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Contents

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The Presidents Page

While the Flicker is being ably edited by Dr. Hofslund, we regret that for some time past it has been difficult to get the publication printed and in the mail until a considerable time after its purported publication date. Your policy committee has carefully considered this matter, but find that in order to maintain a reasonable subscription rate we have been unable to speed up the printing and delivery. In other words, we have traded time for an economic advantage.

Of equal importance to getting the paper to you on time is getting it to you full of newsy bird items and observations from the great outdoors. I have previously mentioned on this page that anyone hearing or observing what might seem like worthwhile bird news should not hesitate to submit it to the editor. If for any reason he finds he cannot use it, which I assure you doesn't happen very often, try again and don't get discouraged. After all it is his job to keep the magazine interesting and as informatively accurate as it is possible.

Not desiring to mention personalities for fear of forgetting some who may have contributed generously in the past, I feel justified in stating that we appreciate the contributions of our Canadian friends, so well presented by Dr. Allin. We are also pleased, I am sure, to see the Range again represented in a report from Vera Barrows. The "Seasonal Reports" by Mrs. Lupient are always worth careful reading.

An important section of Minnesota that we should like to get reports from is the northern corner of the State. No group on the roster of affiliated clubs to represent this section. No reporter to tell us if the sandhill cranes are still stopping in the prairie marshes where the whooping cranes staged their nuptial dances over a hundred years ago. Probably the last authentic report of the great white whooper in Minnesota came from Roseau County in the very northwest corner of the State.

Many of our western birds range eastward into Minnesota showing up first at its western border. Observations from that section should be very interesting. Minnesota is the common meeting ground for many species of birds from all over the country. Here the eastern kingbird mingles with its western kin, the Arkansas. The eastern bluebird sometimes meets its western cousin from the mountains. The raven from the north meets the cardinal from the south and the eastern and the western meadowlarks sing together.

O. A. Finseth, Pres.

A Field Study of Sora Rail and Virginia Rail in Central Minnesota [1]

by

Leo B. Pospichal and William H. Marshall

The sora rail (**Porzana carolina**) and Virgina rail (**Rallus limicola**) are among the most interesting, yet least known of North American migratory game birds. Although often locally abundant, these rails are not conspicuous because of their retiring nature and the habitat they frequent. The present report attempts to fill in some of the many gaps in our knowledge of breeding populations of these two species. It is based on a thesis submitted to the Graduate School of the University of Minnesota in partial fulfullment of the requirements for the degree of Master of Science (Pospichal, 1952).

Comprehensive reports on sora and Virginia rail populations are scarce. Billard (1948) reports on an ecological study including an evaluation of swamp types, natural history, and hunting history of the two species in Connecticut. Walkinshaw (1937, 1940) studied the two species in Michigan and presents a detailed report on nesting and brood behavior.

The study reported here was planned and initiated in 1950 with the objective of contributing information on the following points:

1. Techniques for trapping, marking, sexing, and aging of birds in the field;
2. The life history and ecology of the species in central Minnesota;

and

3. Determination of the productivity of certain marshes.

The authors wish to express appreciation to Dr. James R. Beer and Dr. Dwain W. Warner for their advice and assistance with field work and preparation of the thesis. Thorkil Jensen performed all autopsies and identified the materials cited in the section on parasites. The many hours of field assistance contributed by Arthur N. Whitney, John Tester, and Calvin Lensink are deeply appreciated.

THE STUDY AREAS

Five ponds included in the 1950 study lie within an 80-acre tract bordering either side of Fairview Avenue south of the junction with County Road B. This area in Ramsey County is approximately 1 1/2 miles north of the University of Minnesota St. Paul Campus. In 1951 two areas were added, both of which were located approximately 3 miles north of the St. Paul Campus. One area at the junction of Cleveland Avenue and County Road C-2 included three ponds. A third study area which also included three ponds was situated between County Roads C and C-2 and west of Fairview Avenue.

All the ponds lie within tracts which have been agricultural areas in the past, and four of the seven ponds have a history of drainage to increase tillable acreage during the decade beginning with 1930. All drainage devices have fallen into disrepair but although the ponds now retain considerable water, they have not regained original levels

1. Paper No. 3106, Scientific Journal Series, Minnesota Agricultural Experiment Station, St. Paul 1, Mnnesota.

because of drainage ditches which still function to some extent.

Although 11 ponds were included within the study area only seven were followed intensively for nesting. Trapping operations were conducted on those not utilized for nesting studies. Ponds were classified as semi-permanent cattail potholes (Type B-2) utilizing the pothole classification of Evans, Hawkins, and Marshall (1952). In this system potholes were noted as semi-permanent if they went dry during the summer except in years of abnormally high rainfall. Three subtypes of the semi-permanent pothole type were found to be present in the ponds considered.

