minesota, Minneapolis 14, before May 15.

AMERICAN ORNITHOLOGISTS' UNION MEETING

The Local Committee is already at work on arrangements for entertaining the American Ornithologists' Union on the campus of the University of Minnesota in Minneapolis during the week October 9—13, 1950. This will be a fine opportunity for M.O.U. members to meet personally many of the ornithologists whose names are familiar through bird publications and lecture programs. Hear their papers on their favorite topics. More interesting yet, hear their comments on or discussions about the papers of other speakers or discuss with them your own interests.

We are hoping that each M.O.U. affiliated club in the State will be well represented at this meeting Detailed outlines on the events scheduled for the convention will be sent to each member of the affiliated clubs and to each member-at-large before the date of the meeting. Be sure to red pencil October 9—13 for this event.

The local Committee wants to thank those clubs and individual members who have so generously contributed already toward the fund needed for sponsoring this national convention. May we remind those clubs and individuals who are not yet members of any local club who have not yet contributed that our financial obligations are considerable in handling this meeting. We will appreciate having your contributions sent to Mrs. Mary Lupient, Treasurer, 212 Bedford S. E., Minneapolis 14, Minnesota before May 15, 1950.—Local Committee on Arrangements:

Walter J. Breckenridge, Chairman
Milton Thompson, Vice-Chairman
Mrs. Mary Lupient, Secy-Treas.
Amy Chambers
J. F. Clements
Whitney Eastman
Harvey L. Gunderson
R. A. Kortmann
Donald K. Lewis
Mrs. Gottlieb R. Magney
Theodora Melone
Warren Nord
Olin Sewall Pettingill, Jr.
Dwain W. Warner
Vernon Whipple
Mrs. Malcolm M. Willey

MINNESOTA ORNITHOLOGISTS' UNION

Annual Meeting May 13, 1950, Minneapolis, Minnesota

SCHEDULE

Registration	8:00—12:00, Lobby, Minnesota Museum of Natural History
Field Trips	Minnesota River bottomlands or Thomas S. Roberts Bird Sanctuary
Smorgasbird	12:00, University Lutheran Church of Hope. 601 13th Ave. S.E., Minneapolis
Afternoon Meeting	2:00, Auditorium, Minnesota Museum of Natural History
Evening Meeting	8:00, Auditorium, Minnesota Museum of Natural History

AFTERNOON PROGRAM

BUSINESS MEETING

PAPERS:

1. Bird observations on the Sucker-Vadnais area, St. Paul, Minnesota ..... A. C. Rosenwinkel
2. Comparison of two years of bird census work at Cedar Creek Forest ..... W. J. Breckenridge
3. Effects of a prairie fire on nesting birds at Palmer's Slough, Brooklyn Center, Minnesota ..... B. J. Hayward
4. The Yellow-throat's greatest enemy ..... P. B. Hofslund
5. Waterfowl banding in Minnesota ..... F. B. Lee

EVENING PROGRAM

THE HOMING PIGEON

A. C. Wangaard

The breeding, training and flying of homing pigeons, and the part they played in the war.

Some of the Twin Cities Bird Clubs have scheduled a field trip to Frontenac, Minnesota, on May 14, 1950, to see the warbler migration. Anyone attending these meetings and wishing to make this trip may contact the field trip chairman during the meetings on Saturday, May 13.

The hosts for this meeting, The Minnesota Bird Club, welcome you to this program with the hope that it will be both pleasant and profitable.

Bibliography of Wilson's Snipe

Capella gallinago delicata

by

Arnold B. Erickson

The last legally shot Wilson's snipe were taken from a dwindling population in October of 1941. For eight long years snipe hunting, which for a few hunters had almost been an obsession, has been a sport of the past. The season was closed by the U. S. Fish and Wildlife Service in 1942, and the birds were all but forgotten as far as a positive program was concerned. True, they were mentioned in the annual inventory reports on migratory birds by the Fish and Wildlife Service from year to year, but no serious attempt was made to study the why and wherefore of their decline. The more important ducks being something larger to shoot at and certainly more than a mouthful to eat had refuges built for them, men assigned to study their breeding habits, their migrations, and the factors tending to reduce their numbers. Many a university student wrote his master's or doctor's thesis on the life ihstory of this or that species of duck. And Federal and State biologists were finding new ways to save and increase the duck crop and to perpetuate the sport of wild fowling.

Only for the jacksnipe no one seemed to have the time or money, and that is understandable. It is a difficult bird to work with, of widespread but erratic distribution, wild, wayward, and circumspect. Now after almost a decade of closed hunting seasons, the Wilson's snipe, according to Federal authorities may have come back enough so that once again it may be placed on the hunting list. In the meantime, we have lost eight precious years of research time that should have been and might have been devoted to acquiring an insight into the life history and ecology of this bird.

As a biologist, I am as much at fault as onyone in letting the jacksnipe and future would be snipe hunters down. I began a life history study of this bird in 1939, but various circumstances drew me into other activities after I had completed only a small part what I had hoped to do. Most of the work that I completed appeared as brief notes or articles in several publications. There only remains as a part of this work, a bibliography of 250 items that has not been made available for the general use of ornithologists and others interested in the preservation and increase of this unexcelled game bird.

The bibliography was compiled with the aid of the matchless collection of books, current periodicals, and obscure bird journals in the possession of the late Thomas S. Roberts, then Director of the Minnesota Museum of Natural History, University of Minnesota. Most of the compilation was made between 1939 and 1942. The bibliography has been kept up-to-date.

There is much information in the abundant, but for the most part miscellanous writing on the Wilson's snipe in North America. The compilation and study of this literature can carry one far in rounding out a generalized life history of the species. Much field work, however, especially on nesting grounds where birds are abundant, is necessary to complete and consolidate our knowledge of the life history of this bird. We need to pay particular attention to the effect of habitat changes and hunting pressure on snipe. We need also to know more about census techniques that will give us population trends so that better hunting regulations and better control of hunting may be put into effect, if and when the species is again made legal game.

The foreign literature on the European snipe (**C. gallinago gallinago**), of which only a few items are included in the present bibliography, should not be overlooked. It undoubtedly contains vital information applicable to our American sub-species of snipe, information that could shorten by days and perhaps months needlessly intensive study and field work.

Some of the items in the present bibliography are briefly annotated. Whenever the contents of a particular article, however, are clearly indicated in the title of that article, annotation is omitted.

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Summer Bird Life Of Carimona Woods Fillmore County, Minnesota

by

Dwain W. Warner

The people of the state of Minnesota have long been active in preserving lands for the welfare of the public. These have been in the form of forests, sanctuaries, parks and smaller recreational areas. Some have been set aside for their scenic beauty and natural history interest alone. In most cases, however, we have been too late so that only small remnants have been saved. Without much exploring we may easily see that most remaining areas are disappearing at an ever increasing rate.

To keep pace with man's growing interest in the out-of-doors and with the increase in our population we must search even more for suitable areas and must vigorously pursue our efforts to preserve them not only for the benefit of man but for all of the animals and plants and even the soil which go into the make-up of "primitive areas."

Fortunately, several sizeable and relatively undisturbed tracts remain. Through the wisdom of past and present owners the trees still stand tall against the sky and shade the understory where new saplings struggle for space and sun, and humus lies deep and only deer browse on the tender twigs. Yet, some of us hesistate to strive to save "just a patch of woods" that has no magnificent falls, great cliffs with a view or a placid lake. But there are other things than these which are as spectacular to man's eye and which are of even greater importance to the animals and plants fighting to remain in a region where fire, axe and plow are driving them out forever.

In the following pages I have described briefly the summer bird life of one area. This has been done in an effort to show that a well balanced bird population still remains in a relatively small unit surrounded by lands under intensive cultivation. This is the region known as Carimona Woods which is located along the south branch of the Root River about four miles southwest of the old town of Carimona in Fillmore County. The settlement nearest the most extensively

wooded area is known as Forestville, existing today, however, as one inhabited farm, an abandoned farm and a red brick general store now boarded up and long since unused.

The valley floor between the two settlements averages a little less than one-half mile in width and is quite flat. Almost all of this land is under cultivation with lush growth of clover and timothy the principal crop. Small grains, some corn and heavily grazed, open-wooded pastures cover the remainder of the valley floor except for isolated areas of brush and weeds. Rising gently for the most part but quite steeply in others the sides of the valley break away to the nearly level uplands several hundred feet above the river. A half mile above Forestville the valley becomes narrower and the walls are vertical. Here, bedrock, perforated with numerous small caves and crevices is exposed.

It is along the sides of the valley and adjacent upland where the mature forests of several thousand acres remain. The most extensive of the timbered area lies in the immediate vicinity of Forestville. For the most part it is a maple-basswood type forest but oaks, walnut and butternut are common. On shallower soil, particularly along the upper edges of the valley sides, are a few white pines. About a half mile up the river from Forestville this pine occurs in an almost pure stand one-half acre in size. Elm is the dominant tree of the flood plain woods along the river.

Although timber cutting and grazing are still taking place in much of the remaining forested areas, both are at a minimum today. For the most part lumbering is selective and grazing is limited primarily to smaller woodlots and to a smaller number of livestock than is usually the case.

The area remains as a relatively isolated remnant of a once much larger unit of forest which was surrounded by prairie. Within its bird life are species that are present today only because the forest still retains its original character. A number of species, among them the Tufted Titmouse, Blue-winged Warbler and Red-bellied Woodpecker, are representatives of that group of birds which has rather recently invaded Minnesota from the south and east. These species seem not at all out of place here because many plants and species in all other animal groups together indicate an ecological unit more southern in character than those found only a little farther north. To formerly more common species such as the Ruffed Grouse, Pileated Woodpecker, Cooper's and Red-tailed Hawks the area now represents a sanctuary for the few individuals remaining.

The observations upon which this report is based were recorded June 16-28, 1948, as a part of the field studies on birds and mammals by the Minnesota Museum of Natural History. Other members of the party were Harvey L. Gunderson and Bruce Hayward. The area studied intensively was the forest adjacent to Forestville but daily observations were made in the nearby uplands and along the roads between Forestville and Carimona and Carimona and Preston. All species noted in the region are discussed; the notations represent considerable condensation and selection from my field notes.

Herons

Lack of water except for the Root River in this well drained country precludes the presence of many water birds. Of this group I saw only the Great Blue and Green Heron. Each

was observed singly, the former four times and the latter twice.

Birds of Prey

The one buzzard, five hawks and two owls that I found, though not abundant, added much of interest and beauty to the area. Their presence goes far to help round out the picture of proper balance that one finds in "natural areas."

At least one pair of Turkey Vultures made the region its hunting ground. Occasionally a pair or single birds rode the air currents high over the valley and surrounding hills. Though nesting sites are readily available among the numerous ledges and crevices of the cliffs no nest has been found recently. However, Mr. Ralph Barber who had lived there many years stated that 15 or 20 years ago he had climbed to a nest on the cliff nearby and that a pair had made the area its summer home for many years.

Sharing the air over the valley with the vultures were Red-tailed Hawks. I noted several pairs along eight or nine miles of valley. All were in adult plumage.

A pair of Cooper's Hawks lived in the woods east of Forestville. I noted them first just after the very wet dawn of June 18 as I sat on a log in the dense forest at the edge of a ravine attempting to lure within view an inquisitive but shy Tufted Titmouse. As I sat there making squeaking sounds, my first startled but curious visitor was a Barred Owl that flew directly at me from across the ravine. From its perch on a small branch not six feet from my face this bird with the continuously amazed facial expression leaned far forward and with bobbing head and slightly swaying body scanned me from head to foot before flying to another perch 50 feet away. Before the owl flew a pair of adult Cooper's Hawks circled overhead and perched for several minutes in the tops of nearby trees. The hawks were more wary but just as curious.

Other hawks noted were the Sharp-shinned (one), Marsh (one) and Broad-winged (seen twice).

Perhaps several pairs of Barred Owls lived in those woods for on the night of June 16 three called to one another for several hours. A few nights later we heard a high pitched, wiry squeal coming from two birds near our camp. Our attempts to locate the birds were not rewarding the first night but the next night I collected one of the two. It was a juvenile Barred Owl in postjuvenal molt. Examination of the crop and stomach revealed a full meal of fish, crayfish, beetles and grasshoppers!

I saw no other owls but occasionally in the evenings or during other hours of darkness a pair of Great-horned Owls hooted intermittently.

Upland Game Birds

Ruffed Grouse, though not common, were still present in the denser forests adjacent to Forestville. On the rainy morning of June 24 an adult crossed the road ahead of our car a few hundred yards from that 'town' and on June 20 Gunderson heard one drumming a half mile to the southeast.

In the numerous brushy and weed grown patches which dot the valley floor and sides Bob-white were common. No broods were seen but males were heard calling each day, mostly in the mornings but often during late afternoon.

Ring-necked Pheasants were only fairly common according to my observations but I made no special search for them. I noted a number

of adults of both sexes along roads during rainy weather. On June 17 I saw a hen with a brood of six young only one-fourth grown.

Shorebirds

On the sand bars and pasture at Forestville lived a pair of Killdeer that had well grown young on June 23. A pair of Spotted Sandpipers inhabited several hundred yards of the stream banks a short distance down the river.

Mourning Dove

Mourning Doves were by no means common. I saw pairs or small groups of three or four birds each day but these were widely scattered.

Cuckoos

The Yellow-billed and Black-billed Cuckoos were both present but the latter was the more common. A female Yellow-billed collected on June 27 contained an egg ready for laying. I heard this species in only three localities but the Black-billed Cuckoo called from a considerably greater number of places.

Goatsuckers

Whip-poor-wills called from two localities during six nights of our stay at Forestville. I saw or heard no Nighthawks except at Preston where single birds appeared over the town on three different nights.

Chimney Swift and Hummingbird

Three to five pairs of Chimney Swifts lived in the chimney of the abandoned farm at Forestville.

Ruby-throated Hummingbirds were abundant throughout the woodlands and were especially noticeable about flowers in the hay fields and along the roadsides. They made good use of the fresh drillings of the Yellow-bellied Sapsucker, too. On the morning of June 20 I watched two males and a female feeding at one time from fresh holes in a white birch During the next 20 minutes individuals came and went five times and left only when the sapsuckers returned.

Kingfisher

I saw only two pairs of Belted Kingfishers along the river, one at Forestville and the other at Preston.

Woodpeckers

This family, represented by seven species in the area, was one of the most obvious groups of birds, though the species were not equal in numbers and all did not inhabit the same areas. Flickers were not nearly so common as about the Twin Cities although a few pairs lived along the edges of the woods and in the open-wooded pastures. I saw none in the dense forest.

The Pileated was common. A family group of two adults and three fully grown young spent most of each day within 200 yards of our camp. Much of the time the birds were on the ground where the young followed the adults and begged for food.

The Red-bellied Woodpecker was the most ubiquitous of the group. I encountered four pairs in a mile walk along the river at the edge of the forest. Accompanying two of these pairs were nearly independent young. Not all had nested so early, however, because on June 24 I observed a female feeding three young which had apparently left the nest that day.

In more open country the Red-headed was a conspicuous but not common woodpecker. I observed several near Carimona, a pair at Forestville

and another pair less than a half mile downstream. No young had yet appeared but I watched adults carrying food to nest cavities. These observations indicate that this species nests considerably later than the Red-bellied Woodpecker.

Within the forest a pair of Yellow-bellied Sapsuckers had raised a family by June 20. On that date I saw a pair with one fully grown young feeding high in a white birch and sharing the sap with the hummingbirds.

Downy and Hairy Woodpeckers appeared in about equal numbers and both were common. Both inhabited forest and edges of woods but the Downy seemed more common in the denser woods and the Hairy more prevalent near the edges of large tracts. I noticed no antagonism between the two species even on the two occasions when both species appeared on the same tree. Each had well grown young out of the nest.

Flycatchers

Six species of flycatchers occurred in several diverse habitats and varied much in the numbers of pairs of each present. I saw only two pairs of Eastern Kingbirds, one on the uplands north of Forestville and the other near the river at Carimona. The Crested Flycatcher on the other hand was common in small groves, open woods and dense forest. We saw no young but often watched adults carrying food to nesting holes.

I observed the Phoebe in only two places. One pair had a nest containing four eggs on June 20. The nest was attached to the side of a low stone culvert only 34 inches high near Carimona. The second pair lived at the abandoned farm. In the brush close by this farm lived one of the two pairs of Alder Flycatchers that I saw in the area. The other pair inhabited a brush-covered bar at a bend in the river about three miles to the southwest.

Although nearly identical to the Alder in many respects the Least Flycatcher differed markedly in its nesting habitat. I discovered six pairs within a half mile radius of Forestville. All were in small, fairly open glades in the second growth aspen and oak woods. None was nearer to the edge of the woods than 300 feet.

The Wood Pewee was one of the most common birds of the woodlands. Unlike the Least Flycatcher it inhabited all types of woods from mature oak and maple-basswood forest to fairly young second growth and did not restrict itself to openings in the timber. Except during days of continuous rain the birds called almost incessantly, often far into the night.

Horned Lark

We noted no Horned Larks in the valley and saw single birds only twice in nearby uplands.

Swallows

Of the four swallows observed only the Rough-winged was present in any numbers. Six pairs nested in a dirt bank by the river at Forestville, three or four pairs in the crevices in a stone bridge three miles upstream and a single pair had a nest in a hole in a dirt bank in the uplands three miles north of Forestville. Between Carimona and Preston I noted small groups of two to ten birds.

Other swallows were rare. I saw a dozen Bank Swallows at Forestville on June 23, a pair of Purple Martins at Carimona and a few pairs of Barn Swallows near a number of farms along the valley.

Crows and Jays

The Blue Jay, although present in some numbers throughout the woodlands, was shy and nearly silent during the survey period. I noted adult and immature Crows singly or in groups of three or four feeding in pastures or freshly cut hay fields but did not find it in numbers one might expect in such favorable habitat.

Chickadee and Titmouse

The Black-capped Chickadee was not common. Three of the four pairs that I found were feeding young as large as themselves. Broods contained one, three and four young.

The Tufted Titmouse, one of the quite recent arrivals in southeastern Minnesota, was well established as a breeding bird. Though not obvious in color or song and shy and retiring at that season, it announced its presence by chickadee-like calls whenever I entered the three localities where pairs lived. All of these pairs were in dense woods near the river east of Forestville.

White-breasted Nuthatch

This bird was one of the most common and obvious species both in deep woods and sparsely wooded pastures. In about one square mile of woods I counted six family groups. These families of two to four young each were quite sedentary. One family of four young was seen on the same tree on four consecutive days although the young could fly fairly well.

House Wren

All but one of the five pairs of House Wrens that I found were in small open places in the woods. These openings were similar to those inhabited by the Least Flycatchers but were readily distinguishable by the presence of brush piles, dead stubs or tangles of fallen logs. The other pair of wrens busied themselves about the abandoned farm.

Catbird and Thrasher

The Catbird was abundant throughout the 5 to 25 foot high cut over areas and roadside brush. Three nests discovered on June 19 in a 400 yard walk through the dense brush of a pasture contained 4, 4 and 3 eggs. The Brown Thrasher on the other hand was rare. My only records were those of a single bird near Forestville and a pair beside the bridge at Carimona.

Thrushes

The Robin was uncommon. My observations indicated that probably not more than one pair and their brood of at least two young lived in the area about Forestville.

Within the forest east of Forestville I heard and observed the Wood Thrush in five different places. Song was sporadic and the birds were extremely shy.

Bluebirds with their broods were a common sight along the valley.

Gnatcatcher

The Blue-gray Gnatcatcher, although not easily located, was fairly common in the dense woods. I saw and heard birds almost every day in at least three areas in a narrow strip about one-half mile long at the base of the hill east of Forestville. I found no nests but on June 19 saw one carrying food.

Cedar Waxwing

This species was common, occurring in flocks of 3 to 8 individuals from June 16-19. After the latter date most observations were of pairs. This breaking up into pairs was spectacularly

abrupt and occurred in two or three days although flocks had been becoming smaller for some time previous. On June 24 a pair began building a nest in an almost horizontal 3- branched crotch 15 feet up in a boxelder at the abandoned farm. The pair carried long, dead grasses from a path 100 yards from the nest site. Heavy rains may have interrupted their building activities because on June 27 the nest was not more than half finished.

Migrant Shrike

A pair of these shrikes had three young out of the nest on June 22 on the uplands three miles north of Forestville. A similar distance south of that "town" I saw a single adult on June 25.

Starling

The Starling was fairly common at Preston and Carimona. Small flocks of adults and young wandered about the pastures and hay fields.

Vireos

None of the three vireos present was at all common. However, the almost continuous rain combined with the late June period of observation may have been contributory causes to diminution of song which in turn may have given an inaccurate picture of their numbers. I heard Red-eyed Vireos in not more than five or six localities and the Yellow-throated in not more than three or four. My total notes on the Warbling Vireo were of one bird heard three miles southwest of Forestville.

Warblers

In breeding pairs the six species of this family which were nesting in the area far outnumbered those of any other group.

One of the most common was the Blue-wined Warbler until now scarcely known in this state. It inhabited mature dense forest, second growth woods, cut over areas, dense brush and small patches of grass and scattered brush adjacent to woodlands. Males were in song in all of these places and the breeding season was well advanced. A nest found on June 18 contained three young which left the nest the next day. I found well feathered young with short tails accompanying adults in a number of localities.

The Yellow Warbler was very common in all brush areas and was abundant in the low, tangled raspberry thickets on the hillside above the abandoned farm. In several places this species shared the same brush clumps with Blue-winged Warblers.

In the forest above the river where the valley sides break away to upland a few old, white pines still stand. In that narrow strip and only near the pines I found the Cerulean Warbler a locally common species. Males, as many as four at one time, sang early in the mornings between rains.

The Ovenbird was abundant in mature and second growth woods. Although song dropped off considerably during heavy rains and cooler periods, it was the most noticeable sound heard during the day and sometimes even at night.

Without doubt the Redstart was the most abundant bird in the woodlands. I noted as many as three males at one time in a single small area. These birds showed no antagonism toward one another even when two males found themselves in the same small tree. A nest found on June 19 contained one Cowbird almost ready to leave the nest.

English Sparrow

This bird was common about farms throughout the area and appeared in flocks on roadsides and fields.

Blackbirds, Orioles, Etc.

The Bobolink was not common, especially in view of the abundance of hay fields. I noted no more than four males along ten miles of the valley and only a single male in the upland.

Both Eastern and Western Meadowlarks were present in the region but each was found to be quite distinct from the other in its choice of habitat. The Eastern was restricted to the valley while the Western was found only in the uplands.

The Red-winged Blackbird was absent from the Forestville area. About Carimona and Preston flocks of 40 to 50 birds wandered about the countryside, often in company with smaller numbers of Bronzed Grackles. These were the only Grackles seen.

Orioles were uncommon. Gunderson saw a single adult male Orchard Oriole at Forestville on June 19. The only Baltimore Orioles seen were two adult males, one at Carimona and the other at Forestville.

The Cowbird was common in the pastures and fields where groups of adults came to spend each day. Young Cowbirds were still with foster parents.

Scarlet Tanager

The Scarlet Tanager occurred in at least four widely separated areas in about two square miles of forest. The bird was difficult to find, however, because song was at a minimum.

Finches and Sparrows

Only five of the eleven species of this family which were found in the area were at all common.

The Cardinal, found in abundance in all cut over and second growth stands, had had considerable success with an earlier nesting period. An immature male observed on June 25 was already about half through the post-juvenal molt. However, nestlings were found as late as June 24.

Indigo Buntings inhabited the same general areas as the Cardinal but were most abundant in low brush. Three young left a nest near our camp on June 20. Near that nest on June 27 I collected a female that had an egg in the oviduct.

The Dickcissel was the bird most typical of the hay fields of both the valley and upland but was perhaps twice as numerous in the lowlands. Females were not in evidence but males perched at intervals along the wires were conspicuous.

The Goldfinch and Chipping Sparrow were the only others of this group which I found in numbers. The former, showing no signs of nesting, traveled about in small flocks of 4 to 20 birds The Chipping Sparrow, too, appeared in small groups but these were families with young already on the wing.

I encountered the Savannah, Grasshopper and Field Sparrows at one place each. The first two were on the upland and the latter in a brushy pasture on the north side of the valley. A short distance from the Field Sparrow I found a single Rose-breasted Grosbeak, the only one seen. Although the Song and Vesper Sparrows were observed a number of times, neither was common.—**Museum of Natural History, University of Minnesota, Minneapolis.**

Prairie Fires and Nesting Birds

by

Bruce Hayward

This paper constitutes a condensation of a study in introductory bird ecology undertaken during the spring of 1949 as part of the course in ornithology at the University of Minnesota. The purpose of the project was to select an area and to study the bird ecology of that area throughly. Midway in the project the plot which had been selected caught fire and a large majority of the habitat was destroyed. Because of this the scope of the report was changed to a study of the effects of burning upon the bird life.

This report was a group project conducted by John Jarosz, Ernest Mulch and the author. A total of 151 man hours was spent between April 3 and May 13 in a section of Palmer's Slough, Hennepin County, Minnesota.

This area is located two miles northwest of the Minneapolis city limits and one and a half miles west of the Mississippi River on Hennepin County Highway 130. Palmer Lake was once a fairly large shallow lake. Gradually the water level receded and today most of the lake is slough with only a few small ponds left as remnants of the deeper portions of the lake. The entire slough is approximately 30 acres in size.

The depth of the ponds never normally exceeds six feet at any spot and the greater part of its shore is grown up with cattails, **Phragmites** and bulrushes. The area represents an island type system of communities with farms located on the perimeter. The slough is not of a stagnant nature, but has a continuous circulation of water supplied by Shingle Creek. This creek drains Eagle Lake four miles west of the slough and continues on three and one-half miles in a southeasterly direction where it empties into the Mississippi River in a section of Minneapolis known as Camden. In addition to the creek there is a small drainage ditch which empties into the slough from the west.

A wide variety of plant communities is found in the slough. A small tamarack stand is present along the western edge. The creek bottom had been dredged out throughout most of the latter half of its course. The dikes formed by these dredgings are lined with many cottonwoods, chokecherries, green ash and boxelders. Much of the shoreline is occupied by dense growths of willow. The creek is not deep anywhere along its course. It is three feet deep near the highway bridge and one to two feet deep where it enters the slough.

We selected an area of approximately three acres in the south-central part of the slough. It was bounded on the east by the east edge of Shingle Creek (including the dikes on both sides), on the south by County Highway 130, on the west by the edge of the upland and a north-south

power line, and on the north by the shore of the pond.

This area was selected because it represented in a relatively small area the transition from floating plants to upland. Since the water in the pond is seldom over six feet deep, it was necessary to classify this as floating plant community. The cattails formed a definite band along the shore of the pond. The bulrush and sedge communities were very small and rather indefinite. Behind these young willows were present and became more abundant toward the aspen grove. There was a small grove of balsam poplar, quaking and large-toothed aspen with an understory of red-osier dogwood beyond the willows. This ended abruptly at the base of a rise (shore of old lake). A small oak grove grew on top of this rise. The understory of the upland was predominately wolfberry and Juneberry. Many cottonwoods, boxelders and green ashes grew on the dikes along Shingle Creek. Dense clumps of young willows sprouted up in many places along the creek shore. A small patch of lowland in the south east corner of the area west of the creek had only very short grass and was relatively barren.

April 1949 was cooler than the corresponding month of the previous year. The mean temperature for the month was 47.1°F. There was little precipitation except for 9.3 inches of snow which fell on April 13 and 14. Precipitation for the month was 0.34 inches below normal. The amount of sunshine that month was 14% above normal which may have contributed to the dryness. May was drier than it had been since 1934. Seven days in that month were very dry; one of them (May 3) was extremely dry. The temperature reached 94° that day and a strong, hot wind blew from the south. There were great clouds of dust in the air from the roads and ploughed fields nearby. These arid days caused a deficiency of 2.21 inches of precipitation that month.

Eighty-one species of birds were noted on the study area in the 56 day period. Fifteen species nested within the area and many others nested elsewhere in the slough. The nests found on the area were: 1 Mallard, 4 Ring-necked Pheasant, 1 Phoebe, 1 Tree Swallow, 1 Bluebird, 1 Prairie Marsh Wren, 3 Catbird, 1 Brown Thrasher, 1 Robin, 1 Starling, 3 Yellow Warbler, 1 Yellow-throat, 5 Redwinged Blackbird, 1 Brewer's Blackbird, and 2 Song Sparrow. The portion of the study area along the creek was particularly interesting but the oak upland proved to be very disappointing. The creek area contained 10 nests, but a single Starling nest was all that was found in the upland.

The lowland areas were covered with a dense mat of dead vegetation which provided excellent cover for many birds. The small willows provided singing perches for Song Sparrows. Male Redwings used the dead cattails a great deal for singing and displaying. Swamp Sparrows could always be found in the wetter section of the lowland and pheasants were often flushed from the shrub-willow community. Song and Tree Sparrows inhabited the aspen grove early in the season. Robins, Flickers and Starlings were seen most often in the upland. White-throated and Song Sparrows were frequently noticed in the brush piles near the dikes. By far the greater number of species and individuals was found in the trees and bushes along the creek. Mallards and Blue-winged Teal were nearly always present in the creek or in one of the ponds and Baldpates, Gadwalls, Shovelers

and Green-winged Teal used the ponds for resting places during their northward migration.

At some time between April 26 and 28 a fire occurred in the southern part of the study area adjacent to the upland. The area burned included approximately 75 feet extending in a north-south direction and 500 feet of the southeast corner running parallel with the road. The habitat burned consisted predominately of short grass and young willows. The area prior to destruction by this fire had no bird territories to our knowledge other than the possibility of a Song Sparrow territory so the loss through this fire was not considered to be great.

Nearly everything in the burned area was destroyed. The young willows did not recover that year and all of the dead vegetation was burned. Plant recovery was quite rapid, however, and by May 10 the grass in some spots had grown 5 inches. A week after this the sweet clover had grown to a height of 12 inches. Curiously enough the grass in some portions of this burned area grew very slowly and was only three inches tall a month later.

On the night of May 3 (see weather data) a second fire started near the creek in the southeast corner of the study area. The flames swept westward and destroyed virtually all of the lowland area. A strip of cattails along the pond did not burn because of the wet nature of everything in that vicinity. All of the shrub and sedge communities were blackened. Parts of the understory of the aspen grove and oak upland were also burned. The brush piles near the creek were still smoldering two days later.

A survey of the burned area a day later showed the following nests destroyed: 1 Mallard (7 eggs), 3 Ring-necked Pheasant (4 eggs in embryonic stage, 5 eggs, 3 eggs), 2 Song Sparrow (no eggs) and one nest of an undetermined species. All of the eggs in the nests were broken open, but most of them were still in the nests a day after the fire. Each egg had one fairly large hole in the side which indicates that some bird, probably a Crow, (there were many in the vicinity) had broken the eggs open and eaten the contents. Even if the fire had burned around or near the nests, the predators would probably have found them because of lack of cover. Thus it is not always direct damage by the fire but also the indirect damage such as exposure to predators that may create destruction.

In addition to the actual destruction of nests in the area it was difficult to ascertain the number of birds forced into unburned areas which acted as a disturbing influence on other birds well established in these localities. An illustration of this factor can be cited in the nesting of a Song Sparrow in an area located two feet from the edge of the burned area. The male had used the shrubs in the burned area as singing perches. But the fire had forced this pair into its second nesting site which was restricted on its non-burned side by Redwings and the shore of the pond. Probably as a result of the less desirable environment for this pair the nest was deserted before the eggs hatched.

The only semblance of plant life in the burned localities after the fire was marsh marigolds. A week later the grass had grown to a height of one to three inches. Two weeks after the fire the grass was 10 inches tall. By this time the meadow rue was in flower. **Phragmites** were now 12

inches tall. At the end of three weeks the Phragmites were 24 inches tall and the sedges 26½ inches. A brief trip to the slough was made on June 19 to note nesting success. At that time the vegetation was very lush in the lowland and there was no evidence without close observation that the area had been black and barren six weeks earlier. A similar but unburned area adjacent to the study area was not noticeably different from the burned section. Thus plant recovery was very rapid.

The fact that prior to the fire 15 man hours had been spent searching for nests in the lowland with the resultant discovery of only one-seventh of the nests shows how important nesting cover is. At this time of year the new vegetation is not tall enough to afford concealment so this old dead vegetation from the previous year plays a very important role in nesting cover for the birds.

The first birds to nest in the area after the fire were a pair of Brewer's Blackbirds. Their nest was found on May 31 near the road in the area that had burned first. The nest contained 3 blackbird eggs and 1 Cowbird egg. Because the birds had been frequenting that area for less than a week we believed that the eggs had not been present very long. Since this was at the close of our study, we do not know how many more birds nested in the burned sections after that date.

It was very interesting to note that the fire created desirable habitat for one species for a short period of time. Killdeer were not seen on our study plot until the fire destroyed the dead vegetation. The day after the fire we saw a pair near the road. From that time until the vegetation had grown to a height of about four inches we saw them frequently. Then they left the area as strangely as they had come.

The most obvious effect appeared in the delay of nesting activities of the birds in these communities. The young shoots on the willows were killed which made them useless for anything but song perches. And most singing birds avoided the blackened twigs. Birds which were forced to move from the area as a result of the destruction of the cover were crowded into new and less favorable habitats where they were probably more susceptible to various environmental resistance factors. While it is difficult to calculate the precise number of days that nesting was delayed due to the fires, a delay of two to three weeks would probably be a conservative estimate.

The study was deficient in that it was terminated too early. Several more weeks of study would have undoubtedly shown more aspects of the problem. Then too, not enough hours per week were spent on the area to obtain complete data. However, I hope that this paper may stimulate others to study this very interesting problem more thoroughly.—**Museum of Natural History, University of Minnesota, Minneapolis, Minnesota.**

Spring Migration

by

Mary Lupient

After a severe winter Minnesota experienced an exceptionally late cold spring which delayed the appearance of the early migrants from one to two weeks. At date of this writing, May 20, ice still remains on the northern lakes and snow banks lie in sheltered hollows in the north woods. As late as April 25 a blizzard and heavy snow blocked roads and closed schools in some sections of the state. Disastrous floods causing hundreds of thousands of dollars in damage are at present occurring along the river courses. Destruction is extensive along the Red River of the North. Very strong winds, at times of hurricane proportions, prevailed throughout April and these winds together with freezing temperatures caused considerable mortality among migrating birds. Reports from several localities show that large numbers of swallows, the martins particularly, died of starvation. The following report by J. P. Jensen, Dassel, regarding the loss of his martin colony is typical of the experiences of several other persons having martin colonies. In part Mr. Jensen wrote, "My large colony of about fifty birds came mostly on the 24th, (April) just before the long period of bad weather. However Spring Lake had opened some and I knew they could capture midges there that commence to emerge from the surface as soon as the lake is open. On a couple of still but cold mornings they did capture a few of these small flies but not enough to maintain their body heat and energy so they became weaker and weaker. The snowstorm of Saturday, April 29th was the last straw in their destruction and they collected in the rooms of the bird houses up to as many as six to nine in one room. This was to help keep warm but after the storm they were too far gone. They had little energy, there was a cold wind and no food. Death was the result for most of them. Only one male of my larg. colony remained alive.

"Reports from here and there tell the same tale of woe. The colonies of Victor Ostlund, Ed Isaacson and Albert Edlund have all died."

The harbor at Duluth was still icebound on May 13 and a report from Mira Childs on May 8 stated that birds there were dying of starvation due to so much snow and cold.

The vanguard of the tree swallows appeared in the Twin City area on April 2 and without doubt these birds died, since extreme weather occurred after their arrival.

Myrtle Warblers and both the Ruby-crowned and Golden-crowned Kinglets were seen at the Izaac Walton Bass Ponds on April 1 by Paul C. Murphy. There were not many which is fortunate for they must have perished.

Warblers in abundance have been reported this season. There has been a succession of waves beginning on May 10, and except for the first

wave in which the Myrtles predominated, nearly all species were represented. Reports from observers indicate that an exceptionally large wave passed through the Twin City area on May 19. At the Izaac Walton Bass Ponds there were literally thousands feeding avidly on the ground. The common warblers were very abundant but almost all species were there as well as vireos, flycatchers and others They seemed hungry and were very tame. Reports indicate that migrating birds fed mostly on the ground this season. A small flock of Blue-winged Warblers was seen near the State Fish Hatchery on May 7 by A. C. Rosenwinkel.

Rails arrived in goodly numbers on May 10. Nearly everywhere the water was high enough to cover the rushes so for several days they lived on rafts of broken reeds and other vegetation that floated along the shore lines. Trees and shrubs did not begin to leaf out until about May 15 to 20 so not only rails but all other birds were easily observed. A Yellow Rail was captured by Dr. D. W. Warner, an account of which appears elsewhere in this issue.

The migration of thrushes and sparrows was later than usual and at present they are still passing through the Twin Cities and surrounding territory. A Nelson's Sparrow, far from his natural habitat, sojourned for part of a day in the writer's yard on May 19. The Leconte's Sparrow was found near Anoka on May 6 by Dr. W. J. Breckenridge. Sheridan S. Flaherty of Morris, Minnesota reported an Arctic Towhee. It came to his yard on May 6 and stayed a few days.

Evening Grosbeaks and Bohemian Waxwings remained in the southern part of the state until late in April. Several flocks of these birds were reported from various sections.

On April 6 A. C. Rosenwinkel saw a Saw-whet Owl dozing in an apple tree. It was in a thickly settled district along one of the busiest thoroughfares in St. Paul. Mr. Rosenwinkel also sent in the unusual record of five White Pelicans, seen in the Minnesota River bottomlands near the Izaac Walton Bass Ponds. The date was April 29.

Hawks migrated at about the usual time and according to reports numbers were small except in one instance a good sized flight passed over St. Paul on April 2. A Goshawk was still living along the Minnesota River south of Minneapolis on March 19th. Members of the Minneapolis Bird Club saw a Pigeon Hawk capture a Red-winged Blackbird and perch to eat it. It was at the Izaac Walton Bass Pond April 9. Included in the same report was that of a White Pelican which was seen in the same area. An interesting observation was made by some members of the Minnesota Bird Club near Winona, Minnesota on May 2. A Duck Hawk stooped repeatedly to strike a Red-tailed Hawk. At each attack the Red-tailed Hawk turned on its back to present its talons to its assailant. The speed at which the falcon stooped was astonishing. In straight flight also its speed was very swift. It literally flew circles around the Red-tailed Hawk.

Due to the ice-bound waters the gull migration was late. Of interest were several reports of the Franklin's Gull passing through eastern Minnesota. Mr. Whitney Eastman stated that while he was out along the Minnesota River on April 16, he saw hundreds moving westward.

The Sandhill Crane is not often seen migrating through eastern Minnesota.

March 30 they were seen in flight over Lake Nokomis, Minneapolis, by George Rysgaard.

Whistling Swans arrived at about the usual time but there was little open water. Their departure was about a week late from the southern part of the state. They were reported from several localities but one of the largest concentrations of Whistling Swans occurring in Minnesota was at Faribault in April. From four to five hundred were reported.

Geese appeared at the usual time in normal numbers in the western part of the state. No large flights were reported from eastern Minnesota.

Ducks were a few days late. Only one large concentration was reported from the area near the Twin Cities. Paul C. Murphy reported ducks numbering about two thousand at Otter Lake in Ramsey County on April 22. There were about one thousand Lesser Scaup, three hundred Canvasbacks, two hundred and fifty Redheads and other species in small numbers. O. A. Rustad of Northfield reported ducks and geese in small numbers on April 2. In the Mississippi valley as far south as La Crosse the only duck that appeared in fair numbers this season was the Lesser Scaup. There were very few of all other species except the Mallard. The number of Blue-winged Teal is noticeably less than normal in this section. On a field trip to Frontenac on May 14 members of the M. O. U. observed a European Widgeon, an unusual record.

At present writing very few shore birds have been reported. Water is so high that the mud flats they frequented in other seasons are covered. Rivers, lakes, ponds, and sloughs are flooded and shore birds may have difficulty surviving unless their migration is delayed.

The following report was received on March 25, too late for the Winter Seasonal Report. It is interesting and important enough to be recorded. Reverend O. L. Bolstad, Badger, Minnesota wrote as follows; "This winter several flocks of Magpies have wintered here in Roseau County. It is something unusual. A few have been seen at different times before but very few. This winter they have stayed all winter."—**Minneapolis, Minnesota.**

NOTES OF INTEREST

STRANGE RAVEN ANTICS IN MINNESOTA BOG COUNTRY—While on a moose browse survey in the bog country of the Red Lake Game Refuge, south of Baudette on March 22, 1950, four game biologists of the Pittman-Robertson Unit, Minnesota Division of Game and Fish, and two state refuge patrolmen, were traveling along a ditch bank passing through a black spruce—cedar swamp, when they came into a clearing of about two acres in size. Examination of the snow surface showed that about one acre of the clearing was almost completely covered by a maze of raven tracks. Although no ravens were on the ground at the time, a group of four flew overhead. There was no carrion or feed noted on the ground which might serve as an attraction. Either the birds had gone through a courting dance, had actually mated in the area, or had enjoyed themselves greatly, displaying wings and tails. Marks in the snow indicated that some birds had hopped about for some distance, dragging their wings alongside so that the primaries made trails in the snow. Other birds had spread out on occasions and had flattened wings and tails in the snow so that perfect imprints of the outspread wings and tails were registered. A measurement of one o fthe outspread wing imprints tallied thirty-two inches.

Numerous droppings were found over the entire area and it appeared that the birds spent more time near exposed stumps and snags which may have served as perches.

No explanation for the "spring dance" was evident and neither Dr. Roberts in "The Birds of Minnesota" nor A. C. Bent in his volume on the Jays, Crows, and Titmice, mentions any antics similar to those which had taken place on the bog.—**Milton H. Stenlund, Ely, Minnesota.**

NOTES ON THE AMERICAN MAGPIE IN MINNESOTA, WINTER, 1949-50.—Notes pertaining to observations of American Magpies in Minnesota this winter were furnished the writer by area game managers, game wardens and refuge patrolmen of the Minnesota Division of Game and Fish, and are summarized in the accompanying table. This information was requested when it became apparent that these birds were appearing in the state in somewhat larger numbers than in previous recent winters.

Observations indicate that Magpies were most numerous in the northwest corner of the state, Marshall and Roseau Counties, but that some birds were present in counties more to the south and east. The easternmost record was for Koochiching County and the most southern notes came from Grant and Morrison Counties.

Mr. Jerome Liemandt, state game warden at Thief River Falls, wrote the following on January 2, 1950, regarding the Magpie in his area: "Their presence

this year first became noticeable about September 28th. I see a lot of singles around the area, and the most I have seen that were together at one time was eleven. They are scattered quite uniformly about the country except for the fact that they are a little more numerous in less settled areas like the Mud Lake and Thief Lake Refuges, also the Red Lake Indian Reservation. One thing that might be of interest to you is that these birds are getting caught in mink sets, provided the trap is baited with meat. I have taken seven different Magpies out of traps; Warden Lindwall at Red Lake Falls has taken several; and a few trappers have reported the same experiences. As winter drew nearer, and open water scarcer, they were more abundant in the areas that had a few open ditches left. I located two dead deer in early December through the gathering of Magpies in the vicinity of the carcasses." Mr. Jack Jensen, refuge patrolman, commented on January 4, 1950, that he had noted a number of these birds while patrolling the Norris Camp area.

MAGPIE OBSERVATION SUMMARY, WINTER OF 1949-50

DATE		LOCATION	COUNTY	OBSERVERS
Sept. 26	2	Thief Lake Refuge	Marshall	Robert Farmes Forrest Lee
Oct. 7	12	Near Skime store	Roseau	Arnold Erickson, Donald Burcalow
Oct. 7	9	Vic. of Thief Lake Refuge	Marshall	Arnold Erickson, Donald Burcalow
Oct. 8	2	Thief Lake Refuge	Marshall	David Vesall
Oct. 8	1	Near Greenbush	Roseau	Reported by hunter to Arnold Erickson
Mid-Oct	1	16 mi. so.of Warroad	Roseau	Lloyd Hoffman
Nov. 3	1	East of Waskish	Beltrami	Vernon Gunvalson, Jack Jensen
Nov. 11	2	Mud Lake Refuge	Marshall	Forrest Lee
Nov. 14	2	Mud Lake Refuge	Marshall	Robert Farmes
Nov. 15	6	Mud Lake Refuge	Marshall	Forrest Lee
Nov 18-25	1	Near Int'nat'l Falls	Koochiching	Reported to Lester Magnus as caught in weasel trap.
Dec. 20	1	Near Waskish	Beltrami	Jack Jensen
Jan. 20	1	Thief Lake Refuge	Marshall	Forrest Lee
Jan. 23	1	Near Randall	Morrison	John Zorichak, Forrest Lee
Jan. 28	2	Red Lake Ind. Res.	Clearwater	John Zorichak, Forrest Lee
Jan. 28	2	Mud Lake Refuge	Marshall	John Zorichak, Forrest Lee
Jan. 31	1	Mud Lake Refuge	Marshall	John Zorichak, Forrest Lee
Feb. 3	1	Near Wendel	Grant	Norman Ordal, Robert Benson
Feb. 4	3	Thief Lake Refuge	Marshall	Robert Farmes

Roberts states in "The Birds of Minnesota" that "During the late fall of 1921 and the following winter there was a remarkable invasion of Magpies into the western and southern parts of the state as well as into the states south of Minnesota. Between October 10 and February 11, a total of 51 individuals was reported to the University Museum . . ." It would appear that this year's invasion of Magpies into Minnesota approximates that of 1921 since the observations listed on the accompanying table total 52. Some of these observations, however, may have been of the same birds seen at different times.

Any additional notes on the Magpie will help give a better picture of this year's flight of Magpies and should be sent to the Museum of Natural History, University of Minnesota, or to the Minnesota Division of Game and Fish.—**Forrest B. Lee, Minnesota Division of Game and Fish, Pittman-Robertson Unit.**

A WILSON'S SNIPE NEST IN HENNEPIN COUNTY, MINNESOTA.—Snipe were abundant about the Twin Cities during the very late spring of 1950. On numerous trips during April and early May in Ramsey, Anoka and Hennepin counties I noted many flocks numbering from 10 to 37 individuals. By May 15 their numbers had lessened but small groups and individuals still remained.

On May 30 Mr. William Carlson reported to me that that morning he had flushed a snipe several times from a low, wet meadow on the west side of France Avenue about one-half mile south of State Highway 100 at the edge of Edina. The bird perched on a nearby dead tree for five minutes as Carlson walked about the meadow.

After a brief search of this area on June 3, Carlson flushed the bird from a nest containing four eggs. The next morning Mr. Bruce Hayward, Carlson and I visited the nest. The adult flushed from the eggs when we were ten feet away and disappeared over a low rise to the west calling in its zig-zag flight. In the nest were two eggs, one of which was pipped, in the other the young bird could be heard. Beside the nest lay parts of the shell of one egg and a foot and bill of a young snipe only very recently eaten. No trace of the other egg could be found.

The countryside about the nest site is farmland, irregular in contour with small patches of woods, mostly oak, on the low hills and numerous small, wet grass and sedge meadows and a few larger marshes in the lowlands. The meadow in which the nest was located is about one acre in size and on June 4 contained only a single small pool of water and that some distance from the nest. The surface of the ground about the nest was dotted with small, grass-covered hummocks. The one on which the nest was placed was near the corner of the meadow nine feet from a fence to the south. To the east was the road 38 feet away and half way between the nest and the road was another fence.

Directly in the center of the clump of new grass already 12 inches tall was the slightly cupped nest measuring 3x4 inches in diameter. Blades and stems of dead grass had been laid neatly in a slight hollow in the top of the hummock to a depth of about two inches.

The pipped egg was removed from the nest. From it hatched in two hours a downy male bird which at the end of 24 hours, and before it had fed, weighed 8.25 grams. At that time the bill was blackish and the feet gray.

When Carlson returned to the nest the next morning, he found the nest empty but one parent bird flew excitedly about the meadow calling almost continuously. The action of the adult suggested that the remaining egg may have hatched successfully.

Minnesota nests of this species (T. S. Roberts, Birds of Minnesota, Vol. 1, 1932, pp. 479-482) number only a few. In more than 60 years none had been found in the southern half of the state. In the spring of 1949 Mr. Charles Evans found a nest in Anoka County near Centerville. The finding of another nest this year lends further support to the hope that, as reports indicate, this bird is again increasing in numbers and may become once more a common summer resident of our nearby marshes.—**Dwain W. Warner, Museum of Natural History, University of Minnesota Minneapolis, Minnesota.**

WILSON'S SNIPE NESTING NEAR CENTERVILLE, ANOKA COUNTY.—Mr. Charles D. Evans, student in the wildlife management field course conducted by Dr. James R. Beer, reported finding a Wilson's snipe nest on May 14, 1949. The nest was in a small marshy area some one and a half miles south of the town of Centerville. The sedge vegetation of the marsh had been heavily grazed resulting in a "hummocky" appearance. The nest, containing four eggs, was situated in the center of one of the hummocks so as to be well hidden from above. It was a deep cup made of dry grass and sedge leaves. A slight "trail" could be discerned leading into the hummock. The snipe was observed on the nest on May 17 and 23. When revisited on May 30 three eggs were found to be destroyed. Two were completely destroyed but one had only a small hole—indicating bird predation. The remaining egg, containing a well developed embryo, was removed and is a part of the Natural History Museum Collections.

Snipe winnowing had frequently been heard in this general area by wildlife students during April, May and early June of 1947, 1948, and 1949 but this was the first direct evidence of breeding birds.

When shown the nest on May 17, Dr. Ernst Mayr remarked on the similarity of both nest and habitat to snipe observations he had made in Germany.—**William H. Marshall, Division of Entomology and Economic Zoology. University of Minnesota.**

YELLOW RAIL CAPTURED NEAR ST. PAUL.—So few persons have the opportunity of seeing this elusive bird that it seems worthwhile to record something about a recently captured individual and the intense satisfaction and excitement experienced in watching one flush feebly from beneath one's feet only to plummet to earth a few yards distant and disappear in a twinkling. The reader may rest assured that the thrill of stalking a Yellow Rail about a marsh for the first time is no less thrilling to the professional bird enthusiast than to the amateur.

My first view of a Yellow Rail came as a complete surprise. As with other secretive members of our avifauna, I had tended to forget about its existence and to consider only the Sora and Virginia as the rails typical of our marshes, especially in those marshes within the sight of two major cities and less than ten minutes by car from this museum.

On the afternoon of May 11, 1950, at a small marsh beside Fairview Avenue about one-half mile north of the Minnesota State Fair Grounds in Ramsey County, I was observing rail trapping and banding operations being carried on by Dr. James Beer and several students. The nets and collecting cage had been set and the drivers were spread in a line into the marsh. They waded slowly, driving the rails toward the nets.

Suddenly a rail fluttered from the rather trampled cattails and grasses at the edge of the water and only a few feet from the driver at the edge of the marsh. Before it dropped to earth on its dangling legs after a short, curving flight of not more than 40 feet I noted that the trailing edges of the wings were white—the most distinctive mark of the Yellow Rail. The bird had disappeared in a moment into sparse cover composed of small clumps of dead cattail stalks of the previous year which had become matted at the base with dead grass. We poked carefully into these with our hands and boots for several minutes but no bird appeared until at last, from a clump which had been probed repeatedly, the bird again took flight. Flying weakly for about 20 feet at a maximum height of four feet it dropped to the ground and disappeared as before. As the bird took flight the third time, I narrowly missed catching it in a cap but it continued on over the marsh where it settled on the water about 150 feet away, swimming about slowly and rather poorly. When flushed by Dr. Beer from the marsh, the rail returned to nearly the same place from which it had come only a few yards from the nearest person. This time I located the bird's hiding place exactly so Dr. Beer quickly flattened the grass and cattails over the bird while the others stood by to be ready to snatch the bird from the air when it flushed—but no bird appeared. Instead not a blade or feather quivered. Yet the bird was there directly beneath our hands. Gingerly at first, then quickly I ran my hand into the numerous crevices and irregularities of the mucky soil beneath the dry grass. As I had hoped, my hand finally touched warm, soft and dry feathers. The bird barely struggled as I raised it into the sunlight where its dark gray-brown eye, bright yellow bill and various shades of brown and buff and white bars of the plumage shown beautifully.

Since there is still some uncertainty about the various plumages of the Yellow Rail, I decided to keep the bird in captivity to observe subsequent plumage changes. One hour after cpature it weighed 64.3 grams. Food, concentrated with a fine mesh net, was taken from the pond at which the bird was captured. It consisted of snails, fairy shrimp, aquatic insects and larvae, many other kinds of plankton and some aquatic plants, especially duck weed. Larger aquarium snails were also placed in the cage. Although the shells of large snails were not cracked, the soft bodies were eaten, probably being removed by vigorous shaking.

Each day I watched the bird stalk slowly through its artificial pond pecking rapidly into the water. The head was often completely submerged. From what I could discern the bird was taking food. However, on the morning of May 22, after 11 days in captivity, it was dead. The weight had dropped to 31.6 grams, a remarkable loss of 32.7 grams. Examination of the intestinal tract and abdominal cavity revealed no parasites and only scant food remains.

The only vocal sound I heard uttered by this rail was a very weak "Creeeeeeeeeee" given as I approached the cage. This sound seemed to be an

alarm note, resembling closely that given by the vireos, especially the Warbling, but was longer in duration.—**Dwain W. Warner, Museum of Natural History, University of Minnesota, Minneapolis, Minnesota.**

THE 1950 SPRING SEASON IN THE DULUTH AREA—Our late spring with its freakish weather, a terrific wind storm on May 5 and the worst blizzard of the year on April 25, disrupted the normal migration and nesting season.

The warblers arrived in considerable numbers on May 21, but I have failed to record a single big day since that time. I have still to see my first Black-throated Green Warbler of the season (May 30) although I have always considered it as an early and fairly abundant warbler. On the other hand, the Mourning and Wilson's, late arrivals, have been here in considerable numbers.

The nesting reports have been few and far between. The Robins seem to be just starting their nesting, and a fairly extensive search of Harbor Island on May 27 revealed only two nests, a recently completed Brown Thrasher nest with no eggs and a Killdeer nest with one egg.

Probably large numbers of birds perished from starvation during the month of April. In one week's time four Great Blue Herons were caught alive so weak from lack of food that they made little attempt to evade their captors. I made an examination of the stomach and intestinal contents of one of these birds and found only mucous patches and blood. A Caspian Tern was another starvation victim that was brought to me.

Despite the vagaries of the weather the season has been an interesting one. Several outstanding days will remain in my birding memories. On May 21 a small group of Duluth Bird Club members braved a rather rainy Sunday for the annual Duluth Field Day. My outstanding impressions of the day included: a White-wing Scoter on a small pond in Forest Hill Cemetery; a list of 108 species for the day; a tree that was brilliant with a Baltimore Oriole, four Rose-breasted Grosbeaks, and two Red-headed Woodpeckers; and the courtship performances of several Woodcock. On May 11 between 2,000 and 3,000 Bluejays, about 750 Flickers, and about 250 Sharp-shinned Hawks were estimated to have passed along Minnesota Point between the hours of eight and ten in the morning. May 18 provided a Red-throated Loon and on May 27 my list included a Yellow Rail, Western Grebe, and three Blue Geese.