The first subtype (Pond V) was an open water area of 3.5 acres with a fringe zone of emergent vegetation consisting largely of common cattail **(Typha latifolia)**, narrow-leaved cattail **(Typha angustifolia)**, soft-stem bulrush **(Scirpus validus)**, and river bulrush **(S. fluviatilis)**. Water depths within the belt of emergents ranged from 6 to 24 inches with depths of 2 to 4 feet in open water.

The second type, including Ponds I, II, III, and IV-A, differed from the first subtype in being shallow waters seldom exeeding 2 feet at the greatest depth. The areas were 3.1, 0.7, 1.2, and 0.5 acres, respectively. Emergent vegetation of these ponds consisted largely of both species of cattail, soft-stem bulrush, water plantain **(Alisma triviale)**, and wapato **(Sagittaria latifolia)** with river bulrush seldom in evidence. The larger emergents such as cattail and bulrush were in a border zone and occasionally appeared as islands. Plantain and wapato occupied the open areas and all but obscured open water.

Ponds IV and VI of 2.0 acres and 2.5 acres were areas of almost solid cattail and bulrush cover with occasional openings occupied by plantain and wapato Organic debris in this type of pond was considerably more plentiful than in the preceding types and the maximum water depth was approximately two feet.

The overall vegetation on all the study areas was quite similar with regard to species present. A modification of the plant listing by Marshall (1952) is as follows:

Upland cover was comprised chiefly of Kentucky blue-grass **(Poa pratensis)** and quack grass **(Agropyron repens)** with squirrel-tail grass **(Hordeum jubatum)**, Canada thistle **(Cirsium arvense)**, and yarrow **(Achillea lanulosa)** also being prominent.

Wet areas surrounding the ponds contained blue joint grass **(Calamogrostis canadensis)**, reed canary grass **(Phalaris arundinacea)**, slough grass **(Beckmania Syzigachne)** in addition to such aquatic plants as sedges **(Carex** [illegible]**)**, and duck millet **(Echinochloa pungens)**.

Reed meadow grass **(Glyceria grandis)** often occurred mixed with cattail and bulrush. Water plantain, wapato, and smartweed **(Polygonum** spp.) also contributed importantly to the emergent vegetation.

Lesser duckweed **(Lemna minor)**, greater duckweed **(Spirodela polyrhiza)**, two liverworts **(Riccia fluitans** and **Ricciocarpus natans)**, and several green algae comprised the free-floating aquatics of the ponds.

Submerged aquatics included sago pondweed **(Potamogeton pectinatus)**, which was the most abundant, Berchtold's pondweed **(P. Berchtoldi)**, and musk grass **(Chara** spp.).

Other species which appeared occasionally both in open water and on wet shorelines were dock **(Rumex**

crispus), bedstraw **(Galium tinctorium)**, river bulrush, wool grass **(Scirpus cyperinus)**, beggartick **(Bidens spp.)**, aster **(Aster simplex)**, willow **(Salix spp.)**, cottonwood **(Populus deltoides)**, and box elder **(Acer negundo)**.

Resident mammals of the marsh areas and surrounding uplands of significance to the rails were the following species: muskrat **(Ondatra zibethica)**, mink **(Mustela vison)**, long-tailed weasel **(Mustela frenata)**, short-tailed weasel **(Mustela erminea)**, striped skunk **(Mephitis mephitis)**, and raccoon **(Procyon lotor)**. Feral house cats and domestic dogs were also frequently seen.

Avifauna of the areas included the red-winged blackbird **(Agelaius phoeniceus)**, yellow-headed blackbird, **(Xanthocephalus xanthocephalus)**, long-billed marsh wren.. **(Telmatodytes palustris)**, black tern **(Chlidonias nigra)**, least bittern **(Ixobrychus exilis)**, green heron **(Butorides lentiginosus)**, mallard **(Anas platyrhynchos)**, blue-winged teal **(Anas discors)**, and pied-billed grebe **(Podilymbus podiceps)** which were common close nesting associates on the marshes. The coot **(Fulica americana)** was a common resident on one pond.

Other resident species were the eastern meadowlark **(Sturnella magna)**, western meadowlark **(Sturnella neglecta)**, bobolink **(Dolichonyx oryzivorus)**, yellow-throat **(Geothlypis trichas)**, black-crowned night heron **(Nyctocorax nyctocorax)**, Wilson's snipe **(Capella gallinago)**, woodcock **(Philohela minor)**, ring-necked pheasant **(Phasianus colchicus)**, and marsh hawk **(Circus cyaneus)**.

Numerous other birds, either residents on surrounding areas or migrants, were observed during the course of the study. The black rail **(Laterallus jamaicensis)**, yellow rail **(Coturnicops noveboracensis)**, king rail **(Rallus elegans)**, and Florida gallinule **(Gallinula chloropus)** were all seen as migrants.