The shorebird migration has just started this last week in May so, perhaps, we have some more good migration days to look forward to this spring.—**Pershing B. Hofslund, University of Minnesota, Duluth Branch.**

YELLOW RAIL AT DULUTH—On May 27, 1950 I received a call from Miss Catherin Lieske reporting a Yellow Rail **(Coturnicops novaboracensis)** at the August Carlson residence, 4228 Pitt Street, Duluth. When I investigated, I found that the rail had entered a greenhouse during one of our late storms and had remained there a couple of weeks under the care of Mrs. Carlson. I returned on May 29 with the intention of banding the bird, but it escaped through a small opening that we had failed to notice. Later it was observed in the

Carlson's yard. I have been unable to find any reports of the Yellow Rail in the Northeastern section of Minnesota. Dr. Olga Lakela fails to record the bird in her "Check-list of Birds in the Duluth Region—1937-1947" (1950—mimeographed).**Pershing B. Hofslund, University of Minnesota, Duluth Branch.**

WESTERN GREBE AT DULUTH.—On May 27, 1950 a Western Grebe (**Aechmophorus occidentalis**) was seen swimming in the bay off Minnesota Point. The writer, together with Mr. and Mrs. J. K. Bronoel, Mrs. Evelyn Putman, and Miss Catherin Lieske, was able to observe the bird at close range and in very good light. The markings were checked with Peterson's "Field Guide."

The Western Grebe is rarely seen in Northeastern Minnesota. To the best of my knowledge only one other record, that of Dr. Olga Lakela on June 2, 1940, has been made in the Duluth Region.—**P. B. Hofslund, University of Minnesota, Duluth.**

American Ornithologists' Union Meeting

Many of the outstanding American and Canadian ornithologists will be visiting in Minnesota at the Twin Cities during the week of October 9 to 13 when the American Ornithologists' Union convenes for its 68th Annual Meeting. Sessions will be held at the Museum of Natural History on the Minneapolis Campus of the University of Minnesota. Headquarters Hotel will be the St. Paul Hotel in St. Paul. Regular sessions will begin with registration of members and visitors in the Museum Lobby at 9:00 a.m. on October 10. Morning and afternoon sessions will be held in the Museum Auditorium on October 10, 11, and 12. The Annual Banquet will be held in the Main Ballroom of the Coffman Memorial Union on the University Campus on Tuesday evening, October 10. On Wednesday at 8:00 p.m. a reception will be held in the Museum and the adjacent Center for Continuation Study. Guests will view a display of bird prints from the collections of Dr. & Mrs Dwight E. Minnich in addition to regular and special exhibits in the Museum. On Friday a field trip tour of Minneapolis beauty spots and birding places will bring the Convention to a close.

Joining the University in sponsoring this meeting is a major undertaking as well as a privilege for the M. O. U. and it is the hope of the Local Committee On Arrangements that a large number of M. O. U. members will attend these sessions and take advantage of this close-to-home opportunity to get better acquainted with other bird people from throughout the United States and Canada.

The Local Committee also wishes at this time to thank the members and friends of the M. O. U. for their very generous financial support of this Convention.—**W. J. Breckenridge, Chairman, Local Committee.**

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Capella gallinago delicata

by

Arnold B. Erickson

(Concluded)

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BOOK REVIEW

FIELD BOOK OF NATURAL HISTORY by E. Laurence Palmer. Whittelsey House, McGraw-Hill Book Company, Inc., New York: Toronto. 1949. pp. x plus 664, 2000 illustrations. $7.00.

This is a truly masterful treatment in encyclopedic manner of natural history, of plants, animals, minerals, the earth and heavenly bodies. The section on astronomy is short but includes charts of the sky at night, a directory of the principal stars and constellations, their distances, magnitudes and periods. In another rather brief section the principal rocks, minerals and related components o fthe earth's surface are illustrated and their physical features described. The remainder of the book is devoted to the plant and animal kingdoms, about half to each. These groups are arranged systematically from the more primitive to the more highly developed. Certainly not all species of plants and animals are mentioned but for each family at least one species and more often several or more are included. Cultivated plants and domestic animals are also included. Classification is given for each species from Division or Phylum through Class, Order, Family and scientific and common name. Each species is illustrated. Directly below each illustration is a clear, concise description of the species, its geographical distribution and habitat, notes on food, growth, reproduction, etc., comments on economic importance to man and other features of special interest.

Throughout most of the book the text is set up in three columns per page, one column to each species or earth feature. In the index appear both common and scientific names.

The illustrations are excellent; they include, in addition to accurate portrayal of the diagnostic features of the plant or animal as a whole, fruits, seeds, buds, etc., details on sex differences, eggs, tracks, hair structure, etc.

This book is not a field guide which may be used for the identification of species. Rather it is to be used as a source for a wealth of reliable information on all kinds and types of plants and animals and other phases of natural history.

To the teacher of natural science, nature study or biology this book is indispensible. Amateur naturalists as well as the professional will find it most useful, and the younger generation, especially, will learn much between the covers of this single volume about the vast and amazing assemblage of things and parts which make up "natural history."—**Dwain W. Warner.**

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Nesting Behavior of the Red-wing Blackbird

by

James R. Beer and Douglas Tibbitts

The red-wing blackbird was chosen for the purpose of studying breeding behavior and social relationship because it is one of the most common and easily observed of our marsh dwelling species. There have been several good studies of various phases of its life history such as those of Allen (1914), Mayr (1941), Smith (1943) and Thomsen (1943). These studies have recorded much data and gone far in interpreting it along life history lines. The details of a number of the conclusions from these studies need verification and coordination in order to have a complete and unified understanding of reproductive behavior and population mechanisms in this species.

The area studied in detail was a 2.4 acre marsh along the southeastern shore of Lake Wingra and in the University of Wisconsin Arboretum at Madison, Wisconsin. This marsh was chosen for detailed study because of its size, the number of birds present, its solid bottom and the presence of several other marshes in the neighborhood. The vegetation in this marsh was primarily emergent and was dominantly cattail (**Typha angustifolia**) with a little **Typha latifolia** and **Carex** sp. This vegetation was interspersed with numerous small areas of open water and bordered with willow, birch and red osier dogwood with a background of mixed hardwoods.

The other areas observed were in the same general vicinity and for the most part were relatively small. Their vegetation was primarily cattail (**Typha latifolia**), **bur-reed (Sparganium eurycarpum)**, arrowhead **Sagitaria** spp.) and sedges (**Carex spp.**). The areas were studied during the spring and summer of 1946, 1947, and 1948, though the bulk of the data was obtained in 1947.

The breeding birds of this area, Madison, Dane County, Wisconsin, were determined by J. W. Aldrich of the U. S. National Museum to be **Agelaius phoeniceus phoeniceus (Linn.)** but with tendencies towards **arctolegus.** This conclusion was based on a series of 30 skins of both sexes.

Methods

After selecting the area for study, a detailed map was made showing cover type, location of potential singing perches, open water, muskrat houses and other physical features which might play a part in a blackbird's life. This map was then mimeographed and used for taking field notes.

As soon as the birds started arriving in the spring, they were captured by netting, funnel type traps, single cell drop door traps, snares, and nets, and banded with a Fish and Wildlife Service band and colored celluloid bands so that individuals could be identified in the field. Of these the drop door type trap was the only one that proved to be effective. The colors of bands that proved to be most effective were light green, bright blue, red, yellow and white. After the birds were marked, nearly daily observations were made to determine the activities of these birds. Marked individuals were readily identified by using 8 X field glasses and a 27 X spotting telescope. It was thus possible to make most of the observations from the edge of the marsh.

About two weeks before the beginning of nest building, daily inspection trips were made in the marsh so that we were able to obtain quite complete data on nearly all of the nests on the area. As soon as a nest was found a white metal bound tag which had previously been dipped in paraffin was tied to the highest stable object near the nest. These tags not only identified the nests but made it possible to relocate the nests at will. The nests were visited daily in order to record the progress of nest building, laying, incubation, nesting development, fledging and success. The nestlings from the study area and many from nearby marshes were banded with Fish and Wildlife Service bands. Nearly 900 birds were banded during the study.

Spring Migration

The first migratory red-wings are seen in the vicinity of Madison, Wisconsin, between February 5 and March 11 and average about February 28 (Leopold and Jones, 1947). These early records are of small flocks composed mainly of adult males which are usually seen drifting about in the uplands. During the three years of this study, 1946 to 1948, the first red-wings were reported on March 1, February 21 and February 26 respectively though birds were not seen on the study area until later. Allen (1914). in his monographic study of the red-wing, called this group vagrants because they are supposed not to represent the beginning of the true migration, but to be individuals which have wintered not very far to the south. His observations indicate that these birds do not appear every year but that when they do, they are to be seen in February in his area.

We have chosen to follow Allen's term of vagrant for the first birds seen since we have not been able to make definite observations as to what their true status may be. It is possible that these birds comprise a group which has wintered near-by though our observation on over-wintering birds and their behavior tends to overrule this conclusion. Those birds known to have wintered locally were still to be found on their wintering area when the first migrants were seen. They tend to spend most of their time on a small area of marsh and leave only for short periods to feed in neighboring corn fields. In contrast, the vagrant groups are usually to be seen wandering about the uplands and seem

to frequent the marsh only at night. While we have no definite banding data showing the status of these birds, we feel that they are probably part of the migration pattern and in fact may eventually be placed as a part of the next category.

The first birds to arrive on the marsh were adult males and were seen March 5, 20, and 8 respectively for the years studied. Since the first banding was carried out during the summer of 1946, there were no bands to be looked for during our first year's work. The spring of 1947 was very late and even after the birds had been observed to be in the vicinity on February 21 none was seen on the study area until March 20. After this snow squalls, cold, and windy weather kept the birds from spending much time on the marsh. It was not until March 29 that these birds were adequately observed. At this time the first color banded red-wing was spotted on the area. The spring of 1948 was more nearly average and the first bird was seen on March 8 and a banded adult male was collected March 13 on the area which had been his territory the previous year. After this date banded birds were seen regularly in considerable number. The red-wings do not come to the breeding marshes until the weather is fairly mild and even after they have settled down to fighting for territories during the latter half of March and April, a cold rain, wind or snow will cause them to abandon the marsh, flock up and retire to the corn fields in the upland.

The first birds usually arrive in the general locality before weather conditions and physiological development cause them to seek out the breeding marshes. As the weather becomes milder and the physiological development progresses they are occasionally found on the marsh for short periods in the morning and evening but may desert the marshes completely with inclement weather.

A few days after the resident males arrive an occasional first year male may be seen drifting through the breeding marsh. Seventeen observations on banded birds show that at least many of these are local males. However they seem to be very irregular in their migration as well as other behavior patterns and continue to dribble in until about the time the last resident adult females arrive. It is extremely difficult to make good observations on this group. Allen (1914) listed the resident immature males as arriving after the resident adult females, migrant females and migrant immature males which is considerably later than our observations indicate.

The first small flocks of migrant adult males arrived on March 31 and 20 in 1947 and 1948 respectively with the large flocks arriving about April 8, and March 31 in 1946 and 1948. By the middle of April most of the migrant adult males have passed on to the north. Banding of 21 birds from these flocks has indicated that none of them remain in the vicinity. These flocks seem to be in a hurry and do not remain in the area. Many first year males are seen among the later groups and are assumed to be migrants.

Just after the migrant adult males are starting to come through, an occasional female may be seen about the marsh. The first females are very secretive in their actions and are hard to observe. We did not observe these birds coming in in flocks but rather as individuals. The conclusion that these birds are adults is based on negative and circumstantial evidence.

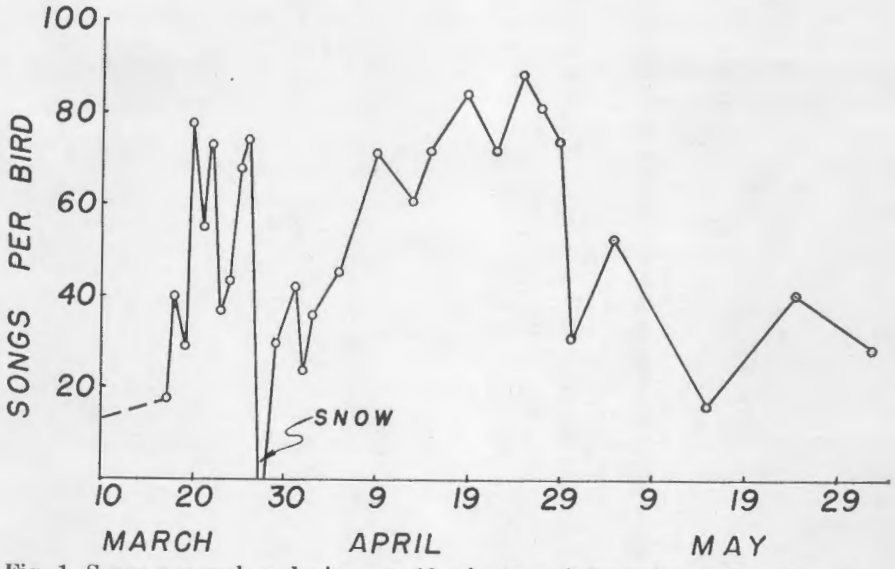


Fig. 1. Songs per male red-wing per 10 minute period as observed at 8 A. M.

The first females to arrive appear to be thoroughly familiar with the area and stay in localized areas in the marsh. None of the many first year females that were banded as nestlings were seen to arrive until much later. The actions of the known first year females were much different from those of the adult females. They did not show the same familiarity with the marsh and did much moving about.

The first banded yearling female was seen on the marsh on April 27 in 1948. There were not adequate numbers of young banded in 1946 for any conclusive observations to be made in 1947. These birds, in contrast with the adult females, are quite conspicious, as they move from marsh to marsh in small compact groups.

The last of the migration is composed of migrant females. We were unable to determine whether the adults moved through first or not but based on the observations on the resident females this is probably the case. The flocks of females are not as large as those of the males and are usually much less conspicious. These flocks usually are seen during the last part of April and the first part of May. The largest flock seen was estimated to contain between four and five hundred birds.

Behavior Patterns

There are many types of behavior patterns but the ones to be discussed here have to do with the territory. The formation of the territory is rather complex and combines many reactions of the birds. When these behavior patterns are studied further it will probably be established that they are controlled by the levels of sex hormones. The actual time when a territory is picked out by the males is not definitely established but our observations indicate that the territory is picked out, at least tentatively, by yearling males during the height of the breeding season.

Immature males are seen drifting

through the breeding marshes all spring but they are invariably attacked and driven on until they are forced to leave. They seem to be interested in the marshes and the hens but do not usually have the drive to establish a territory for themselves. During the three years of study on our area which normally has about 25 territories we observed first year males establishing territories but three times. In each case the territory was maintained for two to three weeks starting about the middle of April and ending during the first week in May. One of these males had been banded on the same marsh the year before as a nestling. This same bird established and held a territory during the following year as a two-year-old bird. This area was near though not the same as where the bird had located the first time. Five other birds which were banded on the marsh as nestlings were observed to establish territories as two year olds. None of the over 400 nestlings banded in nearby marshes was observed to establish territory on the study area. While the number of observations is low, it indicates that there is a definite tendency for the birds to return to the home marsh.

Due to the continual harassing by the adult males the first year males are very difficult to trap. During the seasons of 1946 and 1947 only nine first year males were trapped and banded on the area. Of these nine, the one observed to have established himself on the area in 1947 was on the marsh as a territorial adult male in 1948. Also one of the drifting first year males banded in 1946 was on a territory in 1947.

Our conclusion based on these observations is that the first year males tentatively select areas that they come back to the next year as two year olds and they may or may not be able to defend the selected area.

As previously discussed, the resident adult males are the first birds to arrive on the breeding marsh. When they arrive on the marsh, they settle on or near the area which they will later defend. At this time they are already in song. During the first days on the territory (defined in this paper as any defended area) the birds use the area primarily for roosting. If the weather is warm and not windy they may sing from a high perch but do not display or pay any attention to the other males. After 15 or 20 minutes of intermittent singing, small groups of birds will leave the marsh for the feeding grounds in the uplands. They will then be gone from the marsh until late in the evening when they may sit on some of the high perches nearby before dropping into the marsh for the night. As the season advances they remain on the marsh longer in the morning and arrive earlier in the evening. The intensity of singing becomes greater at the same time (see Fig. 1).

By about March 20 a little display and some fighting may be seen. This first display is merely a slight spreading of the wings during the song. The epaulets are not usually displayed though there is some sporadic and half-hearted fighting. The stretch display may also be seen occasionally (see Fig. 3c). The intensity of display and fighting increases until about the middle of April when it is at its peak. By this time the bulk of the resident females have arrived. This intensity of activity is maintained until the first part of May when nesting and laying starts.

Full display, as described later, did not begin until the hens came to the

marsh. The arrival of the hens stimulated fighting, display and song but did not seem to stimulate directive courtship to, or chasing of the hens by the males. This arrival of the hens on the marsh not only stimulated the normal complement of males who were holding territories on the area, but also all of the excess males that had not been able to find adequate territories crowded in. At times there may be nearly twice as many males on the marsh as will be able to maintain territories. This flurry of activity is usually short lived as the approximate boundaries of the territories are soon determined. By the last of April the business of determining territories is pretty well over and the excess males are apparently on submarginal territories or possibly dispersed to the uplands. Each year four or five territories along the southwestern shore of the area were found to be without hens.

About the first of May the first eggs are laid and starting with egg laying the emphasis seems to shift from gaining a suitable territory to one of defense of the present boundaries and to the defense of the nests in the territory from intruders. This attitude of defending the territory is maintained until the last of his young leave the marsh when the male goes with them. The size of the territory remains about the same throughout the season though the amount of fighting declines steadily after laying is well under way.

If in the pre-nesting season a male is removed from his territory it is immediately taken over by either the adjoining males or a new male. Later in the season this is usually not the case. On April 17, 1947 male Number 29 was trapped and apparently injured as he did not act normally when released. Instead of remaining on the area he flew into the nearby woods and hid. As soon as the disturbance subsided the two adjacent males took over the area and established new boundaries. Three days later male Number 29 returned and re-established his territory. On April 12 a male disappeared from his territory and this area was then occupied by a new male who maintained about the same boundaries as the previous male.

Figure 4 shows the territories as determined for 1947 and 1948. In most cases the males occupied approximately the same territories as the previous year with but minor shifts in boundary. In a few cases the areas maintained were different. An examination of Figure 4 shows that of the 13 territorial males marked in 1947, 8 were back the following year. Number 7 is not shown in Figure 4 for 1948 as it was collected as soon as it arrived on the marsh during the spring of 1948. It was taken in the area later occupied by Number 83. Male Number 30 was on the same area in the marsh during 1946, 1947 and 1948, but did not return in 1949.

The actual competition for an area is only partly backed by actual physical force. Most of the competitive action involves display and bluff. When the red-wings first arrive in spring they do not usually show the red of the epaulets either when sitting or when in flight, (see Fig. 2a). As the season advances, there is a greater tendency for the epaulets to be displayed (see Figs. 2b, c, d, e,). By the first of April singing and display is prominent and the epaulets are displayed continuously under normal conditions. The epaulets are displayed almost continuously while the bird is on the marsh until they start drifting with the flocks of young in July.

There are several basic display patterns: at rest (Fig. 2b), the song display (Fig. 2c), the directional display (Fig. 2d), the song flight (Fig. 2e), the "stretch" or "bluff" display (Fig. 3c) and the precopulatory display (Figs. 3a b).

In the relaxed position the epaulets show as a narrow line (see Fig. 2a) but as the reproductive cycle advances the muscles that control the epaulets cause them to be shown to their full extent (see Fig. 2b). At first the epaulets are not usually displayed during song but as the season progresses and the birds develop sexually the epaulets are displayed during song and soon are to be seen most of the time.

The song display (Fig. 2c) starts with the birds in the rest position as seen in Fig 2b. The bird then spreads its wings and tail, thrusts its head forward as the song starts. At the end of the song the tail and wings are snapped back into position and the bird resumes the rest position. This song display may be given without provocation, due to stimulation by other red-wing songs, the presence of female or male red-wings, or stress such as the presence of a nest predator. This sequence of movements is based on careful study of movies taken of several males during the song display.

The directional display in some respects is very similar to the basic song display with the main difference being that the display is directional and may or may not be accompained by song. It was observed to be used in two different situations: The first as a threat and the second to attract the females. It was observed many times to be displayed toward males flying over the territory at low elevations and toward males that would light near by as a warning that the area was occupied. This same display was observed to be used as part of the regular courtship of the females and as part of the precopulatory display. Even the leading edge of the wing shows the red color during this display. The male often assumes grotesque postures in directing the red wing patches up, down or to the side. There may be other situations in which this display may be used but the above seem to be the primary ones.

The victory display or flight song (Fig 2e) is normally given after successfully chasing a trespassing male from the territory. After the chase has been completed the male slows his wingbeat, spreads his tail and "parachutes" back to his singing perch. During this display he is in continuous song.

The "stretch" posture (Fig. 3c) is apparently a threat display and is probably one of the most important displays in determining territorial boundaries. When one male approaches the edge of his territory, the male in the adjacent territory will often fly to a position opposite the first male and light in the low vegetation. Both birds then draw their feathers tightly to the body and point their bills upward. The epaulets are shown fully throughout this display. When the males have assumed this posture they may remain motionless for several minutes at a time. The lower male may then climb to a position above the other participant. The positions may be reversed several times before both males fly back to the center of their respective territories, one male flying back into his territory apparently leaving that particular spot in possession of the remaining male or more rarely fight.

The roll of the female red-wing in territory formation and maintenance is

not understood. The adult (2 year old and older) females apparently come back to the same area as the one used the previous year. The first females to arrive on the marsh stay in a small localized area except when in the uplands feeding. This was demonstrated by four females which were closely observed during the spring of 1948 and by general impressions from many more casual observations on other birds.

The few observations on known first year females have shown a different pattern. The first year females usually fly into the marsh in a small compact flock of from 3 to 8 birds. When they arrive at the potential breeding area they alight on the highest available perch rather than down in the marsh. At this time they do considerable calling and may circle the marsh or localized areas of it as though looking it over. Their calling and presence excites the males who display and sing vigorously. The males use the directional type of display and may even fly after the females as they leave the marsh and fly to other suitable areas. The two banded first year hens collected from these flocks were found to have been raised one-half and one mile away respectively.

We have no data on pair formation and only scattered observations on post-pairing behavior.

Complete breeding or copulatory behavior was observed 8 times. All 8 of these observations showed the same basic pattern.

Attention was brought to this behavior pattern first by a low call uttered by the female. Usually one or more males would fly to the higher marsh vegetation above her and display. The males would drop down out of sight in the dense vegetation and it is assumed that copulation took place though no positive observations were made.

In some cases the males did not respond to the female's call and she would then fly in low circles over the marsh still calling. This "teasing" flight invariably caused from one to eight or nine males to fly after her. She then flew directly from the marsh for a considerable distance. She then lit and the males displayed to her with the directional type of display. This was usually accompanied by song. The hen then fluttered her wings and held them in a begging position similar to a fledgling bird begging for food except that the head was held low and the bill closed (see Fig. 3a). This begging position seemed to be the signal for the male to drop to the ground and again display to the hen. The hen then lifted her tail to about a 45° angle. The male approached the hen so that his bill was about an inch from the hen and circled the bill always pointing towards her (see Fig. 3b). The male then mounted and copulated. As soon as copulation was completed the male flew back to the marsh. The hen then usually flew back to her area also.

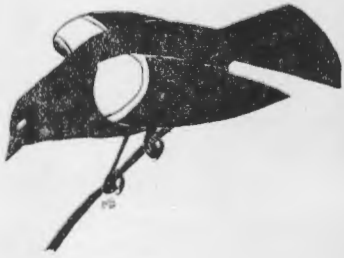
While the greatest amount of copulation probably takes place in the marsh the location of the 8 observations by us were 3 in trees and 5 on the ground. All but one of the cases in a tree were off any known territory.

About the only difference between the display in the tree from that on the ground is that the male "sidles" up along the limb to the female rather than going through the "circle" dance.

While the birds seemed to be paired while on the marsh the fact that several males often went to the female after she had given the pre-copulatory call suggested that the bond may not be very definite.

A

B



D

C

E

Fig. 2. Some display patterns of single red-wings:
A—at rest without epaulets showing, B—at rest with epaulets displayed, C—the song display, D—the directional display and, E—the victory or song flight.

We have but one observation in which all of the participants were marked. A banded hen, later known to nest on male 84's territory, called from the ground while on an unoccupied area. Males 84, 79, and 29 left the marsh and flew to the immediate vicinity and courted with the directional display. Males 84 and 29 started fighting and left the area. Male 79 proceeded to go through copulatory behavior and left. At this moment male 29 returned and again displayed. The hen again displayed and went through copulatory behavior with male 29.

The impression is that the hen probably copulates most frequently with the male on whose territory she has taken residence but, when she is sexually ready for copulation, she will respond to the first available male.

Nesting

During 1946 the study was not carried out on an intensive basis. Phenological data and general habits of the breeding birds were observed so that we were in a position to make detailed observations from the start of the 1947 breeding season. In 1948 time did not permit the duplication of the 1947 observations but allowed mainly the collecting of data that would help fill gaps in our previous data.

The first nest building was observed on April 24, in 1946, and on May 1, 1947. The process of building nests usually proceeds on a regular and definite schedule. After the location for the nest has been determined, the hen goes to work on its construction. This is typically divided into four distinct phases covering four days. On the first day a foundation platform is built from coarse, wet marsh grass. As soon as this platform is completed ,it is left until the next day when the structural part of the sides is completed. This is made from medium sized grass. Again the nest is left when this job is completed. On the third day the sides are lined, followed by the completion of the nest on the fourth day by adding the lining to the bottom. The lining material is fine grass. The construction of the nest starts with a foundation followed by erection of the structural part of the sides. The process then starts at the top and works down as the lining is put in place. This is quite similar to the sequence found by Emlen (1941) for the tricolored red-wing.

The above description applies to the early and peak nesting period. Early in the season a hen may make several false starts before more than a foundation is built. Also very early in the season, several days may elapse before the sides are added to the platform. Once the sides are started the nest is completed in normal sequence or deserted.

If the nest is destroyed late in the season the hen may build her nest in two days and in one or two cases it is believed that a nest was started and completed on the same day. All of the nest construction is carried on by the

Table 1
Nest Measurements*

	No. of Nests	Max.	Min.	Average
Ht. from water	117	30	8	21
Apparent depth in vegetation	117	27	6	12.7
Outside diameter	22	5.1	4.1	4.7
Inside diameter	22	3.3	2.8	3.0
Outside height	22	7.7	3.2	4.6
Inside depth	22	3.2	2.6	2.8

* All measurements in inches.

female. A summary of nest measurements is given in Table 1.

The nest of red-wings have been found in many locations varying from on the ground to twenty feet up in a tree and from over water in the marsh to alfalfa fields in the uplands. The preferred nesting site is in the edges of fairly heavy, stiff emergent vegetation. In the present study, nests were found from two inches above the water to eight feet up in small trees.

Upon analyzing the data on location of the nests in the vegetation it was found that there was little consistency in the height above the ground or water. Upon re-examining the data from several hundred nests it was found that the nest is located in relation to the "apparent" height of the vegetation. The nests averaged 12.7 inches down in the vegetation and varied from a minimum of six inches to a maximum of 27 inches. The "apparent" height of the vegetation is taken as that area that appears as a more or less solid mass and does not include the occasional stem that may go much higher. The reason for this location seems to be that the red-wing flies into the nest from above and the nest is located for this direct approach.

The most important plant species for nesting in this area are the cattails and bur-reeds. Nests were also found in clumps of tussock grass and various herbaceous plants, shrubs and trees. The preferred location is near the edge of the vegetative types and over water.

After the nest has been completed there is typically a four day waiting period before egg laying starts. This is again a typical picture seen during the height of the breeding season but the loafing period may vary from ten days very early in the season to laying the next day late in the season.

Laying usually occurs during the morning and one egg is deposited each day until a full clutch is completed. The data gathered from 153 nests considered to have complete clutches showed that the red-wing averages 3.7 eggs per nest with a range of from two to six eggs. We were unable to detect much difference in the average clutch size with the advance in the season though there were some indications that the clutch size might be slightly more variable during the latter part of the nesting season.

Incubation usually starts with the laying of the last egg though there is some variation between individuals and season. There are indications that some of the birds start incubating after laying the second egg while others wait a day or two after laying the last egg before starting to incubate. As in nest building the female does all of the work. Our observations on 63 nests showed that the incubation period is usually 12 days though cases of hatching coming on the eleventh and thirteenth days were observed. This is the same as found by Fautin (1941) in the yellow-headed blackbird.