TECHNIQUES UTILIZED

Trapping was done with funnel traps and wing nets or leads. This method was used with considerable success by Billard (1948) and Stewart (1951). on rail populations.

Traps and Nets - Three different traps were used during the trapping operations. All were modifications of funnel traps, and each had advantages for particular situations. The first trap used was a single-funnel type measuring 2 by 2 by 2 feet and built of 1-inch mesh netting over a wire frame. A set of "bobs" was later added to the open funnel to prevent loss of birds. Birds were easily handled without injury in this type of trap, but rails were observed to escape through the 1-inch mesh. The second type was a double-funnel trap measuring 1 by 2 by 1 1/2 feet and made of 1/2 inch hardware cloth. "Bobs" were included as standard equipment on this model. This type was easily transported and had a low loss rate, but birds were easily injured on the wire when excited. Best performance of this trap was on over-night sets. The last model was designed for use in drive-trapping and was made of 3/4-inch-mesh net over a 3 by 2 by 3 feet wooden frame. A single funnel of hardware cloth included a set of "bobs" and an enclosed hardware cloth chamber beyond the "bobs" with a counterbalanced sheet metal trap door floor. Three-fourth-inch mesh and the trap-floor completely eliminated losses from the trap. All models of traps were designed to be portable, because the situation of the study areas did not allow the installation of permanent sets without excessive disturbance by intruders.

Nets found most suitable for conven-

ient handling and dependability on small marshes were 1/2 to 3/4 inch mesh and 3 by 35 feet in size. Nets were equipped with lead lines for the bottom and re-inforcing ropes for the top edge. It was found necessary to add the lead lines when it was noted that rails were escaping the drives by diving under the wing nets. Woven nets were found to be superior to chicken wire because the limp hanging net did not allow the rails to force their way through, and also prevented injuries. Celoglas (plastic coated screen) in 18-inch-wide strips was used with some success as wing nets on overnight sets where the solid obstacle presented by the celoglas apparently did not frighten the birds. An additional advantage was the fact that no support was required for this type of lead.

Canopies of netting were spread over the trap and wings at the junction of the two and this reduced loses by preventing flushing from the trap mouth.

Drive-trapping - Drive-trapping was found to be most practical during early spring and summer and sometimes late fall when the vegetation was thin enough to make it possible to drive the birds.

Whenever possible, isolated strips of vegetation were selected as sites for drive-trapping since the manpower available rarely exceeded three men and usually was only one. Border emergents on ponds with open water proved to be the most easily trapped. Isolated islands of vegetation were also desirable.

Wing nets were set to form an acute angle in order that driven birds would not encounter the obstacle head-on. Since the rails would not take to open water unless forced, trap leads were extended beyond the edges of the vegetation to prevent rails from slipping around the ends. Nets were usually supported by draping them over the cattail and bulrush. The tops of the leads were inclined inward toward the funnel of the drive to prevent the rails from climbing or flushing over the leads. The canopy previously mentioned performed this function at the trap mouth.

Drives were made with drivers abreast and following zig-zag paths to allow full coverage. Driving was done at a very slow pace to avoid exciting the rails and also to gently force those inclined to sit tight and flush at the last moment. It was possible with practice to observe the degree of nervousness of the rails. When very excited and likely to flush, the rails would begin pecking with a feeding reflex. A momentary cessation of the drive would usually restore calm. Birds could be forced to fly or swim across open water or thin vegetation if handled very slowly. Use of a drag rope between drivers did not prove satisfactory because the rope rode over the tops of the cattail and did not create enough disturbance to move the birds. It was noted that drives made downwind were invariably more successful, as on upwind drives the birds were more likely to flush from sudden disturbances. Birds in the funnel of the trap were very excitable and required slow handling. Often 10 to 15 minutes would be expended on the last 20 to 30 feet of the drive.

Camouflage on the trap and rushes piled loosely in the trap funnel were found to be helpful in encouraging the rails to enter the trap. On three occasions rails were observed submerged in the water with only the bill and eyes protruding. This may be a common occurrence which further

complicates trapping since the rails will not flush from this position unless directly threatened.

Of a total of 103 birds trapped during the two years, approximately 78 were taken by drive-trapping and these were all adult rails.

Overnight Sets - Overnight sets without driving usually required less careful selection of site although isolated strips of vegetation did yield better results. Sets were found to be practical for trapping during the summer when dense vegetation made it difficult to force the rails from the nests by driving. Traps were set for three to four nights in combinations of two, three, and four, and attempts were usually made to bisect areas of cover with the leads. Traps were checked twice daily to remove any trapped birds. Results were considered satisfactory with this method and 25 rails were netted by this process. Twenty-one of these were juvenile birds.

Marking Adults - All adults trapped and released were banded with No. 3 Fish and Wildlife Service leg bands. These were easily visible on rails in the marsh, but only one instance of a recapture or observation of a leg-banded bird occurred.

Three additional methods of marking were tried on adult rails. These were colored celluloid leg bands, daubing wings and tails with airplane dope, and dyeing undertail coverts. For the purpose of the study the marking was a failure since only one return was achieved in 2 years. All of the marking was done during the early spring when migration was in progress, and it is thought that the bulk of the marking was done on migrants, because summer observations were numerous enough to have warranted some returns.

Marking juveniles - Marking of juveniles, while more difficult, did prove to be more rewarding than marking of adults. Two methods were utilized and each had advantages as well as disadvantages.

In 1950 a group of 39 sora chicks was banded with colored celluloid leg bands. The birds were most easily captured at 24 to 72 hours of age, but marking at this age proved to be difficult since the short tarsus and relaxed feet allowed the bands to slip off unless carefully applied. Bands were applied by spreading with forceps and slipping onto the tarsus. This marking method had the advantage of making chicks easily observed and identified, but two major difficulties were experienced. On the juveniles retrapped at ages of several weeks it was noted that the celluloid bands did not expand as the tarsus grew in diameter and as a result were causing deformities and perhaps even amputations. On several occasions loose bands were found in the marsh and thereby ruled out the dependability of the method for recognizing individuals.

Seventy-nine 1 to 3 day-old chicks, 10 of which were Virginias were marked in 1951 by clipping fish-fingerling tags into the patagium of the right wing. Care was exercised to avoid harming tendons or bone structure when attaching the tags and no cases of crippling were noted. This method had several advantages which made it more desirable than the method uilized in 1950. The speed with which the tags could be attached greatly reduced time spent at a nest disturbing both adults and juveniles. Numbered tags also reduced the time spent in applying combinations of bands and eliminated the possibility of confusion due to the lost bands. Tags found on recaptured birds did not appear to be causing any harm. Punctures were healed without any infection and tags

were securely in place. The disadvantage of this type of marking was the requirement of a bird in the hand for identification because the wing coverts completely covered the tags.

Food habits studies - Food samples were obtained from dead specimens collected for parasite analysis, but some were collected from live specimens by a flushing tube modified from Nord (1941).

A flushing apparatus was constructed by inserting and cementing a 3-millimeter plastic tube within a 9-milimeter tube at a point 6 inches from one end of the larger tube. The smaller tube was connected to a 1-gallon jug which served as a gravity feed source of water. Gravity feed prevented excessive water pressure which could have caused drowning of rails being flushed. The free end of the larger tube was connected to a collecting jar.

The larger tube containing the water source was gently inserted into the mouth and esophagus of the rail until it had reached the proventriculus. Water was then allowed to flow into the bird and a very gentle massaging of the thorax assisted the water in loosening compacted food. When a large enough sample had been obtained the water was cut off and the tube removed. One bird was lost by drowning before the technique was mastered.

Plastic tubing used in construction was thought to be far superior to either glass or metal because of the decreased danger of mechanical injury to the alimentary tract.

Nest studies - The method of searching for nests involved traversing the emergent vegetation of the entire study area covered by water as well as the moist shoreline. Because of the heavy cover found on most of the areas, the traverses were made at intervals of 4 to 6 feet in order to allow overlap in the inspection of vegetation. In especially dense cover traverse strips were necessarily narrowed. Orientation to prevent straying from lines was easily accomplished by periodically checking the path of disturbed vegetation from the previous traverse.

Censuses were begun immediately after check surveys detected beginning of nest construction and continued at frequent intervals until no new constructions were found on successive checks. Check surveys were not discontinued but were carried on at intervals to detect presence of renesting or second nesting. All cover types over water and moist shoreline were given equal consideration to avoid favoring any particular cover type.

The method was considered adequate during the spring and early summer when new vegetation had not reached a peak. Under late spring conditions it was possible to conduct surveys without excessively disturbing nesting cover and still have relatively unrestricted observation. With new vegetation at a peak in late summer, the census method was difficult to utilize with any degree of success.