Only six of 270 nests examined contained cowbird eggs. Each nest contained from one to three (1, 1, 1, 1, 2, 3,) cowbird eggs. In those nests which went to completion there seemed to be no detrimental effect of crowding on either the young red-wings or cowbirds. None of the nests observed to be parasitized was over water while the six parasitized nests were found among the 34 nests built over dry land.

At hatching the birds are blind, nearly naked and very weak. It is all they can do to lift their heads into feeding position. Even before they are com-

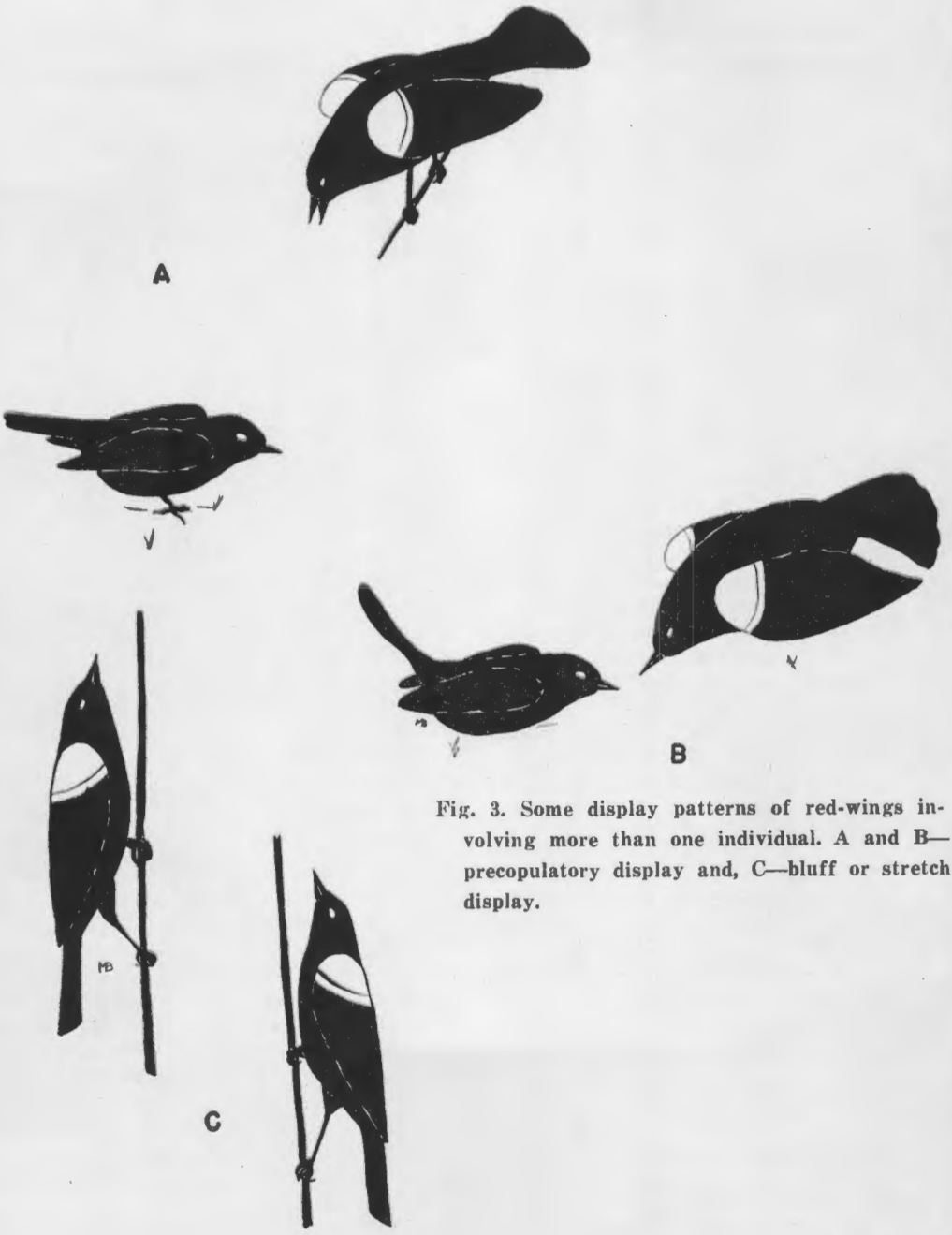


Fig. 3. Some display patterns of red-wings involving more than one individual. A and B—precopulatory display and, C—bluff or stretch display.

pletely out of the egg they will gape when stimulated by jarring the nest. Within a few minutes after the bird has hatched the female removes the eggshell by taking it in her beak and flying off with it.

Development is rapid and on the sixth day their eyes open. This is followed on the seventh and eighth days by considerable "peeping." The cause for this is not understood but it seems to be correlated with a lessened amount of brooding by the female. During bad weather this period is marked by heavy nest mortality (see Table 2).

On the eighth day fear reaction is first seen. This is shown by failing to "gape" when the nest is jarred and crouching. On the ninth and subsequent days a disturbance is apt to cause them to leave the nest. Normally the young leave on the eleventh or twelfth day but in case of cold weather may remain in the nest until the thirteenth day. During this period the female takes care of the young by herself with but a little help from the male. On occasion we have observed the adult males carrying food in the vicinity of the nest and assume that they were feeding the young as observed by Allen (1914).

Table 2

Red-wing Nesting Statistics

	Nests	Eggs	Young
Nests started	118		
Nests completed	101		
Nests deserted	2		
Nests lost track of	8		
Nests laid in	91	325	
Nests deserted before incubation	3	4	
Nests deserted after incubation started	9	29	
Lost eggs	12	29	
Failed to hatch	9	9	
Destroyed	1	4	
Hatched	78	258	258
Disappeared	19		28
Died in nest (weather)	14		39
Killed by predators	4		14
Fledged	57		170

When the young blackbirds leave the nest, they climb about in the vegetation and swim readily when it is necessary to cross a little open water to get to more desirable cover. These young stay in the marsh from ten to fifteen days before they start to leave on the daily foraging trips. As soon as the young fledge, there is a noticeable increase in activity by the male in feeding the young. This increases until the young leave the marsh when the male takes an active and possibly a leading role in feeding them.

When the young are first able to fly, they will flush fairly readily and fly in approximately a straight line until too tired to continue if not interrupted. Usually they get nicely started when an adult male will give chase and knock them back down into the marsh. When they are old enough to fly fairly well they leave the marsh in small flocks accompanied by the adult males and females.

It is possible that most of the care given the young after they leave the marsh is by the male. It is stated that red-wings regularly raise two broods (Allen, 1914). If two broods are raised in Wisconsin, the hen would have to nest early, have no disturbance and leave the young at a fairly early date. That this is possible is shown by Fig. 5. This same figure also shows that only a small portion of the hens actually do so if the minor peak at the tail end of the graph indicates second nesting rather than a late concentration of renestings due to predation, weather or some other influence.

Table 3

Number of young per nest

No. of young	No. of nests
1	11
2	23
3	78
4	69
5	3
6	1

Nesting Success

In 1946 absolutely complete nesting data for the small marsh were not obtained but only 28 young were known to have reached the fledging stage. A female mink raised her young in an old muskrat den on one edge of the area and apparently was very partial to nestling red-wings.

In 1947 complete data on all but five or six nests were obtained. The number of territorial males was about the same and the hen population seemed to be similar but 170 young were known to have fledged. The main difference seemed to be the lack of the family of mink. The nesting statistics are given in Table 2 and Fig. 5.

These data indicate that the average nest that goes to completion starts with 3.7 eggs and fledges 3.0 young. From superficial observations over many marshes it is believed that the 1947 data are relatively normal for areas without extreme spring water fluctuations.

A similar figure of 3.2 for the number of young fledged was obtained from 185 nests of young old enough to band (about 8 days old) from other marshes. The number of young per nest varied as shown in Table 3.

The red-wing seems to be a very persistent renester and may try three or more times before fledging a nest of young.

Summary

Field studies on the breeding behavior of the red-wing blackbird were carried on during the spring and summer of 1946, 1947, and 1948.

The birds were live trapped and banded with both the Fish and Wildlife Service aluminum band and colored celluloid bands so that individuals could be identified in the field. The most effective technique was to use a single cell, drop door type of trap and to use light green, bright blue, red, yellow, and white celluloid bands with the Fish and Wildlife Service band for identification.

The spring migration started with the arrival of vagrants and followed by resident adult males, resident first year males, migrant adult males, resident adult females, migrant first year males and last, the migrant females.

The red-wing is highly territorial and the present study indicates that the territory is tentatively located though not usually defended by the first year males. The territory, once established, is returned to year after year. The establishment of a territory involves threat display, singing, and physical combat.

There are several basic display patterns which include the rest pattern, song display, directional display, song or victory flight, the stretch display and the precopulatory display.

Nest building starts during the last of April or first of May. These nests average 12.7 inches down in the vegetation and are 4.7 inches in outside diameter, 3.0 inches in inside diameter, 4.6 inches in outside height, and 2.8 inches in inside depth.

The clutch size is 3.7 (2 to 6) eggs. These eggs take 12 days to hatch and the average successful nest fledges 3.0 young.

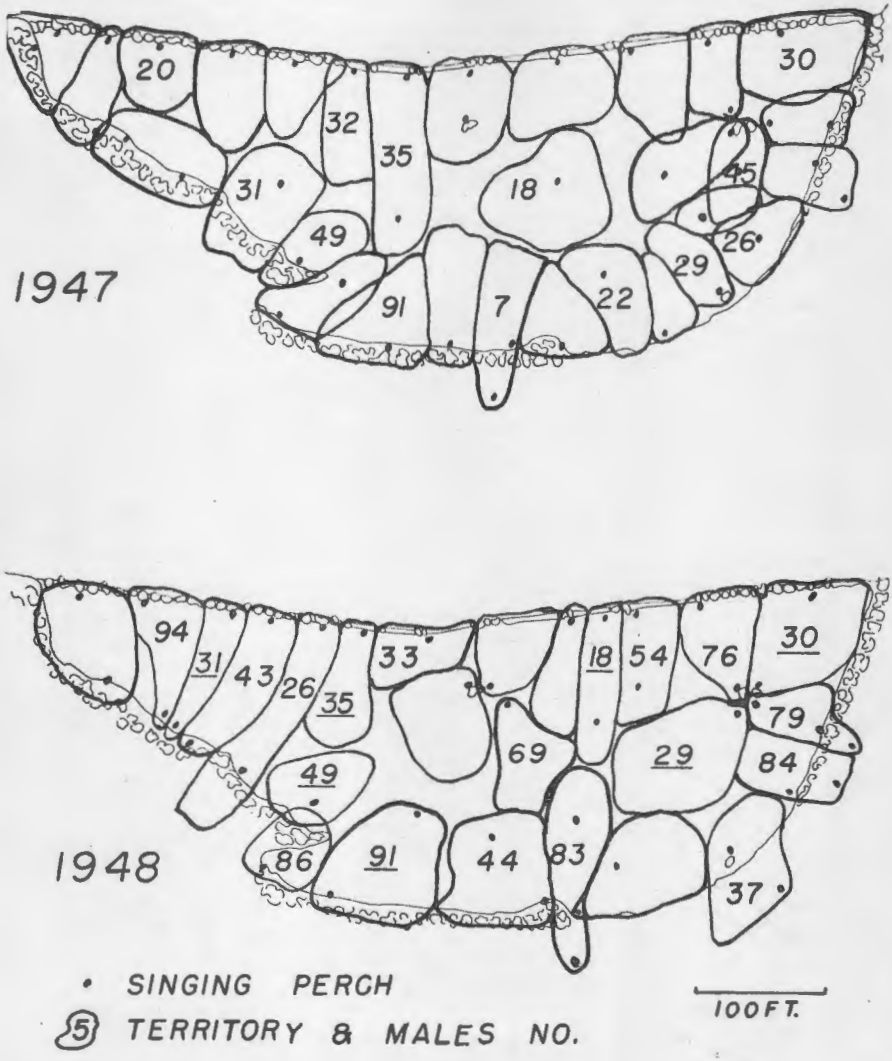


Fig. 4. Territories of red-wings as found in 1947 and 1948. The heavy lines designate the approximate boundaries of these territories and the heavy dots show usual singing perches. The numbers refer to marked males to facilitate the comparison of the territories between 1947 and 1948 on this 2.4 acre marsh..

Acknowledgements

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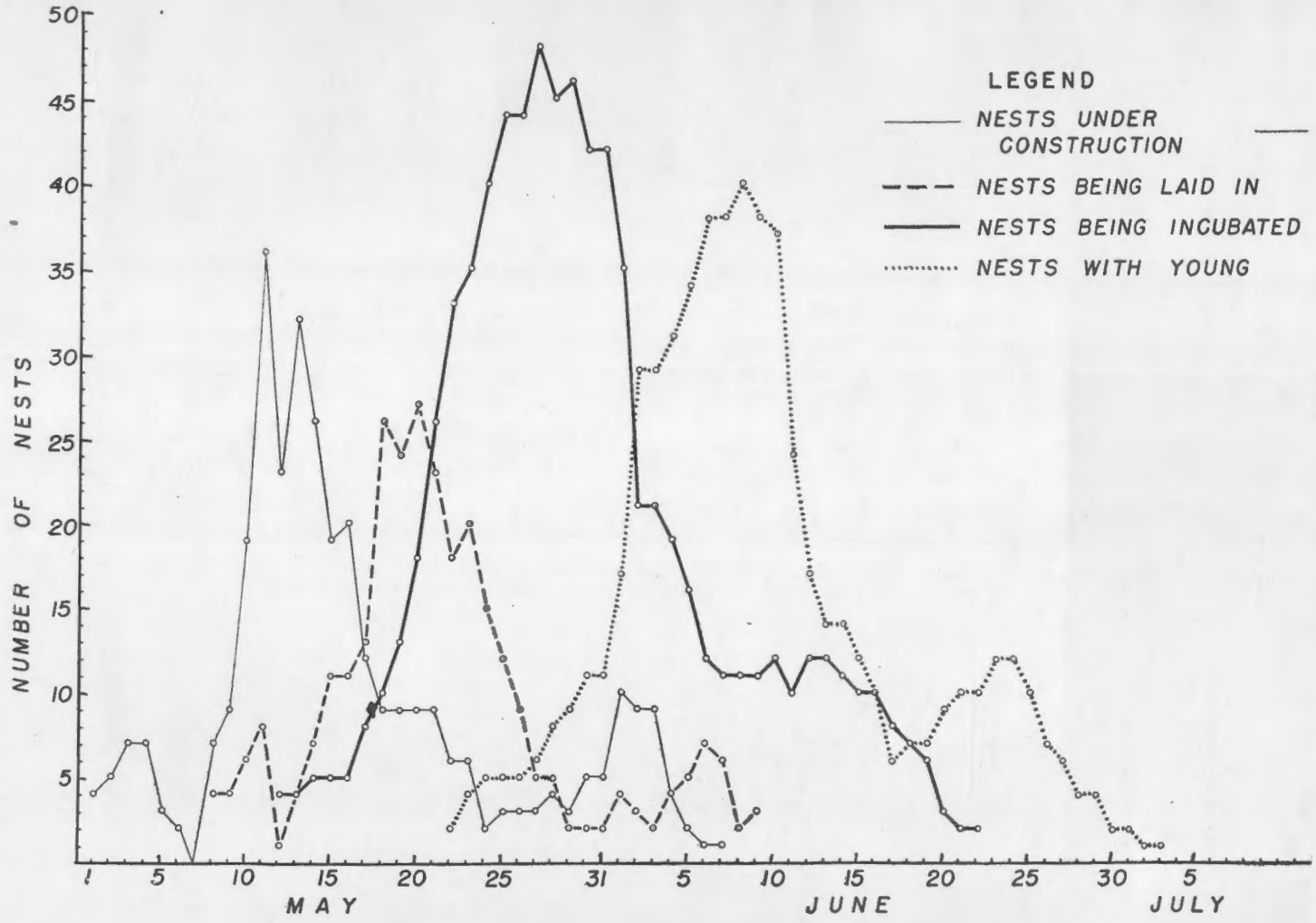

Fig. 5. Seasonal distribution of nesting activities on a 2.4 acre breeding marsh.

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———**Division of Entomology and Economic Zoology, University of Minnesota, St. Paul, Minnesota; Chicago Natural History Museum, Chicago, Illinois.**

Minnesota Waterfowl Banding Activities and Returns, 1949-50

by

Forrest B. Lee and Robert Farmes

This analysis of banding information for Minnesota involves two categories: (1) Recovery data of waterfowl banded in the state and (2) Data of all banded waterfowl recovered in the state.

1. **Data of waterfowl banded in Minnesota.**

Ducks were banded in Marshall County at the Mud Lake Federal Migratory Waterfowl Refuge from August 6 to October 21, 1949 and at the Thief Lake Refuge and Public Shooting Grounds from September 15 to October 10. The Refuge Manager at the Mud Lake Refuge furnished this office with data of ducks banded there, making possible an analysis of recoveries of all waterfowl banded in the state.

Table 1 shows data of banding operations at Thief and Mud Lakes. Three hundred fifteen of the 525 ducks banded were juveniles.

Ninety-two ducks, or 17.5 per cent of the 525, were shot by hunters according to banding returns. Of these, 57 ducks, or 62 per cent (52 mallards, 3 black ducks, and 1 blue-winged teal) were shot in Minnesota.

Eighty-five of the 489 Minnesota banded mallards were recovered. Table 2 shows dates and location of their recovery.

Table 3 summarizes data of ducks banded at Thief Lake in 1948. A total of 677 ducks were banded in Minnesota in 1948 and 1949. In the two years 117 ducks, or 17.3 per cent, of these have been recovered. Seventy-three ducks, or 62.4 per cent, of those recovered were taken in Minnesota.

Figure 1 shows location of recovery by county of the 53 mallards shot in the state as well as location by state or province of the other 32 mallard recoveries. The largest number (18) were shot in Marshall County where they were banded. Figure 2 shows location of mallard recoveries by states and provinces.

2. **Data of banded waterfowl recovered in Minnesota.**

Reports were received from the Bird Banding Office of the U. S. Fish and Wildlife Service up to July 1, 1950 of a total of 436 waterfowl recovered in the state.

Table 4 summarizes these returns by species and place of banding. Fourteen species, which had been banded in twenty-seven states and provinces, were shot in Minnesota. Sixty-three per cent of the waterfowl recovered were mallards. Figure 3 shows the place of banding by number, state, and province.

The distribution of band recoveries by counties for all species is shown on Figure 4. Banded waterfowl were taken in 72 counties.

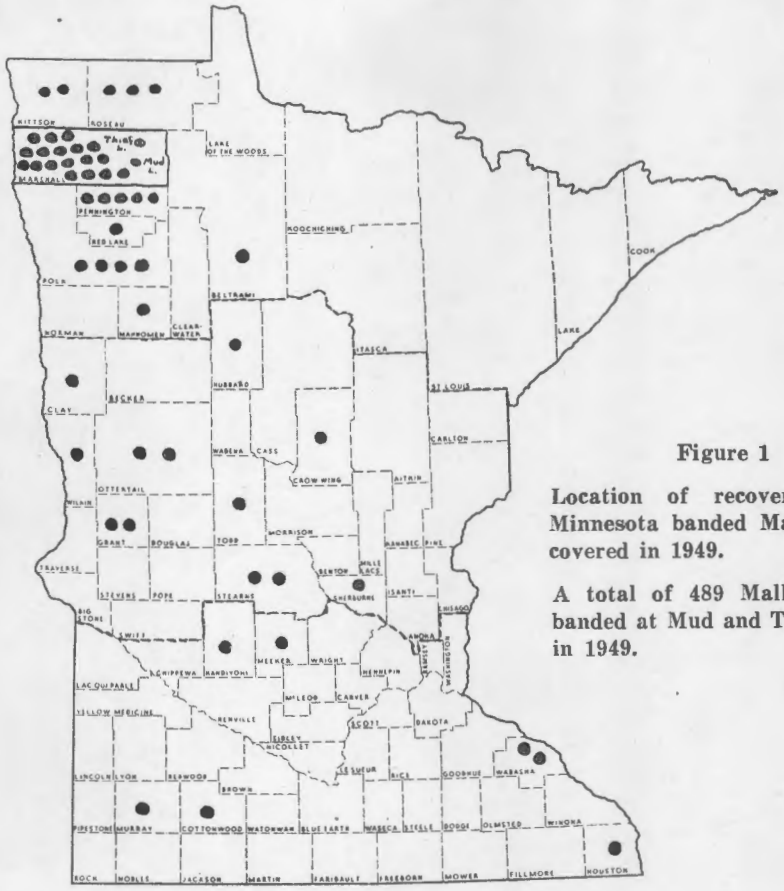

Figure 1

Location of recovery of 85 Minnesota banded Mallards recovered in 1949.

A total of 489 Mallards were banded at Mud and Thief Lakes in 1949.

Table 5 shows the year of banding by species and suggests the ages that individuals of the various species reach.

Table 6 shows the months that the 436 waterfowl were banded in the various states and provinces. If one considers July, August, and September as the months when the ducks are occupying breeding areas, then Table 6 can be interpreted to show that in addition to Minnesota, Manitoba, Alberta, Saskachewan, Wisconsin, and North Dakota raise a large majority of the ducks shot in Minnesota.

Dates of recovery during the hunting season are shown on Table 7. Note that most of the blue-winged teal, 32 out of 48, were taken on the opening week-end of the season. Banded mal-

FIG. 3

PLACE OF BANDING OF 436 DUCKS RECOVERED IN MINNESOTA IN 1949

FIG. 2

LOCATION OF RECOVERY OF 85 MALLARDS BANDED IN MINNESOTA IN 1949

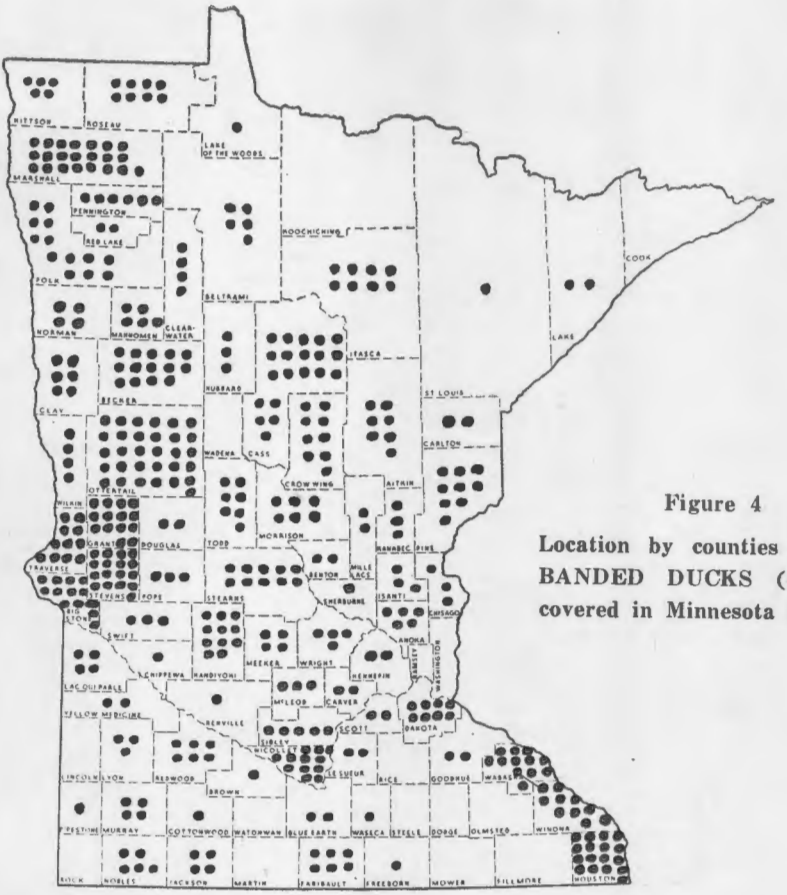

Figure 4

Location by counties of ALL BANDED DUCKS (436) recovered in Minnesota in 1949.

lards were taken in fair numbers all through the hunting season.

The presence of mallards in the state throughout the hunting season is shown also in Figure 5.

Figure 6 again illustrates how most of the blue-winged teal were taken during the opening week-end of the hunting season. Most of these teal were banded as young birds in Canada as is shown by Figure 8. Since blue-winged teal banded as juveniles in Canada are shot in Minnesota early in the hunting season, a question is apparent — are Minnesota-produced teal still in the state at this time? Large numbers of young blue-winged teal should be banded in Minnesota to give further information on the matter.

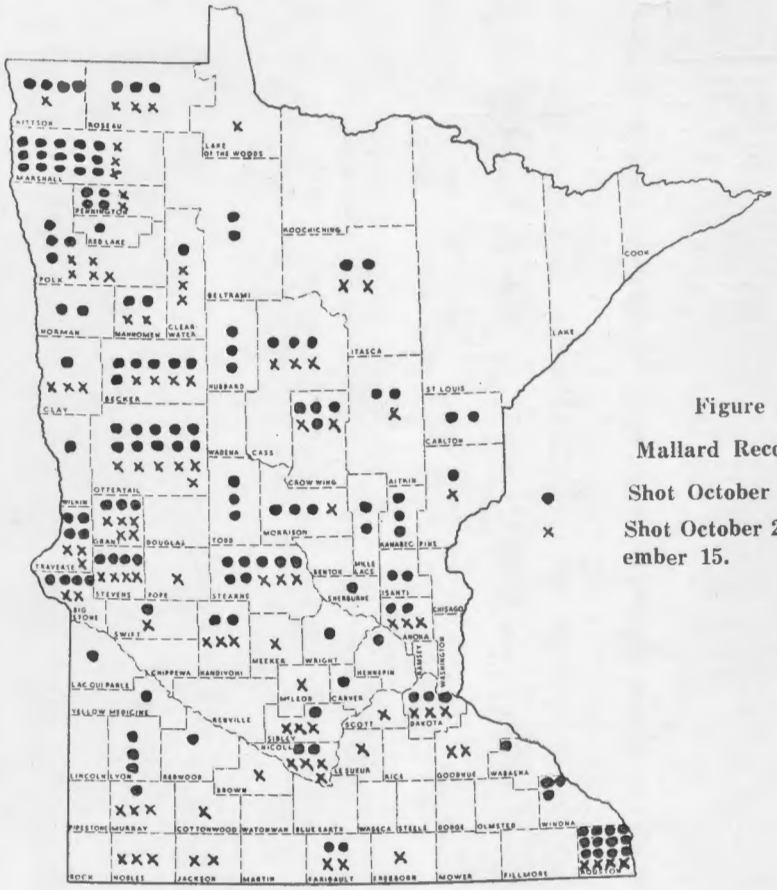

Figure 5

Mallard Recoveries

Shot October 7 to 20.

Shot October 21 to November 15.

Figure 7 shows that young mallards raised in Canada were killed throughout the state. It also indicates that some mallards raised in Wisconsin are shot in Minnesota.

Figure 9 shows the distribution of redhead recoveries and probably indicates the general distribution of this species in the state during the fall.

Extensive banding operations are anticipated for the late summer and fall in Minnesota. Young ducks, especially blue-winged teal, should be banded in large numbers to give needed information about the movements of our Minnesota—raised waterfowl. A projection-type banding net will be used in waterfowl concentration areas and drives will be made of potholes and small water areas to secure young birds.—**Minnesota Division of Game and Fish, Pittman—Robertson Unit, St. Paul, Minnesota.**

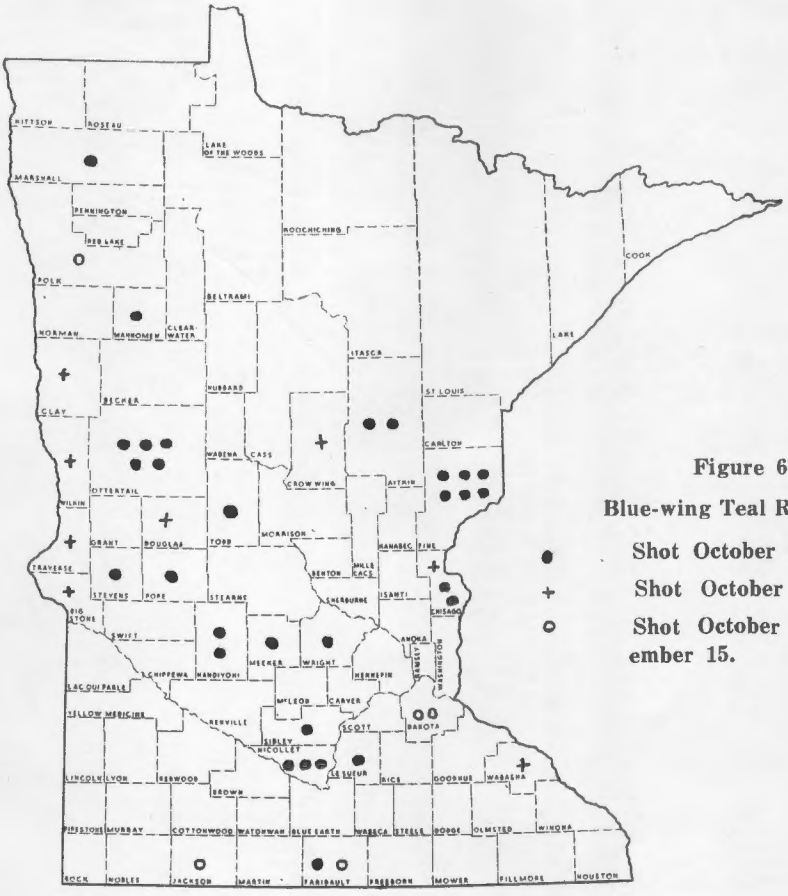

Figure 6

Blue-wing Teal Recoveries

- ● **Shot October 7-10.**
- \+ **Shot October 11-20.**
- ○ **Shot October 21 November 15.**

TABLE 1

DATA OF WATERFOWL BANDED IN MINNESOTA—1949

Species	Thief Lake	Mud Lake	Total	Recoveries
Mallard	139	350	489	85
Black Duck	2	13	15	5
B. W. Teal	7	3	10	1
Redhead	9	—	9	—
Wood Duck	—	1	1	—
Pintail	1	—	1	1
Coot	8	—	8	—
Totals	166	367	533	92

Figure 7

Location of Recovery of Mallards banded in 1949.

● Banded in Canada.

o Banded in Wisconsin.

TABLE 2

RECOVERY DATA OF 85 MALLARDS BANDED IN MINNESOTA—1949

No Date	Oct. 1-10	Oct. 11-20	Oct. 21-30	Oct. 31-Nov. 9	Nov. 10-19	Nov. 20-29	Nov. 30-Dec. 9	Dec. 10-19	Dec. 20-29	Dec. 30-Jan. 9	Total
Minnesota											
North	6	10	10	6	1	1					34
Central	1	4	3	3		1					12
South		1		3	2	1					7
Manitoba					1	1					2

Figure 8

Blue-wing Teal Recoveries of Birds banded in 1949.

- ● Banded in Canada.
- \+ Banded in Wisconsin.
- ○ Banded in North Dakota.
- ⊗ Banded in Minnesota.

North Dakota			1			1						2
South Dakota						1						1
Wisconsin			1	3								4
Iowa				1		1	1					3
Illinois					2		1	1	1			5
Arkansas	1		1				1	2	1	2		8
Tennessee									1			1
Mississippi	1									1		2
Louisiana								2				2
Texas											1	1
Missouri	1											1
Totals	10	15	16	16	6	7	3	5	3	3	1	85

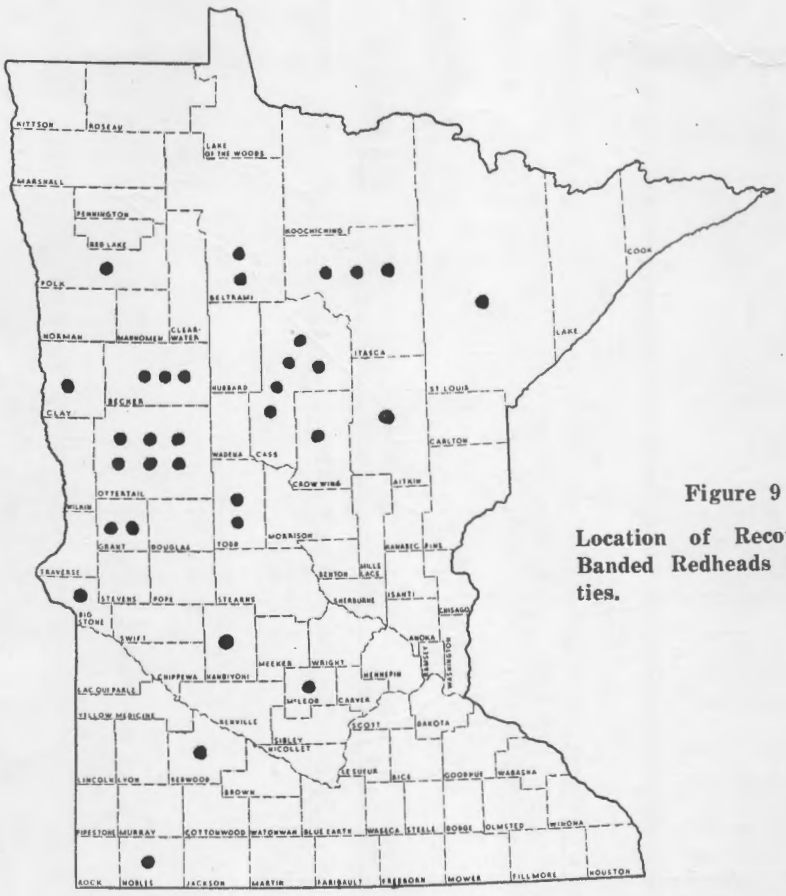

Figure 9

Location of Recoveries of Banded Redheads by Counties.

TABLE 3

DATA OF WATERFOWL BANDED AT THIEF LAKE IN 1948

Species	Banded	Recovered 1948	Recovered 1949	Total Recovered
Mallard	57	12	2	14
Redhead	66	7	1	8
B. W. Teal	18	1		1
G. W. Teal	3	1		1
Black Duck	3			
Lesser Scaup	3			
Wood Duck	1		1	1
Ruddy Duck	1			
Coot	21	1		1
Totals	173	22	4	26

Table 4

SHOWING PLACE OF BANDING OF 436 DUCKS

RECOVERED IN MINNESOTA IN 1949

	Mallard	Blue-wing Teal	Redhead	Pintail	Lesser Scaup	Green-wing Teal	Baldpate	Black Duck	Canvasback	Gadwall	Wood Duck	Shoveler	Ringneck	Coot	Total
Canada															141
Manitoba	38	32	22	16	1		1		2	2	1	4			
Alberta	1			1	2	4									
Saskachewan	7	1		1			3			1					
Quebec						1									
Illinois	90	1		4				3	1						99
Minnesota	54	1						3			1				59
Wisconsin	31	8						1			1				41
North Dakota	9	4	4	1	1		3								22
Oklahoma	14				1										15
Colorado	11			1											12
Michigan	1		5		5					1					12
South Dakota	3		1											1	5
Indiana	2									2					4
Kentucky	2										1				3
Pennsylvania	3														3
Ohio	4														4
Missouri	3		1												4
Washington				1		1									2
South Carolina				1	1										2
Utah			1												1
New York	1														1
Kansas	1														1
Louisiana													1		1
Nebraska			1												1
Montana		1													1
California						1									1
Labrador				1											1
Totals	275	48	35	27	11	7	7	7	3	6	4	4	1	436	

TABLE 5
SHOWING YEAR BANDED BY SPECIES

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949
Mallard	3	1	1	8	13	4	13	44	62	126
Blue-wing Teal						1			8	39
Redhead				1				1	5	28
Pintail						1		3	5	17
Lesser Scaup			1		1			1	2	8
Green-wing Teal									3	4
Baldpate									3	4
Black Duck	1						1	2		4
Canvasback									1	3
Gadwall								1		2
Wood Duck								1	2	1
Shoveler										4
Ringneck		1								
Coot										1

TABLE 6
SHOWING MONTHS OF BANDING BY STATES AND PROVINCES

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Manitoba					1	1	8	62	47			
Alberta							1	2	5			
Saskachewan							10	5				
Quebec									1			
Illinois								2	3	19	55	20
Minnesota								24	15	20		
Wisconsin				2		6	6	10	13	4	1	
North Dakota							1	8	10	1		
Oklahoma	3	2	1									9
Colorado	2	9	1									
Michigan		2	9	1								
Alabama											3	2
South Dakota		1	1					2				
Indiana				1	1					1	1	
Kentucky								1			1	1
Pennsylvania					1						2	
Ohio	1											3
Missouri			3								1	1
Washington		1									1	
South Carolina									1			2
Utah							1					
New York											1	
Kansas											1	
Louisian											1	
Nebraska				1								
Montana								1				
California											1	
Labrador										1		

TABLE 7

DATES OF RECOVERY OF 436 DUCKS

Species	Date Unknown	Oct. 7-10	Oct. 11-20	Oct. 21-30	Oct. 31 Nov. 9	Nov. 10-15
Mallard	32	71	51	74	17	30
Blue-wing Teal	3	32	8	4	1	—
Redhead	4	7	6	11	6	1
Pintail	1	12	8	3	3	—
Others	4	11	6	19	9	2
Total	44	133	79	111	36	33

A Migration List from Fargo, North Dakota[1] 1910-49

by

O. A. Stevens

About 1920, when I began to prepare news material on birds,[2] there was a scarcity of local data. Norman Criddle's "Calendar of Bird Migration" (Auk 39:41-49) for Aweme, Manitoba, shortly became the most-used reference. The present list covers a longer period but is not so nearly complete. It perhaps should be considered as what is likely to be observed rather than what actually occurs. However, I have felt that the records should be made available to people who may be interested. Names are according to the AOU Checklist with revisions according to Audubon Field Notes of February, 1950.

Water birds are notably absent because the immediate area is not suitable and because observations were made largerly in the daily house- to-office walk, supplemented by occasional longer walks afield. With the beginning of banding in 1925, daily walks into the college gardens were established. The traps frequently took birds which would not have been seen otherwise. The addition of water-baited traps in 1931 added many species. Records of fall departures were begun in 1922. Records of birds difficult to identify, such as Gambel's sparrow, Nashville warbler, the thrushes and fall warblers, are largely from trapped birds.

Some expression of variation in time of arrival seemed desirable and it was thought that average variation in number of days might answer the purpose and would be intelligible to the average reader. This has been calculated only for species which are seen with reasonable regularity and which are readily recognized.

Records of arrival (or departure) are subject to two kinds of variations, actual and observational. There seems little question that time of spring arrival depends considerably upon weather and that temperature is a dominant factor. The birds are urged northward by increasing day length but delayed by the lag in temperatures. For transients, observed dates are likely to indicate only stopovers.

Observational variations result from many factors. Regularity and extent of observations, size and character of area covered, even reliability of the

1. Paper No. 1, Journal Series, from the North Dakota Institute for Regional Studies.
2. Circulated 1924-39 to North Dakota newspapers. A file is in the library of the Minnesota Museum of Natural History, N. D. Agricultural College and Masonic Library at Fargo. N. D. Historial Society, University of South Dakota Museum and Morningside College.

observer, are included. I believe that abundance of a species is a major factor. Swenk (Wils. Bull. 42:93,1930), referred to a "peripheral lag in migration" but I think it will be found that uncommon species are likely to yield late records regardless of migration. For example, the bluebird is a well-known early migrant, but my dates are usually late because the birds only rarely wander into the area. The robin is a common and easily observed species but usually only a very few indiviuals appear at first. They are restless and may or may not be in a limited area at the time of observation. This may cause a variation of a few days in date first seen.

I have used averages for three or more years in the table. As a general rule averages are not materially changed by the inclusion of more than five years. I have suspected that some of my early records might be less dependable, but those of recent years seem to show about as many unusually late or early records. In a comparison of the present averages with those of 63 common species up to 1930, the average for 13 species remains the same; for 21 others it is one day later or earlier. The others differ by two to four days except in the case of cedar waxwing and purple martin, which now are both six days earlier, and bluebird which shifted from March 29 to April 14 because several May dates have been added. In the first calculation two records, May 24 and 29, were excluded. In the present figures dates up to May 10 have been included, but a few later ones omitted.

TABLE ONE

DATES OF SPRING ARRIVAL

Species	Average Date	Earliest Date	Latest Date	Average Variation	No. Years Observed
Horned Lark	Feb. 28	Feb. 1, 1931	Mar. 22, 1947		17
Crow	Mar. 17	Feb. 21, 1946	Apr. 4, 1940		30
Lapland Longspur	Mar. 18	Mar. 6, 1927	Mar. 25, 1934		12
Tree Sparrow	Mar. 22	Mar. 1, 1936	Apr. 14, 1937	7.2	33
Slate-colored Junco	Mar. 25	Feb. 23, 1930	Apr. 11, 1937	5.8	37
Robin	Mar. 26	Mar. 14, 1945 Mar. 14, 1946	Apr. 11, 1911	6.7	39
Western Meadowlark	Mar. 27	Mar. 15, 1927	Apr. 11, 1937	5.9	33
Killdeer	Mar. 30	Mar. 14, 1946	Apr. 15, 1923 Apr. 15, 1948	8.2	35
Red-winged Blackbird	Apr. 3	Mar. 18, 1945	Apr. 15, 1913	7.8	33

Species	Average Date	Earliest Date	Latest Date	Average Variation	No. Years Observed
Bronzed Grackle	Apr. 7	Mar 21, 1946	Apr. 13, 1914 Apr. 13, 1936	5.6	37
Brown Creeper	Apr. 8	Mar. 27, 1939	Apr. 25, 1923	6.0	25
Song Sparrow	Apr. 8	Mar. 24, 1938 Mar. 24, 1939	Apr. 20, 1911	6.4	34
Mourning Dove	Apr. 11	Mar. 22, 1945	Apr. 25, 1910	7.0	33
Rusty Blackbird	Apr. 11	Mar. 21, 1926	Apr. 29, 1931		15
Geese	Apr. 14	Mar. 15, 1922	May 11, 1940		18
Bluebird	Apr. 14	Mar. 18, 1945	May 29, 1926		19
Yellow-shafted Flicker	Apr. 14	Mar. 29, 1925	Apr. 28, 1928	5.4	30
Fox Sparrow	Apr. 16	Mar. 25, 1928	May 14, 1935		23
Ruby-crowned Kinglet	Apr. 17	Mar. 27, 1910 Mar. 27, 1919	May 11, 1912	6.9	37
Sparrow Hawk	Apr. 18	Mar. 22, 1925	May 2, 1920		6
Golden-crowned Kinglet	Apr. 18	Ar. 2, 1946	Apr. 3, 1936		18
Eastern Pheobe	Apr. 19	Apr. 7, 1932	May 6, 1923		10
Hermit Thrush	Apr. 19	Apr. 11, 1930	May 11, 1943		16
Loggerhead Shrike	Apr. 20	Apr. 27, 1938 Apr. 27, 1939	May 7, 1943		16
Vesper Sparrow	Apr. 20	Apr. 12, 1925	May 2, 1928	3.3	27
Yellow-bellied Sapsucker	Apr. 22	Apr. 7, 1932	May 15, 1921		17
Myrtle Warbler	Apr. 23	Apr. 13, 1916 Apr. 13, 1927	May 12, 1912	6.0	36
Belted Kingfisher	Apr. 24	Apr. 5, 1925	May 8, 1921		4
Brewer's Blackbird	Apr. 25	Apr. 17, 1932	May 29, 1943		9
Wilson's Snipe	Apr. 25	Apr. 16, 1932	May 6, 1934		12
Chipping Sparrow	Apr. 26	Apr. 6, 1910	May 6, 1918	4.2	34
White-throated Sparrow	Apr. 26	Apr. 15, 1930	May 5, 1947	5.4	39
Savannah Spar-					

Species	Average Date	Earliest Date	Latest Date	Average Variation	No. Years Observed
row	Apr. 28	Apr. 19, 1932	May 14, 1944		13
Purple Martin	Apr. 29	Apr. 15, 1933	May 15, 1926	7.0	36
Cowbird	Apr. 29	Apr. 4, 1921	May 26, 1914	5.8	29
Lincoln's Sparrow	Apr. 29	Apr. 19, 1927	May 10, 1947	3.7	23
Purple Finch	Apr. 30	Apr. 14, 1938 Apr. 14, 1939	May 20, 1925		17
Swamp Sparrow	May 1	Apr. 17, 1932	May 25, 1931		13
Orange-crowned Warbler	May 2	Apr. 22, 1931	May 13, 1923	5.1	17
Greater Yellow-legs	May 5	Apr. 27, 1923	May 14, 1944		3
Clay-colored Sparrow	May 5	Apr. 30, 1934	May 12, 1919	2.7	26
Gambel's Sparrow	May 5	Apr. 25, 1946	May 13, 1944		14
Brown Thrasher	May 6	Apr. 24, 1946	May 19, 1917 May 19, 1918	4.2	38
Lark Sparrow	May 6	Apr. 24, 1942	May 14, 1947		14
White-crowned Sparrow	May 6	Apr. 6, 1910	May 22, 1942		19
Olive-backed Thrush	May 7	Apr. 25, 1924	May 24, 1928		23
Tree Swallow	May 7	Apr. 29, 1942	May 15, 1947		10
Harris's Sparrow	May 7	Apr. 29, 1932	May 15, 1917	2.9	37
Pine Siskin	May 9	May 2, 1920	May 23, 1935	6.2	20
House Wren	May 10	May 1, 1923	May 18, 1931	3.7	31
Palm Warbler	May 10	Apr. 25, 1942	May 23, 1935	4.9	24
Water-thrush	May 10	Apr. 2, 1930	May 16, 1945	3.5	27
Towhee	May 10	Apr. 26, 1925	May 19, 1929	4.8	19
Blue Jay	May 11	Apr. 18, 1948	May 24, 1945		10
Gray-cheeked Thrush	May 11	Apr. 23, 1926	May 23, 1941		26
Black and White Warbler	May 11	Apr. 28, 1940	May 24, 1939		20
Chimney Swift	May 12	May 3, 1941	May 19, 1945	3.3	38
Least Flycatcher	May 12	Apr. 26, 1930	May 24, 1913	4.7	35

Species	Average Date	Earliest Date	Latest Date	Average Variation	No. Years Observed
Barn Swallow	May 12	May 4, 1924 May 4, 1929 May 4, 1930	May 20, 1948	3.7	32
Yellow Warbler	May 12	May 5, 1933 May 5, 1940	May 21, 1918 May 21, 1922	3.0	33
Western Kingbird	May 14	May 6, 1936	May 28, 1911	3.8	39
Black-thr. Gr. Warbler	May 14	May 5, 1924	June 6, 1945		5
American Bittern	May 15	May 6, 1923	May 25, 1924		4
Sora	May 15	May 7, 1928	May 25, 1924		6
Nashville Warbler	May 15	May 9, 1926	May 27, 1947		7
Bobolink	May 15	May 10, 1936	May 20, 1914	2.3	29
Yellow-headed Blackbird	May 15	May 5, 1926	May 25, 1924		4
Baltimore Oriole	May 15	May 10, 1916 May 10, 1922 May 10, 1926	May 24, 1924	2.6	39
Common Goldfinch	May 15	May 9, 1946	May 23, 1944	3.9	34
Tennessee Warbler	May 16	May 9, 1949	May 23, 1931	3.0	21
Blue-headed Vireo	May 17	May 9, 1926	May 28, 1940		4
Warbling Vireo	May 17	May 11, 1941 May 11, 1942	June 2, 1924	3.4	27
Black-poll Warbler	May 17	May 7, 1944	June 3, 1936		29
Oven-bird	May 17	May 9, 1927 May 9, 1932	May 24, 1925	4.4	24
Wilson's Warbler	May 17	May 7, 1935	May 30, 1924	4.4	24
Rose-breasted Grosbeak	May 17	May 10, 1926	May 25, 1913	3.8	30
Yellow-throat	May 18	May 6, 1948	June 1, 1924	5.0	28
Catbird	May 19	May 12, 1934 May 12, 1936	May 30, 1924	3.0	36
Magnolia Warbler	May 19	May 11, 1947	May 30, 1934		23

Species	Average Date	Earliest Date	Latest Date	Average Variation No. Years	Observed
Cape May Warbler	May 19	May 18, 1930	May 24, 1913		8
Red-headed Woodpecker	May 20	May 9, 1926	June 5, 1924	5.3	31
Eastern Kingbird	May 20	May 12, 1919	May 30, 1924	3.5	36
American Redstart	May 21	May 14, 1928	May 30, 1924	3.6	25
Ruby-thr. Hummingbird	May 22	May 11, 1949	May 28, 1932		15
Yellow-throated Vireo	May 22	May 13, 1949	May 28, 1943		13
Bay-breasted Warbler	May 22	May 9, 1922	May 28, 1930		3
Nighthawk	May 23	May 15, 1936	May 30, 1945	3.4	35
Veery	May 23	May 16, 1940	May 29, 1928		8
Red-eyed Vireo	May 24	May 14, 1941	June 1, 1924		16
Canada Warbler	May 25	May 21, 1948	May 29, 1940		4
Cedar Waxwing	May 27	May 6, 1948	June 9, 1920 June 9, 1926		25
Mourning Warbler	May 27	May 22, 1942	June 2, 1931		18
Crested Flycatcher	May 28	May 15, 1934	June 7, 1943		9
Indigo Bunting	May 28	May 25, 1930 May 25, 1941	June 1, 1948		4
Alder Flycatcher	May 29	May 24, 1942	June 2, 1948		4
Connecticut Warbler	May 30	May 24, 1942	June 6, 1945		7
Dickcissel	May 31	May 14, 1928	June 13, 1926		13
Black-billed Cuckoo	June 2	May 19, 1949	June 13, 1920	4.9	23
Wood Pewee	June 3	May 23, 1936	June 14, 1945	5.2	17

TABLE TWO

DATES OF FALL DEPARTURE

Species	Average Date	Earliest Date	Latest Date	No. Years Observed
Purple Martin	Aug. 25	Aug. 17, 1939	Sept. 10, 1947	13
Chimney Swift	Aug. 28	Aug. 16, 1942	Sept. 5, 1940	21
Wood Pewee	Sept. 1	Aug. 19, 1924	Sept. 10, 1937	9
Water-thrush	Sept. 2	Aug. 19, 1930	Sept. 17, 1946	5
Red-headed Woodpecker	Sept. 3	Aug. 25, 1927	Sept. 10, 1937	10
Western Kingbird	Sept. 4	Aug. 22, 1927	Sept. 16, 1939	22
Eastern Kingbird	Sept. 5	Aug. 24, 1942	Sept. 17, 1945	22
Bobolink	Sept. 5	Aug. 26, 1934	Sept. 19, 1926	7
Rose-breasted Grosbeak	Sept. 5	Aug. 30, 1941 Aug. 30, 1947	Sept. 12, 1934	9
Warbling Vireo	Sept. 9	Aug. 29, 1934	Sept. 17, 1927	21
Ruby-throated Hummingbird	Sept. 10	Aug. 28, 1940	Sept. 16, 1942	10
Black and White Warbler	Sept. 11	Aug. 28, 1936 Aug. 28, 1942	Sept. 29, 1940	10
Connecticut Warbler	Sept. 11	Aug. 24, 1942	Sept. 18, 1947	8
Nighthawk	Sept. 12	Aug 22, 1934	Sept. 22, 1942	22
Yellow Warbler	Sept. 12	Aug. 19, 1924	Sept. 27, 1943	12
Oven-bird	Sept. 15	Aug. 29, 1933	Sept. 22, 1935 Sept. 22, 1938	8
Baltimore Oriole	Sept. 16	Aug. 24, 1929	Sept. 31, 1923	18
Barn Swallow	Sept. 20	Sept. 7, 1924	Oct. 15, 1922	24
American Redstart	Sept. 20	Sept. 4, 1932	Nov. 1, 1946	14
Least Flycatcher	Sept. 21	Aug. 30, 1931	Oct. 8, 1937	13
Wilson's Warbler	Sept. 21	Aug. 30, 1941 Aug. 30, 1947	Oct. 26, 1946	14
Phoebe	Sept. 22	Sept. 14, 1924 Sept. 14, 1931	Oct. 9, 1933	7

Species	Average Date	Earliest Date	Latest Date	No. Years Observed
		Sept. 14, 1937		
Tennessee Warbler	Sept. 23	Sept. 1, 1940	Oct. 8, 1938	8
Yellow-throat	Sept. 24	Aug. 17, 1924	Oct. 19, 1942	23
Gray-cheeked Thrush	Sept. 25	Sept. 10, 1933	Oct. 4, 1935	7
Blue Jay	Sept. 26	Sept. 17, 1931	Oct. 14, 1932	14
Catbird	Sept. 26	Sept. 9, 1927	Oct. 11, 1940	27
Yellow-bellied Sapsucker	Sept. 26	Sept. 13, 1933	Oct. 8, 1949	11
Spotted Towhee	Sept. 28	Sept. 21, 1934	Oct. 4, 1937	4
Brown Thrasher	Sept. 30	Sept. 2, 1945	Oct. 24, 1937	28
Towhee	Sept. 31			5
House Wren	Oct. 2	Sept. 14, 1945	Oct. 16, 1943	27
Olive-backed Thrush	Oct. 3	Sept. 26, 1946	Oct. 13, 1938	15
Palm Warbler	Oct. 3	Sept. 22, 1947	Oct. 15, 1937	11
Chipping Sparrow	Oct. 3	Sept. 19, 1924	Oct. 26, 1940	23
Clay-colored Sparrow	Oct. 3	Sept. 25, 1927	Oct. 7, 1937	23
Common Goldfinch	Oct. 4	Sept. 23, 1928 Sept. 23, 1929 Sept. 23, 1943	Nov. 1, 1942	27
Nashville Warbler	Oct. 5	Sept. 24, 1935	Oct. 15, 1947	11
Lincoln's Sparrow	Oct. 7	Sept. 22, 1949	Oct. 20, 1931 Oct. 20, 1938	24
Bronzed Grackle	Oct. 7	Sept. 26, 1933	Oct. 25, 1936	23
Cedar Waxwing	Oct. 8	Sept. 14, 1924	Oct. 29, 1943	24
Vesper Sparrow	Oct. 8	Sept. 21, 1932	Oct. 21, 1928	8
Yellow-shafted Flicker	Oct. 10	Sept. 28, 1925	Oct. 29, 1939	26
Orange-crowned Warbler	Oct. 10	Sept. 28, 1948	Oct. 19, 1939	17
White-crowned				

Species	Average Date	Earliest Date	Latest Date	No. Years Observed
Sparrow	Oct. 10	Sept. 26, 1946	Nov. 3, 1933	22
Swamp Sparrow	Oct. 12	Oct. 5, 1933	Oct. 22, 1946	9
Killdeer	Oct. 13	Sept. 28, 1925	Oct. 24, 1931	22
Red-breasted Nuthatch	Oct. 14	Sept. 24, 1944	Nov. 12, 1943	15
Wilson's Snipe	Oct. 15	Sept. 17, 1942	Nov. 8, 1931	6
Ruby-crowned Kinglet	Oct. 15	Sept. 20, 1942	Oct. 27, 1933	25
Myrtle Thrush	Oct. 15	Oct. 4, 1948	Oct. 28, 1944	28
Hermit Thrush	Oct. 16	Oct. 6, 1941 Oct. 6, 1945	Oct. 29, 1947	17
Mourning Dove	Oct. 18	Sept. 28, 1927	Oct. 31, 1941	28
Western Meadowlark	Oct. 18	Sept. 28, 1949	Oct. 27, 1926	15
Gambel's Sparrow	Oct. 18	Sept. 19, 1935	Oct. 30, 1933	20
Bluebird	Oct. 19	Sept. 25, 1946	Oct. 31, 1934	18
Savannah Sparrow	Oct. 19	Oct. 16, 1932	Oct. 25, 1931	7
Song Sparrow	Oct. 19	Oct. 30, 1933	Nov. 2, 1926	20
Purple Finch	Oct. 20	Oct. 30, 1931	Oct. 30, 1935	14
Fox Sparrow	Oct. 21	Oct. 28, 1925	Nov. 1, 1934	22
Pine Siskin	Oct. 23	Oct. 12, 1924 Oct. 12, 1937	Nov. 1, 1944	13
White- throated Sparrow	Oct. 25	Oct. 14, 1923	Nov. 5, 1937	28
Red-winged Blackbird	Oct. 26	Oct. 16, 1931	Nov. 9, 1927	5
Robin	Nov. 2	Oct. 12, 1949	Nov. 19, 1940 Nov. 19, 1947	28
Harris's Sparrow	Nov. 2	Oct. 14, 1923	Nov. 15, 1925	27
Tree Sparrow	Nov. 3	Oct. 17, 1949	Nov. 18, 1928	28
Golden-crowned Kinglet	Nov. 7	Oct. 24, 1928 Oct. 24, 1942	Dec. 31, 1944	24
Slate-colored Junco	Nov. 12	Nov. 5, 1922	Nov. 29, 1927	27