Sexing adults - Development of sexing techniques on the basis of plumage difference was one of the major objectives in the study. Preliminary work was conducted on specimens at the Minnesota Museum of Natural History where skins were checked for constant plumage characters. An attempt to carry this to the Virginia was abandoned when it became evident that specimens would not be numerous enough for such a project. It was found that due to great individual

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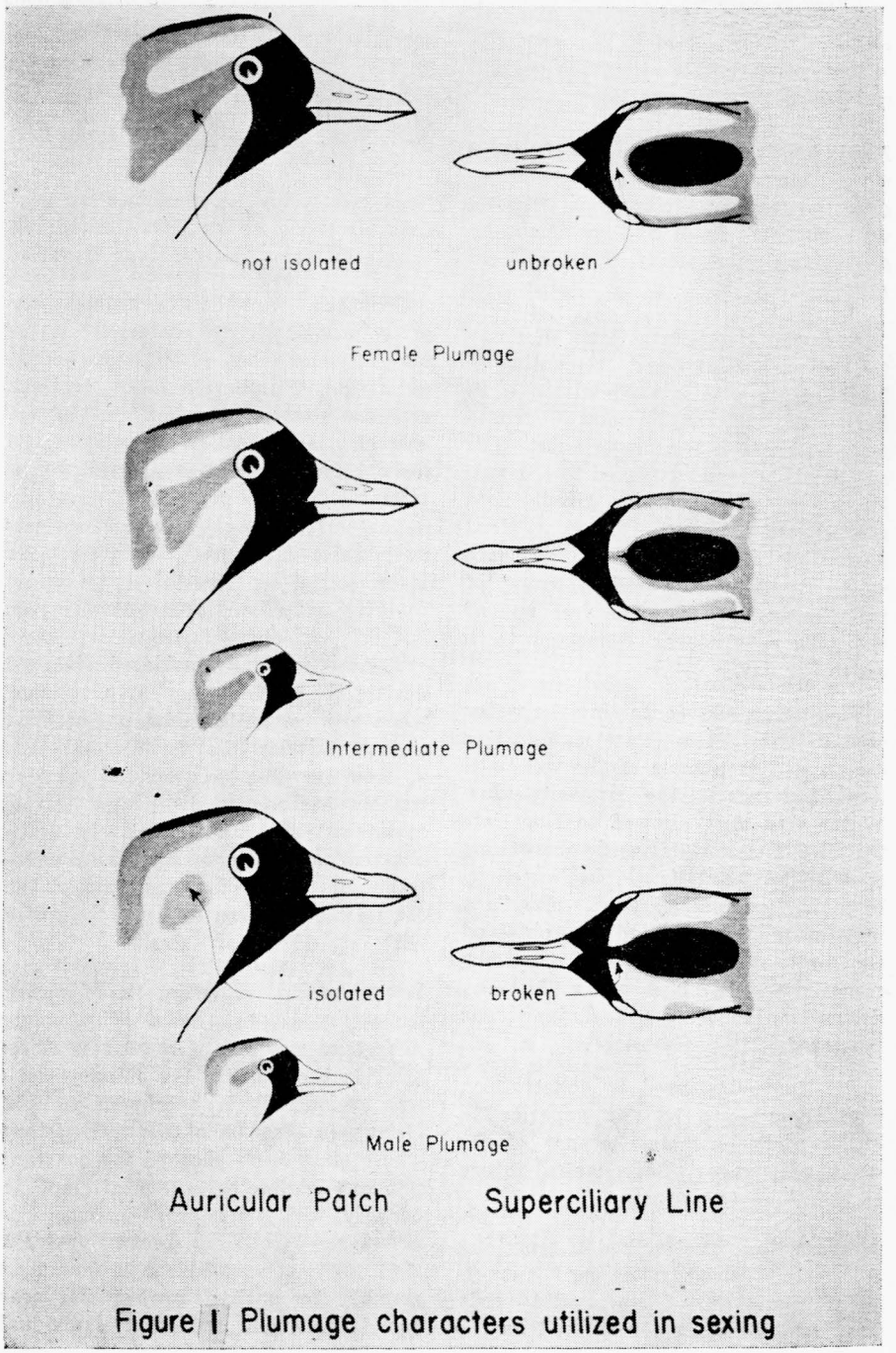

Figure 1 Plumage characters utilized in sexing

hatching of the last egg. Average time for this range was 18.7 days. Walkinshaw (1940) reported an incubation period of 16 to 19 days for the sora. Bent (1926), Roberts (1932), and Mousely (1937) placed the incubation time at 14 days. Average time of 18.7 days attained in this study placed the incubation time within limits set by Walkinshaw (1940). Only three of the 22 nests fell within the 14-day limit.

Three Virginia rail nests showed the period from completion of clutch to hatching of the last egg to range from 13 to 20 days with an average of 17.3 days. Mousely (1940) found 18 days for the same period. Walkinshaw (1937) and Wood (1937) agree on 20 days as the incubation period. Billard (1948) placed the incubation time at 18 to 20 days.

Hatching Period - Eleven sora rail clutches in the 1950 sample had a range of 5 to 12 days in hatching span with an average time of 7.2 days. The 1951 sample average, also based on 11 nests, was found to be 7.5 days and the range was 3 to 13.