TABLE THREE

DEPARTURE AND ARRIVAL OF TRANSIENTS

Species	Spring Departure			Fall Arrival		
	Average	Earliest	Latest	Average	Earliest	Latest
Redpoll	Mar. 21	Mar. 5, 1941	Apr. 4, 1942	Oct. 11	Sept. 30, 1942	Oct. 26, 1926
Bohemian Waxwing	Apr. 6	Mar. 13, 1939	Apr. 24, 1927	Nov. 11	Sept. 30, 1932	Dec. 26, 1944
Black-capped Chickadee	Apr. 21	Mar. 29, 1941	May 25, 1943	Oct. 2	July 28, 1943	Nov. 17, 1940
Northern Shrike				Oct. 29	Oct. 18, 1937	Nov. 5, 1934
White-breasted Nuthatch				Sept. 28	Sept. 23, 1937	Oct. 20, 1936
Lapland Longspur	May 11	May 5, 1928	May 19, 1925	Oct. 9	Sept. 18, 1947	Oct. 17, 1924 Oct. 17, 1945
Tree Sparrow	Apr. 23	Apr. 15, 1938	May 2, 1928 May 2, 1933	Oct. 4	Sept. 19, 1932	Oct. 15, 1922 & 1927, 1943
Slate-colored Junco	May 4	Apr. 22, 1923	May 20, 1940	Sept. 18	Sept. 10, 1922	Oct. 30, 1933
Brown Creeper	Apr. 23	Apr. 4, 1946	May 7, 1933	Oct. 10	Sept. 24, 1931	Nov. 25, 1930
Rusty Blackbird	Apr. 28	Apr. 11, 1926	May 10, 1924	Oct. 2	Sept. 5, 1926	Oct. 24, 1933
Geese	Apr. 28	Apr. 11, 1926	May 22, 1944	Oct. 19	Oct. 1, 1934	Nov. 12, 1922
Fox Sparrow	Apr. 23	Apr. 5, 1943	May 14, 1935	Sept. 27	Sept. 16, 1937	Oct. 13, 1942

Ruby-crowned Kinglet	May 14	Apr. 21, 1944	May 28, 1947	Sept. 18	Sept. 1, 1934	Sept. 29, 1929
Golden-crowned Kinglet	Apr. 21	Apr. 9, 1934	May 9, 1924	Oct. 2	Sept. 17, 1942	Oct. 17, 1940
Hermit Thrush	Apr. 24	Apr. 15, 1938	May 11, 1944	Sept. 30	Sept. 17, 1947	Oct. 20, 1932
Yellow-bellied Sapsucker	Apr. 30	Apr. 10, 1942	May 21, 1935	Sept. 25	Sept. 13, 1932	Oct. 2, 1942
Myrtle Warbler	May 14	May 4, 1944	May 22, 1927	Sept. 17	Sept. 5, 1926	Sept. 26, 1941
Wilson's Snipe	May 3	Apr. 19, 1942	May 15, 1924	Sept. 24	Sept. 17, 1942	Oct. 12, 1944
White-throated Sparrow	May 21	May 13, 1941 May 13, 1949	May 30, 1939	Sept. 8	Sept. 2, 1928	Sept. 24, 1925
Lincoln's Sparrow	May 22	May 10, 1949	May 29, 1934	Sept. 11	Aug. 29, 1936	Sept. 30, 1924
Purple Finch	May 3	Apr. 20, 1944	May 11, 1947	Sept. 25	Aug. 25, 1947	Oct. 13, 1942
Swamp Sparrow	May 9	Apr. 30, 1934	May 19, 1935	Sept. 22	Sept. 15, 1936	Oct. 6, 1938
Orange-crowned Warbler	May 21	May 11, 1932	June 5, 1938	Sept. 16	Aug. 18, 1942	Sept. 24, 1924 Sept. 24, 1949
Gambel's Sparrow	May 18	May 4, 1929	May 31, 1936	Sept. 20	Sept. 11, 1932	Oct. 3, 1945
White-crowned						

Sparrow	May 16	May 5, 1943	May 29, 1927	Sept. 23	Sept. 5, 1926	Oct. 26, 1941
Olive-backed Thrush	May 29	May 8, 1943	June 8, 1935	Sept. 7	Aug. 26, 1930	Sept. 22, 1949
Harris's Sparrow	May 23	May 14, 1948	May 29, 1932 & 1935, 1938	Sept. 21	Sept. 1, 1935	Sept. 28, 1946
Pine Siskin	May 22	May 7, 1937	June 5, 1947	Oct. 9	Sept. 26, 1945	Oct. 24, 1932 & 1933
Palm Warbler	May 16	May 7, 1949	May 23, 1935 & 1937, 1948	Sept. 22	Sept. 9, 1948	Oct. 3, 1937
Waterthrush	May 17	May 8, 1948	May 28, 1937	Sept. 5	Sept. 13, 1932	Sept. 25, 1935
Eastern Towhee	May 14	May 11, 1935	May 21, 1942	Sept. 24	Sept. 14, 1938	Sept. 26, 1944
Spotted Towhee		See Notes		Sept. 27	Sept. 16, 1936	Oct. 11, 1938 Sept. 23, 1947
Gray-cheeked Thrush	May 22	May 7, 1948	June 4, 1939	Sept. 11	Aug. 27, 1940	
Black & White Warbler	May 19	May 11, 1937 & 1941	May 30, 1924	Sept. 12	Aug. 19, 1941 & 1942	Sept. 14, 1935
Nashville Warbler	May 18	May 13, 1946	May 27, 1947	Sept. 20	Sept. 5, 1935	Oct. 2, 1939
Tennessee Warbler	May 28	May 21, 1944	June 6, 1940	Sept. 10	Aug. 29, 1934	Sept. 22, 1935
Blue-headed Vireo		May 20, 1935		Sept. 12	Sept. 4, 1940	Sept. 24, 1938

		only					
Black-poll Warbler	May 26	May 19, 1943	June 3, 1940	One record	Oct. 23, 1944		
Wilson's Warbler	May 25	May 17, 1933	June 2, 1947	Aug. 25	Aug. 13, 1933	Sept. 12, 1938	
Oven-bird	May 24	May 13, 1933	June 1, 1947	Sept. 15	Aug. 29, 1933	Oct. 4, 1940	
Magnolia Warbler	May 29	May 22, 1946	June 5, 1936	Sept. 23	Sept. 3, 1943	Oct. 10, 1938	
Cape May Warbler	May 25	May 21, 1935	May 29, 1940	2 records	Sept. 24, 1935	Oct. 2, 1934	
American Redstart	May 29	May 18, 1944	June 5, 1936 & 1939	Sept. 6	Aug. 18, 1942	Sept. 26, 1948	
Red-breasted Nuthatch	No Record			Sept. 8	Aug. 25, 1932 & 1949	Sept. 24, 1925	
Veery	May 25	May 19, 1935	June 2, 1937	2 rec.	Aug. 22, 1941	Sept. 14, 1939	
Canada Warbler	May 25	May 21, 1948	May 29, 1940	Sept. 4	Aug. 22, 1940	Sept. 16, 1932	
Mourning Warbler	June 3	May 29, 1941	June 7, 1935 & 1945	Sept. 2	Aug. 25, 1947	Sept. 12, 1937	
Connecticut Warbler	June 2	May 24, 1942	June 6, 1939 & 1945, 1946	Aug. 28	Aug. 24, 1942	Sept. 12, 1948	

In Table 3 the spring departure and fall arrival dates for transient species are arranged in the same order as in Table 1. For these the more or less accidental nature of the records is still more evident. Frequently a species is seen only once during the migration season so that date would be both a first and last record. If a species is quite common the dates extend over a considerable period.

Kingfisher, blue jay, red-eyed vireo, redstart and ovenbird are common or fairly common summer residents but do not nest in the immediate area. Burrowing owl, chat, orchard oriole, scarlet tanager and indigo bunting may nest not far away and wander into the aera of observation occasionally.

Additional Notes

Pied-billed Grebe. One in a ditch April 7, 1932.

Geese. I am not familiar with the different forms and have made only casual notes of white and dark birds as seen flying high overhead. The chief item of interest is that they usually are seen late in the season. The early migration of geese has been much publicized but little has been said about the migration continuing all through spring May records are: May 4, 1941 (150 birds), May 5, 1941 (200), May 5, 1945 (200), May 7, 1946 (500), May 10 1938 (100), May 11, 1940 (60), May 13, 1933 (100), May 22, 1945 (80).

Ruddy Duck. One, same place as Pied-billed Grebe, May 4, 1934.

Sharp-shinned Hawk. Recorded September 5 to October 1 for 5 years.

King Rail. Two birds were shot near Fargo on October 15, 1925 and brought to me for identification. See Bent, U.S. Nat. Mus. Bull. 135:265, 1926.

Yellow Rail. One found dead on street, September 30, 1934.

Golden Plover. One date of May 5, 1934. A flock of this species was in the vicinity for several days one spring but I am unable to find the date.

Burrowing Owl. Recorded April 7, 1940 and October 8, 1942.

Long-eared Owl. One record of October 26, 1946.

Whip-poor will. September 26, 1936 is my only record.

Belted Kingfisher. Seen flying over May 2, 1920, May 8, 1921.

Arctic Three-toed Woodpecker. One bird was seen in the area, March 16 to April 8, 1938.

Olive-sided Flycatcher. May 30, 1934 and May 20-23, 1950 are the only spring dates.

Blue Jay. Nests and winters locally but not in immediate area.

Red-breasted Nuthatch. April 28, 1941 and May 6, 1942 are the only spring dates.

Townsend's Solitaire. One trapped October 1, 1946.

Sprague's Pipit. A record of April 27, 1941 at Muskoda, Minnesota 15 miles east is probably representative.

Cedar Waxwing. Two were in a flock of Bohemian Waxwings, Febraury 21, to March 7, 1948. A group of 7 were seen March 14, 1946 and about 50 on April 14, 1946. These have been excluded from the average because their late arrival is such a general rule.

Yellow-throated Vireo. This species is seen regularly along the streets in

the immediate area. One nest observed in 1932 was built about ten feet above a much used walk.

Red-eyed Vireo. This well known bird does not nest in the immediate area although is common in wooded places.

Philadelphia Vireo. One trapped May 24, 1940 and one May 27, 1945. One was observed singing September 3, 1945.

Winter Wren. One was trapped October 8, 1938, three other records of September 24—October 12.

Short-billed Marsh Wren. Records of May 2, 1923 and May 23, 1942. It reputedly nested in an adjoining slough area formerly.

Black-poll Warbler. Banded 58 birds in spring but only one in fall.

Parula Warbler. Two were trapped May 17, 1936; one record of September 10, 1933.

Black-throated Blue Warbler. Recorded September 14 to October 23 for 7 years.

Chestnut-sided Warbler. Records of May 27, 1933 and May 21, 1942; August 26 to September 13 for 5 years.

Yellow-breasted Chat. One was trapped May 17, 1936.

Orchard Oriole. Trapped May 31, 1934, August 26, 1942 and September 10, 1933. It is only a straggler in the area so far as is known but is not rare in the general region.

Rusty Blackbird. Not recorded in the immediate area since 1936.

Scarlet Tanager. Recorded May 23, 1926 and September 16, 1939; one trapped October 2, 1935. It is also a straggler in the immediate area.

Western Tanager. One seen in the area May 3, 1936 by Dr. W. N. Keck.

Pine Grosbeak. Recorded September 28 to November 20, 1938.

Evening Grosbeak. Recorded November 19, 1933, October 27-31, 1935, May 7, 1947 and May 21, 1950.

Indigo Bunting. Fall records of September 3 to October 1 for 4 years.

Red Grossbill. Recorded at various dates, July 31 to October 23, 1931; October 29, 1932; July 16, 1933; August 31 to October 28, 1935; July 29 to September 18, 1936; October 25, 1944; November 9, 1930.

White-winged Grossbill. One trapped October 23, 1946.

Red-eyed Towhee. Dates used in Table 1 include birds identified as red-eyed and also birds heard and not definitely identified. Specific records of red-eyed are: May 2, 1948, May 6-15, 1939, May 6, 1942, May 17, 1943, September 21, 1934, September 24, 1936, September 25-October 4, 1937.

Spotted Towhee. Definite records are: April 26 to May 18, 1939, May 5, 1940, May 6, 1934, May 16, 1937, May 16, 1931, May 17, 1948; Sep-October 1, 1941, September 24, 1936, September 25 to October 4, 1937. Both forms are occasional, about equally common and appear at about the same time.

Reference should be made to an excellent report by Monson (Wilson Bull. 46:37-58, 1934) for the years 1925-32 on a rural area about 15 miles to the northwest. — **Department of Botany and Plant Pathology, North Dakota Agricultural College, Fargo, North Dakota.**

Seasonal Report

by

Mary Lupient

The past spring in Minnesota was late and cold. The weather bureau reported temperatures at 25 degrees below normal. In northern Minnesota there was frost as late as June 3 and Duluth Harbor was still full of broken ice June 5. Although the nesting of nearly all species of birds was delayed about two weeks, there were several reports of nestlings dying of chill. In and around the Twin Cities the increased number of nesting song birds was noticeable. They adjusted themselves to much smaller territories than formerly. Robins in particular nested in close proximity to others of their kind. Two pairs of robins built nests about two feet apart on rungs of a ladder hung on the wall of a dwelling. The young hatched in both nests. Besides these robins there were four other pairs that nested twice, one pair of brown thrashers, one pair of mourning doves, two pairs of orioles, one pair of starlings, two pairs of bluejays, one pair of house-wrens, one pair of white-breasted nuthatches, and several English sparrows, all of which nested in an ordinary city block that had a dwelling on each fifty foot lot. One pair of robins nested in a tree and lost both broods after they had left the nest, evidently predators got them. The nest of the robins nested on window sills and over doors of dwellings. Altogether they raised three young. The brown thrashers lost their young and one of the adults was missing. The other still lives in the area at the time of this writing, August 15. The mourning doves raised two young and the other species raised young the exact number of which was not determined. Though each nesting pair selected such a small territory, they lived amicably together.

Wood ducks nest each year in hollow trees at the home of Dr. W. J. Breckenridge. They began nesting about two weeks later than usual. Ron Anderson, Mankato, keeps a complete nesting record of the species found in the territory around Mankato. Most of the dates were late. May 24 he found the nest of a wood duck on the ground under a rock outcropping at Sibley Park. There were eleven young in it all of which apparently died of chill. Another unusual wood duck nesting site was reported by Whitney Eastmen June 5 at the Isaac Walton Bass Ponds. The nest was built about thirty feet above the ground in a vine that hung in a tree. There were eggs in the nest but due to its inaccessability the number could not be determined. Several saw the bird leave the nest at various times. Near St. Paul a wood duck nest was found nearly one-half mile from water by A. C. Rosenwinkel.

Reports from several areas in the state indicate that due to flooded conditions and cold weather the nesting of ducks was not only later but there were fewer of the first nests. Robley W. Hunt, Manager of Mud Lake National Wildlife Refuge, reported on nesting as follows, "Due to the greatly delayed spring migration and flooded condition of the area at the time the first migrants arrived the nesting pat-

tern has been very much upset. We had a very minimum of satisfactory nesting sites for land nesters and as a result it now appears as if our mallard, teal, baldpate, etc. population will remain somewhat low until such time as birds capable of flight return to the area later in the summer. As far as we are able to determine a good many of what would have been refuge nesters were forced to seek suitable nesting sites on the outside. On the other hand we have an apparent increase in the numbers of scaup, ringneck, canvasback, redhead, ruddy, coot and pied-billed grebes. This might be expected as the raft type nesters would not be too handicapped by high water levels. We might also add that since taking our first brood count we have observed considerable additional broods of both dabblers and divers, possibly a combination of late nesting as water levels receded and second nesting attempts. In that spring migrants arrived when flood levels were at a peak we are of the opinion that actual loss through flooded nests could not have been great. The few suitable sites available upon arrival were utilized. From that time on water levels dropped until July 27 when normal levels on the larger marsh areas were finally attained."

In Steele County William Longley reported the following species of ducks with downy young (dates July 3 to July 13): mallard, pintail, gadwall and blue-winged teal. He stated that on June 28 at Silver Lake, Rochester, from three to four hundred tame mallards were seen to have about twenty-seven broods with one hundred fifty-nine young most of which were downy, some half grown. There were six Canada geese, a pair of which successfully nested and had four young which were half grown. At Mayowood, Rochester, on May 10 he found a pair of tame Canada geese with six young a day old. His report contained the record of a king rail with four downy young July 13, Steele County.

Mr. Longley saw a Swainson's hawk which he believed to be nesting in Dodge County, May 11. Red-shouldered hawks have been seen along the Minnesota River during nesting season and the nest of one was found at Forestville by Franklin Willis. Rev. O. L. Bolstad, Badger, is of the opinion that the hawk population is on the decrease in that area. He drives in the country much of the time and saw only four hawks this summer. Thirty years ago, he states, any number of several species of hawks could be seen throughout the year but the last few years they seem to have disappeared. Many observers have had the same experience. Although nearly all species of hawks are protected by law in Minnesota, they are indiscriminately shot at any time of the year and the great flights of hawks in migration are very seldom seen.

Rev. Bolstad reported that the nesting of the sandhill crane has increased in the state during the past several years, that the magpie population is increasing also and that 12 or 13 are spending the summer at Roseau Lake. He stated also in his report that several ravens nested in the Northwest Angle last spring and that this summer there is a very heavy population of hummingbirds in that area.

Because of the high water observers did not have the opportunity to see the shore bird migration in eastern Minnesota last spring. This summer their return has not been satisfactorily observed either because the vegetation is very lush in swampy areas along the rivers and only small mud flats are available. Harvey Gunderson and Bruce Hayward saw yellowlegs and

semipalmated sandpipers July 18 near Cedar Creek Forest. To date very few shore birds have been reported.

A. C. Rosenwinkel made observations at Whitefish Lake July 1 to 7. He reported nine Caspian terns and two Bonaparte's gulls. Flood conditions around Badger brought an influx of Franklin's gulls according to Rev. Bolstad. Thousands stayed all summer to feed after the water receded. Robley Hunt reported a nesting colony of between five and six thousand Franklin's gulls at Mud Lake Refuge. Forester's terns nested at Swan Lake, Nicollet County. Seven nests were listed by Ron Anderson.

From reports there was a high mortality among warblers last spring even though they arrived later than usual. S. S. Flaherty wrote that at Morris many warblers perished from bad weather and lack of food. They were found dead along the roads and highways. No large waves of the late warblers were reported. Dr. D. W. Warner reported nests of the blue-winged warbler in the southeastern part of the state in 1948. The nesting of this bird was again reported this season at Forestville by Franklin Willis.

In the city of Mankato forty-six nestings of the mourning dove were recorded by Ron Anderson. Twenty-eight of them were unsuccessful.

It was a dickcissel year. They were seen throughout the southern half of Minnesota by Dr. W. J. Breckenridge, S. S. Flaherty, A. C. Rosenwinkel and others.

The first appearance this season of the American egret was in Freeborn County July 6. In Waseca County they were seen July 11. Both of these early records were sent by Forest Lee. They have appeared at various points during late July and early August and the indications are that they have arrived in considerable numbers.

There were a few unusual records. A white pelican was seen in Aitkin County by Forest Lee and a red-throated loon in Duluth Bay, May 18, by Dr. O. Lakela. A rare visitor to Minnesota, the Acadian flycatcher, was observed in Nerstrand Woods by A. C. Rosenwinkel. This is a very unusual record but Mr. Rosenwinkel listened carefully to its call and feels certain that his identification is correct. — **Minneapolis, Minnesota**

NOTES OF INTEREST

BEWICK'S WREN NESTING AT FORT SNELLING — On April 23, while watching some early migrants near the mouth of the Minnesota River at old Fort Snelling Military Reservation, Hennepin County, my attention was drawn to some strange bird notes coming from a thicket. They sounded something like the scolding notes of the white-breasted nuthatch, but were muffled. The notes came from a small bird which kept darting from one thicket to another and gave me little chance for identification. It kept scolding all the while I was trying to see it. Just once it mounted a dead weed stalk and I had a chance to study it for a brief moment. It had an eye-line and a rather long tail. I guessed that it was some sort of wren from its build and actions—either a Carolina or Bewick's wren. Being totally unfamiliar with the notes or appearance of either, I looked them up in various field guides that evening but was still not positive as to its identity. Two days later was the start of the week of cold weather that killed so many birds and I expected the wren to be one of them. On May 4, however, I saw it in the same locality and this time there was another with it. One, presumably the male, had a song resembling that of the song sparrow. According to the texts, the song of the Bewick's wren is song sparrow-like, but since it is difficult to identify a bird's song from a written description, I reported it to the Museum of Natural History and examined skins of both Carolina and Bewick's wrens. It proved to be the latter.

I saw the birds throughout the month of May, but couldn't find the nest. On May 30 I saw the male carrying food into a gully. Following him, I found a nest containing two young a few days old and one unhatched egg. The gully was six feet deep and the nest was five feet from the bottom in a crevice formed by the overhanging rocks and sod. The birds made little attempt to close the opening of the crevice as house wrens do when nesting in similar sites.

I was unable to visit the nest again until June 20, when I saw the adults feeding two full-grown young. The male was in song again, as if the female were starting her second nest. Although I searched the area, I never saw the adults again after that day, but I saw the juveniles again on July 8. The territory these wrens occupied seems to be ideal for them. It has tall trees, plenty of vine tangles and shrubs for feeding, and gullies, small cliffs, and hollow trees to nest in. Perhaps with the success of this nest the pair will nest again in the area. — **Russell Hofstead, St. Paul, Minnesota.**

COWBIRD-WOOD THRUSH RELATIONSHIP—On May 21 in the old Fort Snelling Military Reservation, Hennepin County. I found a wood thrush nest which contained two thrush eggs and nine eggs of the cowbird. This is, in my experience, an unusual number of cowbird's eggs to find in a host's nest. I have found five in Brewer's blackbird nests, but the usual number is from one to three.

The thrush was incubating the eggs, which were piled on top of each other, and both thrush eggs had dented shells.

Cowbirds were very numerous in the woods at that time, and small groups of them were noisily flying around. A wood thrush nest in an adjacent territory, with the thrush incubating, contained four cowbird eggs and no thrush eggs on May 23. The eggs were thrown out and on May 25 the thrush was again incubating four cowbird eggs and none of her own. The wood thrush served as the most common host in the area, at least as to number of eggs received. The fourteen wood thrush nests I found contained a total of 31 cowbird eggs. In addition, two thrushes were feeding three cowbird young each that were out of the nest. Except for these two nests the parasitism of the cowbird on the wood thrush was unsuccessful in the area. Probably none of the eggs would have hatched in the nest containing nine, so the total suggests a wanton waste of eggs. — **Russell Hofstead, St. Paul, Minnesota.**

ADULT BALD EAGLES — The following observations of adult bald eagles were made by John L. Zorichak and I, as biologists of the Minnesota Division of Game and Fish, Minnesota Pittman-Robertson Unit, while conducting the aerial waterfowl breeding-ground transect in the spring of 1950:

One, May 22, west of Black Duck, Beltrami Co.; one pair, May 31, Northwest Angle. Lake of the Woods Co.; one, June 1, Mud and Goose Lake area, Cass Co.; one pair, June 1, White Oak Lake, Cass Co.; and one June 1, T 16 N, R 24 W, Itasca Co. — **Forrest B. Lee, Minnesota Division of Game and Fish, Pittman-Robertson Unit, St. Paul, Minnesota.**

MOCKINGBIRD IN ITASCA COUNTY — On the evening of July 5, 1950 my cousin Keith Schwartz and I had the pleasure of studying a mockingbird for a full hour. The locality was three miles southeast of Deer River, Minnesota, in Itasca County. We were "birding" at the edge of a small grove surrounded by flat meadowland when we flushed the mockingbird. The vivid display of rectangular white wing patches and white outer rectrices as seen through my 7x50 binoculars caused me to exclaim excitedly "Mockingbird!" It lit on a hay mower handle a few hundred feet from us, and soon hopped to the freshly mowed hay.

Keith, who is a zealous bird student, asserted almost as soon as I that it was a mockingbird. It acted much like a robin while it searched for food, except that sometimes it flitted a few feet instead of hopping. The bird's flight was in a straight line, and consisted of steady wing beats, except that at times a very slight pause could be detected between groupings of three wing beats. Whenever the bird had just come to a standing position from flying or hopping, its tail assumed a position above horizontal, always sinking in a few seconds to a sub-horizontal level. It consistently kept at a distance of about 150 feet from us. Several times, due to our approach, it flew a short distance—sometimes alighting on the field again, or sometimes flying to a brush pile or tree at the grove's edge.

A very interesting incident occurred as it perched at the latter spot. A pair of Baltimore orioles, which had a nest in the grove, apparently did not like the stranger's presence, because the male oriole vigorously chased the mockingbird from its perch and gave quick pursuit. This was the only time we heard from the

mockingbird, as he emitted a sort of squawk. About ten minutes after sunset the bird arose from the field and flew toward the setting sun to a group of willows bordering the open field one-quarter mile away. — **John R. Rehbein, Cohasset, Minnesota.**

SUMMER FEEDING OF SUET PAYS DIVIDENDS — Mrs. Melvin Jacobson, 622 E. Broadway, Owatonna, experimented with keeping small amounts of fresh suet at her feeders all summer. During the winter months there had been a long line of steady boarders—hairy and downy woodpeckers, black-capped chickadees, white-breasted nuthatches, blue jays, and cardinals. The payoff came when the cardinals and the hairy and downy woodpeckers came in with their families—twins in each case. The blue jays came with their triplets. Of special interest was the behavior of a pair of catbirds, whose young came just as far as a nearby hedge where the parents carried the large chunks of suet to them. — **Mrs P A. Becker, Owatonna, Minnesota.**

SQUIRREL FEEDER HELPS TAKE PRESSURE OFF BIRD FEEDERS — Mrs. Melvin Jacobson, 622 E. Broadway, Owatonna (president of the H. J Jager Audubon Society), has been using a squirrel feeder with results, to date most satisfactory. The squirrels are so fond of the germ in the kernel of corn that they will choose the "whole-ear-of-corn" feeder in preference to any of the regular bird feeders. They eat the germ of the corn and throw the remainder of the kernel away. Blue jays are fond of cleaning up these cast-off kernels.

To make a squirrel feeder, drive a five-inch nail through the center of a three-quarter-inch board, six to eight inches square. Sharpen the point of the nail after it has been driven through. Fasten this spiked board to tree trunk or post by means of a bracket underneath. Force a large ear of field corn down over the nail.