One successful Virginia clutch of nine eggs in 1950 hatched over a 2-day period. The 1951 data based on two successful nests of 8 and 11 eggs with 5 and 3 days hatching span, respectively, had an average of 4 days per clutch.

Very few data are available for comparative purposes, but Billard (1948) found the average hatching period of eight sora clutches to be 10.5 days. This relatively long hatching period is in part a reflection of the clutch size which averaged 11.77 eggs based on nine clutches. Walkinshaw (1940) states of the sora: "The eggs always hatched over a period of days, from two or three to four, five, and possibly more."

Total observed hatching period for the breeding population of soras in 1950 covered 21 days from June 9 to June 29 (Figure 2). The 1951 first hatch was also completed in 21 days but from June 3 to June 23, thus reflecting the more favorable spring by being almost a week in advance of the 1950 season. The portion of the 1951 second hatch observed occurred from July 7 to July 11.

The 1950 Virginia rail hatch observed was completed in two days on June 11 and 12. First hatch of 1951 covered a space of five days from June 7 to June 11 and the second hatch spanned a period of 10 days from July 10 to July 19.

Nest Success - Examination of nesting data indicated an increase in nest success from 1950 to 1951 in the case of the sora. Virginias did not show the same trend probably due to the size of the sample. The 1950 sora nest success was 75 percent on 16 nests and 83.3 percent in 1951 on 18 nests. Virginia 1950 sucess was 50 percent on two nests and 50 percent on six nests in 1951. Walkinshaw (1940) found 36 sora nests and 22 of these were successful for a nest success of 61.11 percent. It must be noted that the figures presented by Walkinshaw are data accumulated in several areas over a long span of years and thus are not directly comparable with data previously presented.

Three nests found during the second nesting of 1951 enjoyed a success of 100 percent in both species. Lack of any record of loss might possibly be attributed to the small number of nests observed, but the success might also have been due to the dense cover on the marshes during the latter part of the summer. Increased difficulty in

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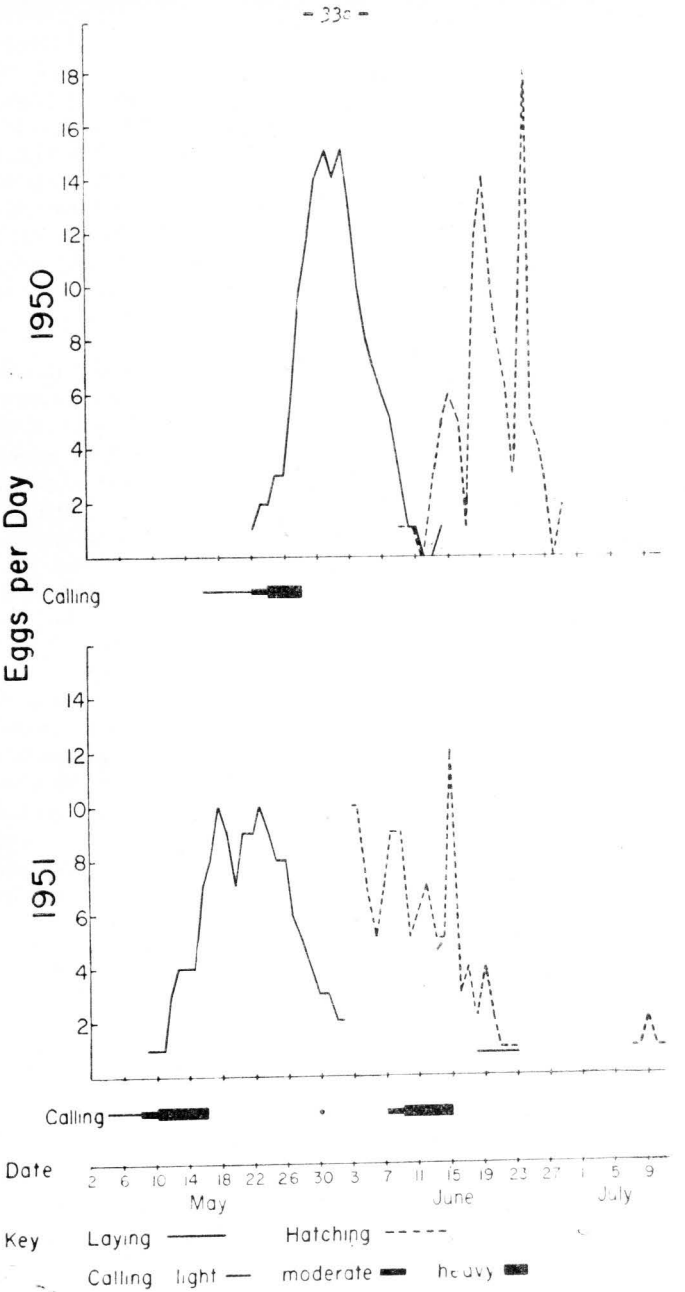