This year this squirrel feeder was placed directly beneath a bird feeder fashioned from an apple box. Last year the squirrels were a continual nuisance here, but this year they have looked in a few times, then retreated beneath the bird feeder to their beloved ear of corn. — **Mrs. P. A. Becker, Owatonna, Minnesota.**

DO YOU WANT BIRDS IN NUMBERS, NESTING IN YOUR YARD? — Give them a variety of nesting material, collected during the winter months, to encourage them to nest. Although any convenient container will do, I use paper sacks, and keep them ready—in upstairs, kitchen, and basement—to receive material as it is collected. I keep the feathers in a separate container.

Nesting material should not be more than six to eight inches long. White or extremely light colors seem to be preferred Wrapping cord, darning cotton, light-colored basting threads, ravelings from tearing cloth, and threads from the edges of fraying seams (collected on ironing day) are good. Strips of soft old muslin are a must (soft old pillow cases are fine). Keep them six to eight inches long and one-fourth inch wide. Waxwings and other open-nesting birds use them for what we term "starters." In making the final nesting check after the foliage is gone, I have noticed that the pillow case strips stand out plainly.

Large wads of mechanic's waste, well pulled apart before being put out, are excellent for birds that build nests of the type of the yellow warbler. Quite

a collection of cotton can be saved, since it is used as packing around medicine containers and jewelry. Large meshed potato sacks, when unwoven and cut into six-inch lengths, are a favorite with waxwings and chipping sparrows. Onion sacks and gunny sacks are not usable.

By all means save the combings of long-haired dogs. Any acquaintance having a riding horse might save long horse hairs for your nesting sack. Human hair combings should also be saved. Increase the amount with some permanent wave cuttings from your beauty shop. If possible, select outstanding colors—blond, black, auburn, and gray. It is interesting to spot them in the checkup of the nests.

Because of our large tree swallow colony we must save white feathers. When short of this nesting material I have dry-picked fowl in the open, with the tree swallows swooping over me as I threw the handfuls into the air. Keep the feathers free of blood, or the birds will become frantic, as they do when incubating eggs are destroyed in the nesting box. Save dark feathers also. Domestic will do, but wild game feathers are better. So—be a martyr and dry-pick pheasants and ruffed grouse with your nesting sack in mind. We double our wren population whenever we have these game feathers available.

For our large purple martin colony we leave several piles of raked-up spring lawn and garden debris in the open. How the martins do gather and talk things over! Spanish moss, so prevalent in parts of the south, is perfect bird nesting material. Have a friend living there? Ask for a large box!

Butter paper cut in strips, cleansing tissues, and light-colored ribbon (not too wide) are fine for robins and catbirds. During a dry spring see that the robins have a mud puddle!

We put out the nesting material loosely arranged in a nesting rack we have designed. Small amounts may be arranged daily on evergreen boughs or on bushes. A small square of lawn can be kept closely cut and a little material scattered there each day, although rain tends to mat it when it is out in the open. A nesting rack is somewhat protected and helps keep the material dry. We have eight such racks, and keep each in the same location year after year. It is obvious by the manner in which they approach the racks that the birds come to know that the nesting material is there. String and muslin strips may be hung on the clothes-line if the day is still. Keep a count of the number put out, as part of your project.—**Mrs. P. A. Becker, Owatonna, Minnesota.**

SOME SNOWY OWL OBSERVATIONS FOR THE WINTER OF 1949-1950.—Almost every winter brings at least a few snowy owls to Minnesota. Some winters, however, are called "Snowy Owl Years" and are characterized by a considerable influx of this large, beautiful, snowy-white predator. The winter of 1949-50 was such and was marked by a heavy invasion of these denizens of the far north into our state. The Museum of Natural History of the University of Minnesota received 84 records of snowy owls in this state. Twenty-four of these reports were from the Red Lake area and vicinity. A considerable number of the reports came from the area surrounding the Twin Cities.

My first snowy owl of the winter was observed on December 4, 1949, at Lake Calhoun in Minneapolis. My last snowy owl record was that of a bird observed by members of the Minnesota Bird Club at Sand Lake Refuge, South Dakota on April 15, 1950. This bird was perched on the ice on Sand Lake. As we approached, it flew parallel to the highway where it made an unsuccessful stoop upon one of two pheasant hens.

In discussing the snowy owl invasion with Inez Olson of Hibbing, Minnesota, High School she stated that her students had recorded 24 snowy owls in the vicinity of Hibbing during the past winter. Miss Olson kindly furnished the records which follow. These are in addition to those reported to the Museum of Natural History of the University of Minnesota.

SNOWY OWLS OBSERVED NEAR HIBBING

Date	Number	Locality
December	1	10 miles from Hibbing
December	1	2 miles from Hibbing
December	1	Hibbing
January	1	Hibbing
January	1	Hibbing
February	1	5 miles from Hibbing
February	7	20 miles from Hibbing in small area
March 14	3	In Hibbing sitting on ore car
March 15	1	3 miles from Hibbing
March 21	4	4 miles from Hibbing
April 10	2	23 miles from Hibbing
May 6	1	3 miles from Hibbing

—Lewis L. Barrett, Minneapolis, Minnesota.

RECENT RECORDS OF THE AVOCET IN MINNESOTA—State Game Wardens Hiram Southwick and Jay Eberlein reported seeing three avocets on May 9, 1950 two or three miles southeast of the town of Lake Wilson, Murray County, Minnesota. These birds were working around some water in a roadside ditch. Mr. Southwick reported seeing a total of eight or nine avocets in his area, Murray and Pipestone Counties, during the spring migration.

Matt Saari, Pittman-Robertson Field Supervisor, found a dead avocet on Highway No. 62, about one-half mile from Talcott Lake, Cottonwood County, on May 25, 1950. Because the bird was in poor condition, no part of it was saved.

I observed two avocets in the vicinity of the north end of Lake Marshall, Lyon County, about 10:00 a.m. on May 2, 1950. (Township 111 N., Range 41 W., Section 26.) When first seen, these birds came flying from the south, over the lake, and landed in a rather extensive, rolling, treeless and grassy pasture adjacent to the north end of the lake. This pair of birds, no doubt, was migrating as they resumed their northward flight again after only a few minutes of rest. **—Gerald T. Bue, Marshall, Minnesota.**

1950 Annual M. O. U. Meeting

Several changes in the structure and functioning of the Minnesota Ornithologists' Union were made at the annual meeting held at the Museum of Natural History at the University of Minnesota on Saturday, May 13th.

The 98 members present, representing nine bird clubs from various parts of the state, voted to eliminate student memberships and to raise the dues of all members to $1.00 per year. This change was made necessary because of the increased cost of publication of The Flicker and other increased expenses of the M. O. U. The clubs have been notified of these changes.

Another change in the functioning of the M. O. U. was the setting up of a council to be composed of one member from each club, elected or appointed as the individual group may see fit. This council member is to be informed on M. O. U. affairs between annual meetings and will serve as a liaison officer between the local club and the Union. The council is to be an informal body to be convened at the discretion of the president.

The annual meeting of the Union also passed a motion condemning the indiscriminate use of poison to kill pigeons, and set up a committee to study the state law involved, with instructions to bring violations to the attention of the proper authorities with the request that the law be enforced. President Harvey Gunderson appointed Messrs. A. C. Wangaard, Minneapolis; Guy Atherton, St. Paul; and Joel Bronoel, Duluth, to serve on this committee.

Warm, sunny weather greeted the convention delegates, who left the museum shortly after registration on field trips to the Bass Pond and the T. S. Roberts Sanctuary at Lake Harriet. These trips produced a total list of 113 birds seen.

After an attractively served smorgasbord luncheon, the afternoon business meeting (outlined above) and the program of papers took place.

Mr. A. C. Rosenwinkel gave winter bird observations in the Sucker-Vadnais area, St. Paul.

A two-year study of the Cedar Creek Forest, illustrated with slides, was discussed by Dr. W. J. Breckenridge. He pointed out that in most instances there was great similarity between the various species nesting in this area in 1948 and 1949, as well as the selection of almost identical nesting sites in the two years.

The effect of a prairie fire on birds nesting at Palmer's Slough in Brooklyn Center was told by Bruce Hayward, and Mr. P. B. Hofslund discussed the study he is making of the nesting of the Northern Yellow-throat.

Forrest Lee, of the State Department of Conservation, showed slides to illustrate the work being done in waterfowl banding.

The evening program consisted of an interesting discussion by Mr. A. C. Wangaard on the breeding, training, and flying of homing pigeons.

The 1951 meeting of the Minnesota Ornithologists' Union will be held jointly at St. Cloud and St. John's University, and the following officers will serve for the coming year:

President	Fr. Adelard Thuente
Vice President	Mrs. Evelyn Putnam
Secretary	Miss Vera Sparkes
Treasurer	Mrs. Mary Lupient
Editor of The Flicker	Dr. Dwain W. Warner

—Vera E. Sparkes, Minneapolis Bird Club

"AFFILIATED SOCIETIES" (continued)

DULUTH BIRD CLUB

Officers: President, Mr. O. A. Finseth; Vice President, Ralph Boeder; Secretary, Mrs. Harvey Putnam; Treasurer, Miss Mira Childs.

Meetings are held the second Thursday of each month at the Duluth Branch, University of Minnesota.

RANGE NATURALISTS' CLUB

Officers: President, Mrs. Dorothy Beard; Vice President, Hjalmer Halunen: Secretary, Vera F. Barrows; Treasurer, Ruth Ambrose.

Meetings are held the third Thursday of each month, October through May at 7:00 p. m. in the Clubrooms of the Virginia Public Library.

Minnesota Ornithologists' Union
Affiliated Societies

CLOUQUET BIRD CLUB

Officers: President, Ruth Johnson; Vice President, Olive Esping; Secretary-Treasurer, Irene Lorie.

Meetings are held the second Thursday of each month in the Clouquet High School at 7:30 P. M.

MINNEAPOLIS AUDUBON SOCIETY

Officers: President, Mrs. G. R. Magney; Treasurer, Mrs. W. W. Wilcox; Recording Secretary, Mrs. A. M. McLeod; Corresponding Secretary, Mrs. S. A. Gile; Field Secretary, Mrs. J. A. Thompson; Auditor, Mrs. Gaylord Davidson.

Meetings are held the first Friday of each month at 2 p. m. at the Walker Branch Library. Field trips during April and May on Tuesdays and Fridays.

MINNEAPOLIS BIRD CLUB

Officers: President, Marvin H. Rosien; Vice President, Mrs. M. E. Herz; Secretary, Mrs. Mildred Snyder; Treasurer, Mrs. Dorothy Smith.

Meetings are held the first and third Tuesdays of each month at 7:30 p. m. at the Minneapolis Public Library Museum.

MINNESOTA BIRD CLUB

Officers: President, Dana Struthers; Vice President, Bruce Hayward; Secretary, Mrs. Mary Lupient; Treasurer, Mrs. Morrie Self.

Meetings are held the first Wednesday of each month, except June, July, August, and September, at 8:00 p. m. at the Minnesota Museum of Natural History, University of Minnesota.

ST. CLOUD BIRD CLUB

Officers: President, H. H. Goehring; Vice President, Mrs. Charles Beacom; Secretary-treasurer, Miss Loretta Rosenberger.

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The Flicker

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THE FLICKER

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A Study Of Waterfowl Sex Ratios During Spring Migration--Minnesota, 1950

by

Harvey K. Nelson

INTRODUCTION

It has long been recognized that there is a differential sex ratio in most species of birds, in that males predominate to a varying degree. Recent studies indicate that there is a definite preponderance of male ducks over females in many species. The differential sex ratio factor is of prime importance in waterfowl management.

In the vicinity of Minneapolis and St. Paul, during the 1950 spring migration, I made a survey to determine whether observed sex ratios showed the same trends as those reported by Lincoln (1932), Erickson (1943), and others.

I wish to acknowledge the assistance of Dr. William H. Marshall and Dr. James Beer of the Division of Entomology and Economic Zoology, University of Minnesota under whose direction the work was carried on, and to convey to Sigurd T. Olson, Jr., and to my wife my appreciation of their assistance in the field.

PROCEDURE AND METHODS

A 52-mile route in the vicinity of St. Paul, New Brighton, and Centerville made it possible to observe eight lakes and several smaller potholes. Travel was by automobile or by foot. Field glasses (8x30) and a 27x spotting scope were used.

The period of observation was from April 15 to May 19, with intervals no longer than four days between observations. The work was carried out under various weather conditions, interruptions occurring only when snow or rain decreased visibility to a point where field glasses and spotting scope were useless.

All waterfowl observed and identified were recorded as to species, numbers and sex. However, when an entire group could not be counted, no record was kept. Unless otherwise stated, figures refer to numbers of birds positively identified as to spe-

cies and sex.

DESCRIPTION OF AREAS

Como Lake lies within Como Park in St. Paul. It is a shallow-water area of about 95 acres. There is little shoreline vegetation other than the park lawn extending to the water's edge. The Lake has a high population of minnows (**Cyprinidae**), many of which are goldfish. There is some submerged vegetation, mostly pondweed (**Potamogeton spp.**). The lake is used for recreational purposes such as swimming and boating.

Valentine Lake, east of U. S. Highway 10 in Ramsey County near New Brighton, is a small, shallow-water area of about 60 acres, with a sparse growth of cattails and bulrushes along the west and north edges. The remainder of the area is pasture to the water's edge.

Rush Lake is a small, open-water lake of approximately 60 acres lying along U. S. Highway 8 in Ramsey County, just north of New Brighton. The lake, in a deep depression surrounded by wooded hillsides, is fringed with sedges and cattails along the shore. The north end is separated from an adjoining lake by a floating bog. Refuse from a bottle-gas company on the south side of the lake creates a pollution problem.

Rice Lake is a large, open-water area of approximately 540 acres. It lies in the southeastern corner of Anoka County, east of U. S. Highway 8. There is little shoreline vegetation except along the east side and northeast bay. Because waterfowl using the area are often disturbed by seaplanes which use the lake as a base, observations were restricted to the southwestern half of the lake.

Rondo Lake is a shallow area of about 400 acres, one and one-half miles east of the village of Lino on U. S. Highway 8 in Anoka County. About one-half of the total area is open water; the remainder consists of a wide fringe of sedges, cattails, and bulrushes, with a floating bog surrounding an island near the center of the lake and a wide band of floating bog in the south end. Food and cover are abundant.

Tamarack Lake, in Anoka County, is a shallow, open-water lake of approximately 300 acres, draining through an artificial ditch into Rondo Lake to the south. Tamarack Lake is surrounded by a peat bog on which there is a heavy growth of cattails and sedges. The east shore adjoins a wooded pasture and is fringed with low shrubs, chiefly willow (**Salix spp.**), red-osier dogwood (**Cornus Stolonifera**) and some tamarack (**Larix laricina**) on the immediate shoreline. The south end is surrounded by a wet marsh, the dryer portion of which is used for pasture.

Centerville Lake is a deep, open-water lake of approximately 454 acres just west of the village of Centerville in Anoka County. There is very little shoreline vegetation except in the small southeast bay, where some emergent aquatics and sedges are found. According to reports, the lake has a very high population of panfish, bullheads, and carp. It is used as a feeding area by large flocks of cormorants during spring and fall migrations. Loons and mergansers are also present in large numbers some years.

Vadnais Lake is an area used as a reservoir by the St. Paul Water Works. It is reported to be a fairly deep lake with some bullheads and panfish present There is little shoreline cover or emergent vegetation.

Smaller areas along the route were classified as potholes. Those which

seemed to have permanent aquatic vegetation and to retain water through most of the summer were classified as permanent, while those which showed no sign of permanent aquatic vegetation were classified as temporary potholes.

DISCUSSION

General Spring Migration Notes

Arrival dates of the different species of waterfowl were recorded as observed on the route. Although several species were observed on the nearby Minnesota River bottoms as early as April 2, the spring breakup did not start on route areas until about April 13, and large numbers of ducks were not seen until April 19. All areas were clear of ice by April 22, and concentrations of ducks remained at about the same level until May 3. There was a continued increase in numbers from May 3 to 10, with the peak occurring about the tenth. By May 13, most of the ducks had moved north. The only diving ducks remaining were a few pairs of lesser scaups, ring-necks, and ruddy ducks. Many river ducks were scattered in the lakes and potholes. The probability that females were engaged in nesting activities by May 10 was indicated by the fact that many waiting males were seen after that date.

Sex Ratio Observations

The sex ratio was calculated for each species each day as observed on all areas, and the average sex ratio for each species was determined. Following is a discussion, by species, of sex ratios observed, and comparisons with ratios reported by other authors:

MALLARD

Total number observed, 160; sex ratio, 1.4:1.

The greater number of males seen during later observation periods may be due to nesting activities of females. The sex ratio generally is evenly balanced. Beer (1945) reported a ratio of 1.03:1 for 1,652 birds in Washington. Another study by Yocom (1949) yielded a ratio of 109:100, or about 1.1:1, for 8,805 birds.

BALDPATE

Total, 51; sex ratio, 1.3:1.

The ratio is slightly high compared to the 1.2:1 reported by Erickson (1943) for 126 birds. Beer (1945) reported a ratio of 1.14:1 on 4, 999 birds in Washington. He states that flocks on the wintering grounds varied greatly in sex composition.

BLUE-WINGED TEAL

Total, 222; sex ratio, 1.3:1.

This ratio is slightly lower than the 1.48:1 reported by Erickson (1943) for 447 birds. Bennett (1938) reported that 59% of 5,090 birds observed in Iowa were males. His figures yield a ratio of about 1.44:1.

REDHEAD

Total, 367; sex ratio, 2.1:1.

The redhead was the second most abundant species observed. The majority were seen in the southeast bay of Centerville Lake or in the large pothole just south of that area. The sex ratio is considerably higher than Erickson's 1.65:1 (1943), or Aldrich's 1.4:1 (1949) determined in a breeding ground survey in Minnesota.

RING-NECKED DUCK

Total, 255; sex ratio, 1.4:1.

Erickson (1943) observed a ratio of 1.39:1 for 580 birds over a three-year period.

CANVASBACK

Total, 125; sex ratio, 2:1.

This ratio is higher than the 1.77:1 obtained by Erickson (1943) for 147 individuals. It is interesting to note that during some of the first banding studies carried out by Lincoln (1932), a ratio of 1.77:1 was also obtained, for 353 birds. Studies by Hochbaum (1944) over a four-year period from 1939-42 recorded 1,118 males to 573 females, with a ratio of 1.9:1.

LESSER SCAUP

Total, 3,155; sex ratio, 2.1:1.

The lesser scaup was the most abundant species observed during the study, constituting 66.5% of the total. The sex ratio varied throughout the observation period, with a high of 2.8:1 on April 30 and a low of 1.45:1 on May 13.

Studies by Erickson (1943) from 1938 to 1940 revealed a similarly high proportion of males. He found that the ratio varied from year to year and from early spring to late spring. From a total of 3,114 individuals, he reported an average ratio of 2.56:1. Studies by Hochbaum (1944) at the Delta Waterfowl Research Station showed a ratio of 2.03:1 for 6,037 birds.

AMERICAN GOLDEN-EYE

Total, 113; sex ratio, 2.9:1.

It is difficult to obtain an accurate sex ratio for this species because the first year males closely resemble the females. Observations revealed a constant, high proportion of males, with the possibility of a still higher proportion in the case that some first year males had been mistaken for females.

Studies by Beer (1945) in Washington yielded a ratio of 2.5:1 on a small number of birds. Erickson (1943) reported a ratio of 1.41:1 for 140 individuals.

RUDDY DUCK

Total, 146; sex ratio, 2.2:1.

The ruddy duck, a late arrival, was not observed in numbers this year until the first two weeks of May. The first birds seen were chiefly males, but the proportion of females rose during the last week of observation. Due to its small size and coloration the ruddy duck is difficult to observe and to sex accurately, except on clear days. The male usually can be distinguished by a white patch on the face or by the blue bill. However, some males may retain their dark winter plumage until quite late. What was believed to be a pair of ruddy ducks was collected by Dr. Dwain W. Warner of the Minnesota Museum of Natural History. Upon closer observation the one believed to be the female showed signs of a white patch on the face and proved to be a male. Later observations with the 27x spotting scope showed that many individuals had faint white patches. Because these no doubt would have been called females had field glasses alone been used, the observed sex ratio may not be accurate. This may also be the reason that higher numbers of females are reported in some studies than in others.

Erickson (1943) reported a ratio of .95:1 for 80 birds. Hochbaum (1944) reported one instance in which he recorded 329 males to 35 females. This probably was due only in part to the early arrival of males, since he also states that numerous unmated drakes frequent the Delta marshes each year.

RED-BREASTED MERGANSER

Total, 77; sex ratio, 1.2:1.

This species is not considered a common migrant in Minnesota but is often reported in large flocks passing through. Erickson (1943) reported

the much higher ratio of 2.5:1 for 97 birds.

OTHERS

The gadwall, pintail, green-winged teal, bufflehead, hooded merganser and American merganser were seen so infrequently that the ratios are of little significance.

Fluctuations in Sex Ratios

Among the diving ducks, only the lesser scaup, ring-neck, and redhead occurred in sufficient numbers to be plotted, as shown in Figure 1, to show the fluctuations in sex ratios.

Application of the Chi-Square test for significance to daily observations of 50 or more birds revealed highly significant deviations from the expected ratio of 1:1, indicating that the observed sex ratios were not due to chance and that the three diving species listed in Figure 1 show a preponderance of males. (In the case of the ring-neck only one daily observation gave a total of 50 or more birds, but observations of smaller groups proved, through application of the Chi-Square test, to be significant and were therefore used in Figure 1.)

Figure 1 shows that the patterns for lesser scaups and ring-necks are similar. The redhead graph begins with a high percentage of males (2.4:1), drops to 1.7:1, and then rises to 2.5:1 near the end of the observation period. The first ratio could be due to the early arrival of males; the second, to the arrival of more females; and the third, to a large number of unmated males remaining after the birds had paired off. Just what causes fluctuations such as those shown by the lesser scaups and ring-necks is difficult to determine. Indications are that different groups vary greatly in sex composition, perhaps because most of the lesser scaups and ring-necks are not paired when they first arrive in Minnesota during the spring migration. In this survey, no groups composed predominantly of one sex were noted. While it may appear that variation may be due to observer's error, the methods of observation and recording used were planned to eliminate probability of such error.

Possible Causes of Differential Sex Ratios

River ducks show the least deviation from the expected ratio of 1:1, while some of the diving ducks, such as the lesser scaups and redhead, show a ratio higher than 2:1. Why this difference exists is unknown. Several theories have been suggested as to the cause of the overall differential sex ratio.

While there has been little actual proof to support the theory, many biologists and sportsmen believe that the nesting female is more subject to predation than is the male, and is thereby reduced in numbers, leaving an excess of males. Others are inclined to believe that while nests may be preyed upon, the female herself is seldom lost.

To some it may seem that there could be selective shooting of the brighter males by the hunter. Hawkins (1939) found that the kill of female mallards was about 48% during the first half-month of the season, and increased to 62% the last half-month, indicating that there may be a heavier kill of females than of males in an entire season. On the other hand, when more males than females are reported killed, it is probably an indication that there are more males in the first place.

Ernst Mayr (1939) carried out an intensive survey of literature on sex ratios in wild birds. He concluded that there is a great deal of well-documented evidence of the occurrence of un-

even sex ratios with a general preponderance of males. He believes that the existing evidence points to an unbalanced primary sex ratio (the sex ratio at fertilization). If such is the case, more males than females are hatched. Mayr believes that such factors are usually correlated with some peculiarity in the life history of the species. Hochbaum (1944) reported that at the Delta Station the canvasback, redhead, mallard and pintail had a slightly larger percentage of males at the time of hatching, but that the difference was not enough to account for the severe distortion of the ratio in adults.

Other factors, such as the difference in time of male and female migrations or in plumage coloration, may influence ratios obtained through direct observations. Some biologists believe that there are certain physiological factors that make the females more susceptible to disease. Hochbaum (1944) states that the delayed wing molt of the female suggests the probability of her greater vulnerability to botulism in the northern breeding area.

SUMMARY

The average sex ratio for all species of river ducks was approximately 1.3:1 while that for all species of diving ducks was approximately 2.0:1. The ratios obtained for most species were comparable to those reported by the authors cited, with exception of the redheads, canvasbacks, and ruddy ducks, which showed a somewhat higher percentage of males in this study.

The condition of unbalanced sex ratios is one of the most important phases of waterfowl biology today. It is to be hoped that in the future more intensive research will provide clues to the causes of the distortion.

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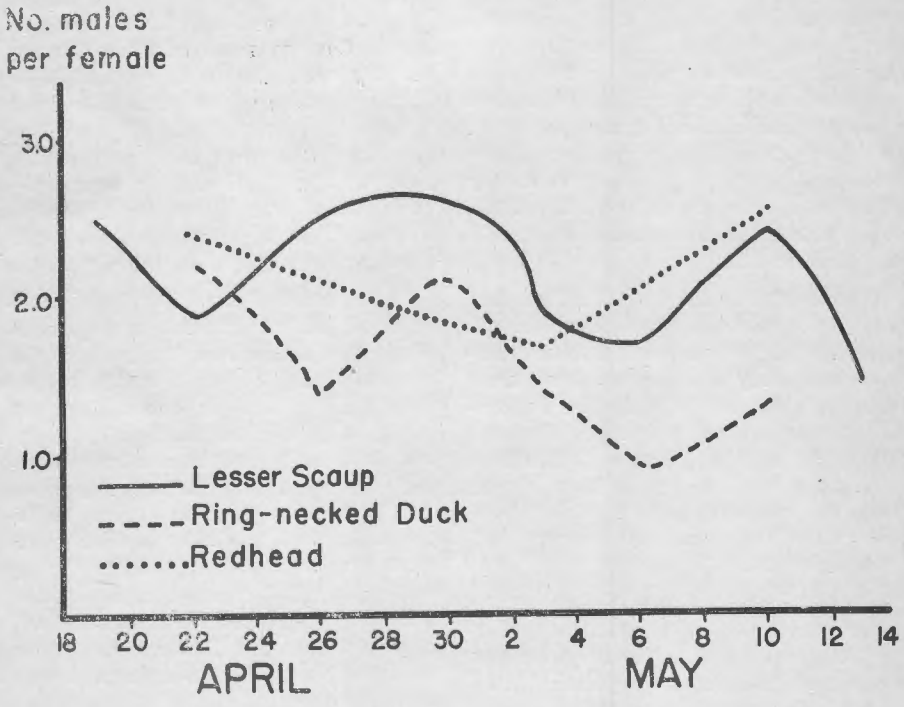


Figure 1. Fluctuations in sex ratios of three ducks in Minnesota during spring of 1950.

Seasonal Report

by

Mary Lupient

The earliest killing frost in many years occurred on August 19 in all but the southern part of Minnesota. As a result many farmers were forced to cut their corn early and to use it for silage. The autumn weather to date (November 15) has been unusually pleasant with occasional frost. A light snow fell in northern Minnesota on October 21.

Egrets were seen near St. Paul and in the lowlands of the Minnesota and Mississippi Rivers during late summer and early autumn, most of them disappearing as usual at the beginning of the hunting season. On September 6 Mrs. C. E. Peterson, Madison, saw 23 American egrets in a slough one and one-half miles west of Bellingham. Ten remained there until September 19.

Dr. A. B. Erickson, Minnesota Department of Conservation, in commenting on conflicting reports by hunters regarding the grouse population, submitted the following excerpts from a report made to his department by field men in the Upland Game Division: "When hunting began, grouse were difficult to find. All kinds of theories were rife to account for their disappearance. Although birds become more evident in some localities later in the season, there was no doubt that they were much scarcer than last year. 'Islands' of good grouse populations, however, still existed in October, 1950: the Deer River area in Itasca County, most of Pine County, the Ely area, the south part of Mille Lacs County, and an eight-mile burn in Aitkin County. It is important to note that 1950 may have marked the start of a cyclic decline, although the birds are as yet by no means few in number. That there was a spotty disappearance of birds is known."

There were reports of the appearance of ruffed grouse in populated areas. One frequented the yard at the residence of Dr W. J. Breckenridge; Mrs. J. H. Reisinger stated that one came daily to a residence in Midway, St. Paul. In regard to similarly varying reports from hunters regarding the pheasant populations, Dr. Erickson said that he believes that pheasant populations were only slightly lower than last year. Large fields of standing corn made hunting difficult and probably led hunters to believe that there were fewer birds than were actually present.