Figure 2 Sora laying and hatching

blish categories of differentiation between sexes. Tarsus length, bill length, weight in grams, wing chord and tail length were recorded and were found, with the exception of tail length, to measure consistently larger in the case of the male. Short ranges of overlap were present between sexes in all measurements with the extremes being very reliable as sexing characters. A tarsus length of 35 millimeters or over could be relied on to indicate a male while the reliable female range from the specimens examined was 29 to 32 millimeters. A bill length of 22 to 25 millimeters could be considered as designating a male, and a bill length of 19 to 20.5 millimeters was usually a female character.

MIGRATION

Three years of observation on first arrivals in Ramsey County are available from the present study. In 1949 the first sora rails were seen on the area on April 28, while the Virginia was not seen until May 3. In 1950 both species were first observed on May 4 and on May 10 rails were noted to be quite numerous, possibly as a result of a migration wave of the preceding night. Earliest observation date of the sora for 1951 was April 23, and the Virginia was first seen on April 30.

Review of field notes for the years 1949-1951 revealed the following concerning phenology of rail arrivals:

1. Emergent vegetation (cattail and bulrush) had begun to show above water;
2. Field grasses(Kentucky bluegrass, quack grass, and others) had reached a height of 3 to 7 inches; and
3. Peach-leaved willow showed evidence of leafing.

Utilizing phenological data compiled by Hodson (1951) for the years 1949-1951 as a basis for seasonal trends it becomes apparent that arrival dates of rails are influenced by the degree of progress of the spring. In 1950, the latest season phenologically, the arrival date of May 4 for both species was found to be later than for the 1949 and 1951 seasons which were approximately 12 and 6 days, respectively, in advance of the 1950 season at the time of rail arrival.

In 1951 sex and age ratios were determined on 20 migrant soras by internal examination. The male to female ratio of these specimens was 190:100. The adult to young ratio of the same birds was 130:100. A young bird was classified on the basis of remains of the yolk stalk on the small intestine. These birds were probably entering their first breeding season.

An external sexing technique designed for use on sora rails was devised prior to the 1951 migration. This method, which is thought to have a high rate of accuracy, was used on all birds banded and collected. The male to female ratio of 39 individuals including banded birds which were sexed externally was 180:100.

Fall migration is thought to be extremely variable and dependent upon weather conditions to a large extent.

Rails were known to concentrate on larger marshes in the early fall as population estimates on larger marshes by observation and calling counts indicated concentrations in excess of the increment of young. Since small marshes in the immediate vicinity were noted to have decreased populations, it was assumed that a movement to concentration areas did occur prior to migration. This movement became apparent in late August and early September. Soras were known to have

left the study areas by October 31, 1950.

BREEDING SEASON

Prenesting Period - A brief period of courtship and mating of the sora, which precedes the actual nest construction and egg laying, is characterized by the sound of the "whinny" and the "spring peeper" calls which are the predominant calls of the early season. The period from the first noted arrival until first observation of egg laying was recorded as 18 days in 1950 and 16 days in 1951. The "whinny" which was the most frequently heard call was recorded in field notes according to the intensity as light, moderate, or heavy. Examination of notes revealed that calling began with light intensity approximately a week after first arrivals were observed (Figure 2) and continued with mounting intensity until approximately a week of egg laying had elapsed. At this point calling dropped off abruptly and was heard only on scattered occasions thereafter.

Numerous observations of birds were made during this period, but no pattern of courtship behavior could be ascertained from the data collected.

Nest Construction and Characteristics- Nest construction evidently was completed in a relatively short period of time, because in 2 years of study on 112 nests only four instances were noted where active nests were found completed, but containing no eggs. In all four instances, two of which were soras, the nests were located only one day prior to the deposition of the first egg of the clutch. The period of nest construction was not determined, but in view of the availability of nesting material and the type of nest construction, it is assumed that the period probably does not exceed 3 to 4 days.

Nests of both species were loosely woven baskets of available nesting material, usually cattail. They were found in clumps of vegetation with the base of the nest in contact with water and often extending somewhat below the surface. In most cases it was possible to determine the species constructing the nest since the sora nest was usually a loosely built structure with the basket of the nest less completely finished and often of relatively coarse material. In addition, the sora usually constructed an elaborate ramp up to the nest lip. Incomplete or dummy nests were sometimes identified by their proximity to active nests of either species on the asumption that they represented practice nests or loafing platforms of the resident pair.