William Longley, who made observations in the Weaver marshes along the Mississippi River, reported that ducks were at their peak during the first week in November. A storm November 8 and 9 carried great flights through the area and forced out most of the flocks that had congregated there before the storm. Mr. Longley sent a migration report that is too long to include here, except for numbers and

dates of greatest abundance, which follow: mallard, Nov. 2—2100; black duck, Nov. 16—600; gadwall, Nov. 2—600; baldpate, Oct. 18—2,000; pintail, Oct. 18—1500; green-winged teal, Nov. 2—300; blue-winged teal, Sept. 14—436; shoveller, Oct. 26—20; wood duck, Oct. 6—100; canvasback, Nov. 11—275; lesser scaup, Nov. 2—1600; American golden-eye, Nov. 17—35; ring-necked duck, Nov. 2—300; bufflehead, Nov. 6—6; many ring-necked ducks were present in early October. He saw only one ruddy duck this fall.

Among the more interesting waterfowl observations were a greater scaup shot by Whitney Eastman at Ten Mile Lake near Dalton during the first week in November, and two surf scoters observed on Bear Lake, Freeborn County, October 25 by Robert Meyers and Russ Sether of Albert Lea. One was killed and positively identified.

Reports from Dr. W. J. Breckenridge, Harvey Gunderson, William Longley, A. C. Rosenwinkel, and others indicate that the major goose flight passed through Minnesota during the first three weeks in October. William Longley saw 6 Richardson's geese in Rochester on October 19. He stated that there were 527 Canada geese in the same area on November 2 and that there were many lesser Canada geese in this flock. More than 200 Canada geese were still there on December 1. A pair of Canada geese nested near the home of George T. Ryan, Whitefish Lake, last summer. When first observed, they had seven young, later only five. One of the adults had a crippled wing which probably accounts for the nesting at that site. Mr. Ryan believes that they were all shot during hunting season.

More than 75 white pelicans were seen near Madison on October 5 by Mrs. C. E. Peterson. William Longley observed one at Cannon Lake on October 15. Mr. Longley also saw 12 whistling swans, not often seen in Minnesota during fall migration, at Weaver on November 8.

Flocks of Franklin's gulls came to eastern Minnesota again during fall migration. They were over the Izaak Walton Bass Ponds area on October 13, and seen by William Longley at Weaver on October 15. Marvin Wass at Nisswa noted Caspian terns on September 17 and three in the same area on October 10.

Lloyd H. Mangus, Assistant refuge manager of Mud Lake National Wildlife Refuge, stated that both bald and golden eagles were seen there the latter part of October. One or two golden eagles are usually observed there throughout the summer. From 35 to 40 American rough-legged hawks were concentrated along the northwest boundary on September 26 and remained until October 2.

Another observation of more than usual interest was that of a white gyrfalcon, found dead at Rat Lake near International Falls on November 3, by Lester Magnus. It was lodged against a muskrat house. Mr. Magnus said that 5 American magpies were seen on a deer carcass in Red Lake Game Refuge on October 25.

In general the fall migration of shore birds and song birds proceeded normally. A few shore birds lingered through October and early November, perhaps because of the mild weather. A. C. Rosenwinkel sent the following last dates: solitary sandpiper, October 29; lesser yellowlegs, Oct. 31; greater yellowlegs, Nov. 5. These observations were made at the Izaak Walton Bass Ponds near Minneapolis. There were more than the usual number of stilt sandpipers reported this fall.

The writer observed a Florida gallinule with two downy young on August 20 at the Izaak Walton Bass Ponds. They were still there on September 17.

The earliest warbler migration date (August 18) was reported by Sheridan S. Flaherty at Morris. The earliest warbler wave in the Twin Cities area was observed by Dr. W. J. Breckenridge on August 29 when a number of species, including several Canada warblers, passed through his yard. Several large waves, myrtles predominating, passed through the glen of the Little Marais River on September 28 and 29. Through the Twin Cities from September 19 to 21 there was a constant migration of warblers traveling singly or in small bands. Mrs. C. E. Peterson banded a golden-winged warbler at Madison on September 2 and observed a yellow-breasted chat there on September 4.

Large flocks of American pipits were more or less common in Minnesota in the past but are now rarely reported. Harvey Gunderson and Bruce Hayward saw a flock of more than 200 north of Ely on September 20.

Among the early winter visitors were snow buntings seen by Dr. William Marshall on October 14 at Ely and Two Harbors, at Nisswa by Marvin Wass on November 6 and near Weaver by William Longley on November 9. Brother Vincent saw 12 pine grosbeaks at Winona on November 1.

Red crossbills were seen by Mrs. C. E. Peterson at Madison on October 23. Marvin Wass reported them to be the most numerous bird at Nisswa about the middle of October. Two red crossbills of unusually large size which during a high wind, had struck a window at the residence of Ronald McLaughlin, 9400 Cedar Ave., Minneapolis, were brought to the Museum of Natural History.

A late date for purple martins was recorded by Whitney Eastman. On October 7, six of them flew over a duck pass at Lake Glesne about 25 miles northwest of Willmar.

One of the rarest records in Minnesota for a long time is that of an ancient murrelet which was caught in a bullhead net at Cutfoot Sioux Lake, Itasca County, November 27, by Larry Dibble. The specimen is now in the collection of the Minnesota Museum of Natural History. The only other specimen known from the state was shot at Lake Hook, McLeod County in November 1905 by W. B. Hopper of Hutchinson. This species, which nests along the shores of the North Pacific and migrates along the coastlines of Asia and North America as far as Lower California and Japan in winter, occurs only rarely east of the Rockies.—**Minneapolis, Minnesota.**

NOTES OF INTEREST

WATERFOWL SPECIES PREFERANCE FOR AREAS—In my **Study of Waterfowl Sex Ratios During Migration—Minnesota, 1950,** I reported that the different species observed showed preference for certain areas. (See p. 114 this issue.) During this study I noted sex and species of the 4,742 waterfowl identified. Of this total, 3,155 were lesser scaups. Of these, 30% were seen on Tamarack Lake, 20% on Valentine Lake, 18% on Rush Lake, 11% on Rondo Lake, 8% on Como Lake, and the remaining 13% were scattered in other lakes and potholes. Lesser scaups were the most abundant species on each of the lakes.

Since lesser scaups seem to prefer larger, open-water areas it would seem that Rice and Tamarack Lakes should have shown similar numbers, but very few were seen on Rice in comparison to the large concentrations on Tamarack.

Other species of diving ducks, despite their smaller numbers, gave some evidence of preference for areas: Ring-necks, 40% on Rondo Lake; canvasbacks, 99% on Rice Lake; redheads, 53% on Rice Lake, and 35% on permanent potholes; American golden-eyes, 88% on Rush Lake; and ruddy ducks, 80% on Tamarack Lake, with most of the remaining 20% on Valentine Lake. American, red-breasted, and hooded mergansers were seen most frequently on Centerville and Vadnais Lakes.

While the river ducks were found in small numbers on each area, 43% of the blue-winged teal were seen on permanent potholes and 21% on temporary potholes. Of the mallards, 32% were seen on permanent or temporary potholes. **—Harvey K. Nelson, U. S. Fish and Wildlife Service, Columbia, South Dakota.**

FEEDING OF YOUNG BIRDS—At Gooseberry State Park, where I spent the period of July 17-July 30, 1950, I found that there, as nearly everywhere else along the North Shore, nature in general was about a week to ten days behind last year's "schedule." Comparison was made easy by the fact that I had spent two weeks in this same area in 1949, from July 19 to August 1.

A greater number than I saw last year of parent birds feeding their young indicated that birds also were behind in "schedule." In all cases, however, the young had left the nest. The following are birds that I saw feeding young within the boundaries of Gooseberry Park (I am reasonably certain that there are no duplications):

I saw the black-throated green warbler feeding young 8 times; chestnut-sided warbler, 7; myrtle warbler, 6; black and white warbler, 5; redstart, 4; mourning warbler, 3; northern yellow-throat, 3; white-throated sparrow, 2; pine siskin, 2; song sparrow, 1; chipping sparrow, 1; blue-headed vireo, 1; and wood pewee, 1.

I saw a young red-tailed hawk, fully grown, clamoring for food from a perch in the top of a tall tree. From the Cliff Trail I watched adult herring

gulls feeding their young on Lake Superior. Not far from the Park limits I found young phoebes huddling close, shoulder to shoulder, in the cold lake breeze. Adults came to them occasionally with food. In this same spot, on another day, five sparrow hawks sat on a telephone wire at intervals of five to ten feet. They were "pa and ma and the three kids." They all took turns darting after dragonflies, and the immature hawks were doing as well as the adults. Upon returning with the catch they tore it apart, holding it against the wire with their claws. They did not eat the wings of the insects.

About a city block away from the north park boundary marker, along Highway 61, a mother ruffed grouse was "herding" her young in the close-cut herbage on the shoulder of the road. When cars roared by she stood very still and alert. When I stepped out of the car and approached, the mother became alarmed but did not leave her post until all the little ones had flown or scampered into the thick underbrush. There were eight to ten young in the covey.—**A. C. Rosenwinkel, St. Paul, Minnesota.**

BIRDS ALONG THE NATURE TRAIL—Since I was unable to obtain a guide-sheet for the well-laid-out Nature Trail in Gooseberry Park (late July, 1950), I concentrated on birds in a two-hour walk there. The species I observed are listed in order of abundance:

Black-throated green warbler, chestnut-sided warbler, redstart, myrtle warbler, (all equally abundant), white-throated sparrow (more immatures than adults), black and white warbler, song sparrow, magnolia warbler, chickadee, pine siskin, northern yellow-throat, purple finch, red-eyed vireo, robin, rough-winged swallow, tree swallow, goldfinch, crow, oven-bird (2), least flycatcher (2), alder flycatcher (1), golden-winged warbler (1, in the dense stand of cedar, spruce, and balsam near Marker No. 43), Connecticut warbler (1), spotted sandpiper (along the river), hummingbird (picking something off the stems of maple saplings), and barn swallow (1). Total number of species—28.

Birds seen away from the Nature Trail but within the confines of the park were: Common loon, in the bay at the mouth of the river; broad-winged hawk, an adult one day and an immature a week later; marsh hawk, flying over the clearing in the park; solitary sandpiper (1), along a pool of the Gooseberry River; herring gull, looking for food at the park dump; mourning dove (1); long-eared owl (1); hairy woodpecker; downy woodpecker; kingbird (1); wood pewee (a few); blue jay (a few); scarlet tanager (1); bluebird; catbird; robin; house wren; warbling vireo (1); Blackburnian warbler; Canada warbler (2); yellow warbler (2); orange-crowned warbler (1); and Nashville warbler (2).

I ought to mention the complete absence of the cowbird. I found neither adult nor young anywhere along the North Shore.—**A. C. Rosenwinkel, St. Paul, Minnesota.**

FEEDING HABITS OF THE EVENING GROSBEAK—The large-scale invasion of evening grosbeaks in Minnesota during the winter of 1949-1950 presented an opportunity to observe the feeding habits of this striking bird. The following observations were recorded on the dates indicated:

October 28, 1949—Woman Lake, Cass County: two (a pair), feeding on mountain ash berries.

January 3, 1950—Medicine Lake, near Minneapolis: a flock, feeding on hackberry fruits.

February 11—Duluth: 75, feeding on sunflower seeds at a feeder, and on mountain ash fruits.

March 2—Minneapolis: three (females), apparently feeding on crab grass seeds on a bare patch of lawn.

March 5—Columbia Heights, Minneapolis: 14, feeding on green ash fruits.

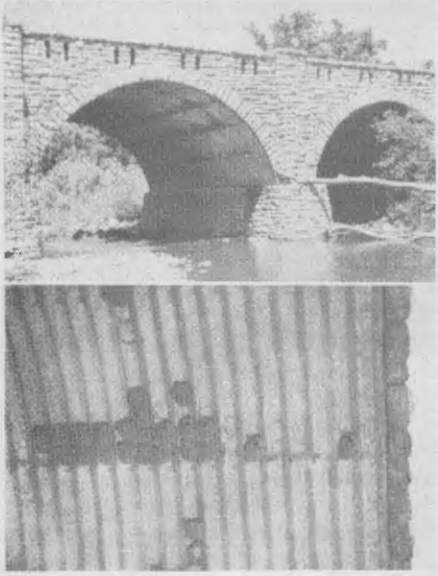
March 12—Minneapolis: two (a pair), feeding on box elder seeds.

April 5—University Farm Campus, St. Paul: 36, feeding on ornamental crab apple fruits, from which they seemed to be extracting the seeds; and 12, feeding on lilac fruits; Lake Vadnais, near St. Paul; 13, feeding on pine seeds; and Rice Creek, where it empties into the Mississippi River above Minneapolis; 6, feeding on weed seeds.

April 11—Minneapolis: 7, feeding on suet from our feeder and picking up gravel in the yard.—**Lewis L. Barrett, Minneapolis, Minnesota.**

LARGE CLIFF SWALLOW COLONY—One of the largest Minnesota colonies of cliff swallows is established on a bridge in Whitewater State Park, Winona County.

At least 400 nests were in use on June 16 this year. Many were then finished, and many were still being built. On July 15 another count of nests was made, and this time the total was nearer 500, with most nests containing young.



Photos by A. B. Erickson

Cliff Swallow Colony at Whitewater State Park, Winona County, Minnesota, 1950.

Most colonies in Minnesota contain only a few nests, seldom as many as 100, although in the Dakotas and Manitoba colonies of several hundred nests

occur on large cliffs along rivers.

The Whitewater colony is built on the sides and ceiling of the middle arch of a three-arch culvert-type bridge. The underside of the bridge, being lined with corrugated galvanized iron, offers footing for nests only at the seams which run horizontally from one side of the bridge to the other; thus, the nests are for the most part in six multiple rows. Some nests are attached directly to the ceiling.

All but one of the nests are in the central arch, probably because the Whitewater River flows through that arch and gives protection from some enemies. Although the rushing water below the nests looks hazardous, no doubt young falling into the water are spared the slow death that overtakes young birds of this type on land. One large young swallow was seen to fall into the water and to crawl up on a large boulder.—**William H. Longley, Kasson, Minnesota.**

COLONIES OF CLIFF AND BARN SWALLOWS—On June 4 dozens of cliff and barn swallows were flying in and out under the small bridge on Highway 371 at Steamboat Lake, 12 miles north of Walker (Cass County). We found three of the gourd-shaped cliff swallow nests under the only corner of the bridge that we could examine from dry ground. The barn swallows seemed equally at home, although no nests were visible from our corner of the bridge.

On June 18 we saw a colony of cliff swallows at Debs (Beltrami County). The 20 nests, seemingly all occupied, were not more than 10 feet from the ground, under the eaves of a small frame building.

On July 16 we found cliff and barn swallows nesting under the bridge over the Mississippi on Highway 2 near Ball Club (Itasca County). We saw three cliff swallow nests and three barn swallow nests, one of them only eight or ten inches below a cliff swallow's nests. **Nora Mae Smith, St. Paul Audubon Society, (Bemidji, Minnesota).**

A SUMMER SIGHT-RECORD OF THE AMERICAN ROUGH-LEGGED HAWK —On June 2, and again on July 10, 1950 I saw an American rough-legged hawk on the Nortondale Tract in Duluth, Minnesota. Roberts' "Birds of Minnesota," second edition (revised), lists it as a winter visitant throughout the state and gives a late date of May 4, 1927 for the northern part of the state. Although melanistic red-tailed hawks and the ferruginous rough-leg are similar species, the excellent opportunity for observation that I had makes me as certain of the identification as one can be of a sight record.

On June 2 the bird flew low across the site of the new University of Minnesota, Duluth Branch, campus and alighted on a dead tree. I was able to approach within 100 feet of the bird, and to watch it for about five minutes with a 7x35 binocular. On July 10 my attention was called in the same field to a hawk which I watched with my binocular for about 15 minutes. I was able, in the good light, to compare its field marks with those in Roger Tory Peterson's "A Field Guide to the Birds."

The hawk was in the dark phase, with its body and most of the undersides of the wings black. I could see its "wrist" marks and white "windows" in its flight feathers plainly, as well as its white tail with a dark terminal band. The light-colored head gave the bird a somewhat bald-headed look. It had the typical

shape of a buteo, but was less chunky than a red-tail. I repeatedly noted a kingfisher-like hovering, typical of the rough-leg, during both observations. The similarity of appearance between the two birds and the lateness of the dates leads me to believe they were the same bird.—**P. B. Hofslund, Biology Department, University of Minnesota, Duluth Branch, Duluth, Minnesota.**

CORMORANT-GREAT BLUE HERON ROOKERY—On July 2, 1950 Mr. O. A. Finseth, Mr. and Mrs. J. K. Bronoel and Mr. and Mrs. P. B. Hofslund of the Duluth Bird Club visited Rice Lake Refuge, Aitken Co., to census a thriving colony of great blue herons and double-crested cormorants on Tom's Island in Rice Lake. Thirty-eight nests were found in the larger trees. We found nests of both species in single trees with the heron nests usually higher. The cormorants were in all stages of developed down. The herons seemed to be farther along in development than most of the cormorants

A check of the contents of the nests that could be conveniently reached revealed the following results:

Great Blue Heron

21 nests. Of 5 nests examined, 4 had 3 young, 1 had 2.

Double Crested Cormorant

17 nests. Of 16 nests examined, 8 had 4 young, 1 had 3 young and 1 pipped egg, 2 had 3 young, 1 had 2young, 2 had 3 eggs, and 2 nests were empty.—**P. B. Hofslund, Biology Department, University of Minnesota, Duluth Branch, Duluth, Minnesota.**

HERRING GULL CENSUS ON KNIFE ISLAND—The annual Duluth Bird Club census of herring gulls nesting on Knife Island in Lake Superior was taken on June 17, 1950 by Mr. O. A. Finseth, Mr. and Mrs. J. K. Bronoel and Mr. and Mrs. P. B. Hofslund.

	June 19 1948	June 18 1949	June 17 1950
Nests	187	228	312
Eggs	62	40	151
Living Young	267	405	338
Dead Young	5	8	3
TOTAL	334	453	492

The results of this year's census compared with those of 1948 and 1949 indicate an apparently increased use of the island for nesting.—**P. B. Hofslund, Biology Department, University of Minnesota, Duluth Branch, Duluth, Minnesota.**

CENSUS REVIEW, HARBOR ISLAND, DULUTH, MINNESOTA—For the fourth consecutive year the Duluth Bird Club took a census of nesting birds on Harbor Island, just off Park Point, Duluth. The island is the only known nesting area of the piping plover and the common tern near Duluth. This year's census was taken by Mrs. Flora Evans, Mr. O. A. Finseth, Mr. and Mrs. J. K. Bronoel and Mr. and Mrs. P. B. Hofslund.

The piping plover population has decreased at an alarming rate since its high in 1948. One pair nesting on the island were the only birds of this species reported in the area during the 1950 season, although previous nesting places of the bird were covered thoroughly.

The numbers of common terns remain relatively stable, as do those of other birds nesting on the island. Much of the land is overgrown with small shrubs, decreasing the extent of sandy area. Persistent decrease may bring changes in the bird population in the next few years.

A comparative population count of nesting bird pairs during the past four years is shown in the following table:

	1947 June 29	1948 June 18	1949 June 11	1950 June 24
Mallard			1	
Piping Plover	1	10	2	1
Killdeer			6	6
Sp. Sandpiper		3	4	4
Common Tern	9	20	16	17
Catbird		1		2
Br. Thrasher		1	2	1
Yel. Warbler			3	2
Red-Wing Blackbird		7	8	2
Song Sparrow	1		1	

Yellow-throats are regular inhabitants of the island, but no nests have been located during the census trips.—**P. B. Hofslund, Biology Department, University of Minnesota, Duluth Branch, Duluth, Minnesota.**

SANDHILL CRANE NEAR GRYGLA, MARSHALL COUNTY, MINNESOTA,—About 3 P.M. on the afternoon of August 14, 1950, members of the class in vertebrate ecology of the University of Minnesota Biological Station had the good fortune to observe two sandhill cranes about thirteen miles southeast of Grygla. The birds were seen to light in a grassy field some three hundred yards from the road. After observation through a 27X scope by all class members, during which time the birds were moving about in the tall grass (12-18 inches in height) and apparently feeding, six of us decided to try to stalk them further. By advancing along a ditchbank and crawling through the grass so as to take advantage of cover afforded by two willow bushes we moved to within sixty yards of the birds. By this time they had become alerted and watched for several minutes before suddenly flying away. Immediately after launching into flight the birds repeatedly uttered the characteristic ringing cry of sandhill cranes as they flew to the south.

Searching the field, which was of peat soil with a heavy stand of several grass species we found small diggings in somewhat bare areas where there was a growth of strawberries. It was thought the birds were feeding on roots of the latter plants.—**William H. Marshall, University Farm, St. Paul 1, Minnesota.**

SNOWY EGRET IN FARIBAULT COUNTY, MINNESOTA—Among the American egrets which move northward late in the summer one might expect to find an occasional snowy egret. None has heretofore been reported, however, from Minnesota.

On August 28, 1950 I watched a snowy egret in Faribault County (Section 11, T.102 N., R. 25W). When I flushed a group of American egrets from the rushes of a small marsh to count them, I saw one white bird that was much smaller than the others. After the 46 large egrets had settled down, the small one passed close enough for me to see its yellow feet and black bill. Its smaller size was obvious when it alighted beside a large American egret and when it walked past a mallard, a bird similar in size.

About 30 great blue herons and 50 black-crowned night herons were spread about the one acre of open water. Other American egrets seen that day were 19 in Section 12 of the above township and 29 near Albert Lea.—**William Longley, Kasson, Minnesota.**

WHERE TO FIND BIRDS IN MINNESOTA—A GUIDE TO 62 BIRDING AREAS, PARKS AND SANCTUARIES compiled by Kenneth D. Morrison and Josephine Daneman Herz. Itasca Press: The Webb Publishing Company, Saint Paul, 1950. 5 x 7½ inches, 122 pages plus i—xiii, illustrations by Roger Tory Peterson. $1.50

The appearance of this book through the cooperation of many persons and with the sponsorship of the National Audubon Society, marks another milestone in Minnesota's achievements in presenting to everyone its bird life.

This book lives up to its title by describing in detail 62 of the best places in Minnesota where one might look for birds. The kinds of birds to be found with special notes on the more interesting species, the best time for a visit to an area, precise directions for finding the areas and brief descriptions of the terrain are given for each area. In addition the descriptive material for each area includes mention of major groups and species characteristic of the locality with notations on seasonal status and specific habitat. Good vantage points for bird observation and hazards to be encountered are also mentioned. The last paragraph of each section contains a general account of many birding highlights of the area.

As an aid to locating birding areas the state has been divided into four regions. From the key map, which includes county lines, principal lakes and rivers and major cities and towns, one may turn to any of the four sections and find an enlarged map of the section reproduced for easy reference.

A pleasing personal touch, amounting to an invitation to visit each area, is given at the end of the description of each area by the appearance of the name and address of the contributor. Every reader will be intrigued and exicted by reading information such as that which appears under "Sandhill Crane Territory": "Anyone not familiar with this territory who wishes to watch the Sandhill Cranes may call on me at Ada any time during the migration."

For the most prt the occurrence of species is accurate. There are, however, a number of inaccurate statements and some others which are open to question. For example, under the Lidgerwood Slough area of North Dakota the White-

rumped and Baird's Sandpipers are listed as "nesting" and the Semi- palmated Plover as "nesting?". The compilers could have determined very quickly that the first two nest only in the high arctic regions and the latter only as far south as central Canada. It should be understood, too, that the fork-tailed, white tern nesting on the shallow, mud-bottomed prairie marshes and lakes is Forster's tern and not the common tern as is stated on page 5. Among those statements open to question is the notation on page 97 that the green-winged teal nests on the north shore of Lake Superior. This should be further substantiated before it is accepted.

Near the back of the book are listed the Audubon Societies in Minnesota. Under each is given the name and address of the president as of date of publication of the book. These should be useful to persons unfamiliar with the region who wish to look for birds. It is regrettable, however, that such persons must be deprived of additional help which might have come through contact with other bird clubs in the state which are not mentioned.

An index to the birds, localities and names of contributors is included. The last eight pages are left blank and may be used for taking notes. The book is attractively illustrated. It is strengthened by heavy paper covers and spiral binding.

You will find in this book a real challenge—to know your state and its birds better. Through its use you will gain many new and pleasant experiences over hundreds of miles of beautiful countryside.—**Dwain W. Warner.**

"AFFILIATED SOCIETIES" (continued)

DULUTH BIRD CLUB

Officers: President, Mr. O. A. Finseth; Vice President, Ralph Boeder; Secretary, Mrs. Harvey Putnam; Treasurer, Miss Mira Childs.

Meetings are held the second Thursday of each month at the Duluth Branch, University of Minnesota.

RANGE NATURALISTS' CLUB

Officers: President, Mrs. Dorothy Beard; Vice President, Hjalmer Halunen: Secretary, Vera F. Barrows; Treasurer, Ruth Ambrose.

Meetings are held the third Thursday of each month, October through May at 7:00 p. m. in the Clubrooms of the Virginia Public Library.

Minnesota Ornithologists' Union Affiliated Societies

CLOUQUET BIRD CLUB

Officers: President, Ruth Johnson; Vice President, Olive Esping; Secretary-Treasurer, Irene Lorie.

Meetings are held the second Thursday of each month in the Clouquet High School at 7:30 P. M.

MINNEAPOLIS AUDUBON SOCIETY

Officers: President, Mrs. G. R. Magney; Treasurer, Mrs. W. W. Wilcox; Recording Secretary, Mrs. A. M. McLeod; Corresponding Secretary, Mrs. S. A. Gile; Field Secretary, Mrs. J. A. Thompson; Auditor, Mrs. Gaylord Davidson.

Meetings are held the first Friday of each month at 2 p. m. at the Walker Branch Library. Field trips during April and May on Tuesdays and Fridays.

MINNEAPOLIS BIRD CLUB

Officers: President, Marvin H. Rosien; Vice President, Mrs. M. E. Herz; Secretary, Mrs. Mildred Snyder; Treasurer, Mrs. Dorothy Smith.

Meetings are held the first and third Tuesdays of each month at 7:30 p. m. at the Minneapolis Public Library Museum.

MINNESOTA BIRD CLUB

Officers: President, Dana Struthers; Vice President, Bruce Hayward; Secretary, Mrs. Mary Lupient; Treasurer, Mrs. Morrie Self.

Meetings are held the first Wednesday of each month, except June, July, August, and September, at 8:00 p. m. at the Minnesota Museum of Natural History, University of Minnesota.

ST. CLOUD BIRD CLUB

Officers: President, H. H. Goehring; Vice President, Mrs. Charles Beacom; Secretary-treasurer, Miss Loretta Rosenberger.

Meetings are held the first Wednesday of each month from October through March in the committee room of the public library at 8:00 p. m.

T. S. ROBERTS ORNITHOLOGICAL CLUB

Officers: President, John Miller; Vice President, Benjamin Friedrich; Secretary-Treasurer, Joan Fowler; Historian, Dolores Gerard.

Meetings are held bi-monthly February through May at the St. Cloud State Teachers College.

ST. PAUL AUDUBON SOCIETY

Officers: President, Mrs. P. M. Jewell; Vice Presiden, Dr. Vernon L. Whipple; Treasurer, Marvin H. Arams; Corresponding Secretary, Miss Winifred Lawrence; Recording Secretary, Mrs. Charles E. Hart; Director-at-Large Leonard Lustig, J. M. Rice.

MANKATO AUDUBON SOCIETY

Officers: President, T. E. Thomson; Vice President, Mrs. H. B. Elford; Secretary, Miss Libbie Williams; Treasurer, Miss Martha Cunrath; Directors, J. George Lynch and Dr. H. Bradley Troost.

Meetings are held the first Thursday of each month (except July, August and September) at Mankato State Teachers College.