Examination of nest measurements of 52 complete and 21 incomplete sora nests and 12 complete and 4 incomplete Virginia nests revealed a considerable overlap in sizes and no large differences in the averages of these measurements. Average measurements and ranges of the 52 completed sora nests were: inside diameter 10.7 centimeters with a range of 9 to 13 centimeters; outside diameter 15.4 centimeters with a range of 12 to 20 centimeters; height of nest lip above water 11.7 centimeters and a range of 5 to 23 centimeters.

The Virginia average and ranges for 12 complete nests were: inside diameter 11.7 centimeters with a range of 10 to 13 centimeters; outside diameter 17.3 centimeters with a range of 14 to 20 centimeters; height of nest lip above water 12.3 centimeters with a range of 5 to 21 centimeters. Water depth was measured at the nest site during incubation in an attempt to determine the influence of water depth on nesting cover selected. Fifty-two complete sora nests measured gave an average depth of 21.6 centimeters at the nest

with a range of 5 to 41.5 centimeters.

Twelve complete Virginia nests had an average of 21.2 centimeters with a range of 12 to 44 centimeters. These measurements represented actual water depth exclusive of underlying mud. It was noted on the areas that a greater portion of available nesting cover was found within water depth ranges mentioned. However, on some ponds where apparently adequate nesting cover was found over water exceeding the ranges given, it was not utilized by either species for nesting. Walkinshaw (1937) found a water depth average of 18 centimeters at the nest and a range of 10 to 25 centimeters for the Virginia rail. Billard (1948) recorded water depth at the Virginia nest as rarely exceeding 6 inches and more commonly remaining near 2.6 during incubation.

Fluctuations in water depth due to rainfall have little effect on nest survival unless water levels rise too rapidly for accommodation to be accomplished. Some evidence of accommodation to high water was seen on sora nests where platforms had been built up 3 to 4 inches to keep eggs above water. Billard (1948) found sora nests along the Connecticut River with "pyres" 17 to 19 inches tall which had been constructed to overcome flood conditions.

Information on the effect of lowering water levels was noted in 1950. Several sora nests were stranded by early summer drought conditions, but incubation was completed in all except one case.

For the 46 sora nests examined, the average distance between nests was found to be 31.2 feet and the range from 4 to 100 feet. Minimum distance between active sora nests was recorded as 10 feet. From these data it would seem that the intraspecific tolerance is liberal.

The population of Virginia rails on any one marsh was small, and nests were widely separated. Distances between Virginia nests were estimated to average approximately 150 feet. It was impossible to determine whether this wide separation was a function of suitable nesting sites or one of competition. In several cases is was noted that Virginia nestings occupied almost identical locations in succeeding years.

Interspecific tolerance of the two species appeared to be liberal. An average of 13 distances between sora and Virginia nests was found to be 25.3 feet. The 13 measurements encompassed a range of 5 to 100 feet. Billard (1948) found sora and Virginia rails to be quite tolerant of one another in nesting with a minimum recorded distance of 15 feet.

Dummy nests - Construction of dummy or practice nests was noted to be a common practice with both species. These dummy nests were always found in close proximity to the active nests and seemed to serve as resting and feeding platforms since it was evident that they were in constant use. It is believed that these platforms constitute a portion of the nesting area of the breeding birds in a manner similar to the loafing spots utilized by some waterfowl. No actual defense of these structures or of the nest sites was noted. In the light of a lack of evidence to the contrary, it is felt that these dummy nests should not be eliminated when considering distances between nest sites.

In the 1950 total of 36 sora nests 20 were found to be dummies, and in 1951 a total of 40 nests included 22 dummy nests. The Virginia total of six in 1950 included four inactive nests,

and in 1951 the total of 10 included four dummy nests.

Nesting cover - Study of requirements in nesting cover for the two species has been of interest in the light of the apparent variation in cover preference in different sections of the United States. Walkinshaw (1937, 1940), working with the sora and Virginia in Michigan, made the observation, at least by implication, that both species utilized rushes and sedges to a greater extent and cattail only occasionally. On one particular cattail marsh containing 13 sora nests, 12 were found in the sedge border. Bellard (1948) in Connecticut found the sora to have a preference for cattail with less use of sedges and grasses. The Virginia showed a preference for hummock sedges and grasses with only occasional use of cattail exclusively.

Ponds observed during 1950 and 1951 contained all of the cover types mentioned by both of the above authors and, in most cases, the same species of plants. A total of 78 sora and 17 Virginia active and inactive nests were located. Of the 78 sora nests, 66 were located in and built of cattail; one was located in soft-stem bulrush and built of cattail; six were located in and built of wool grass; two were located in soft-stem bulrush and built of the same material; one was located in reed meadow grass and made of the same material; one was constructed of cattail in a clump of reed meadow grass; and one was made of cattail in a clump of water plantain. All 17 Virginia nests were located in cattail and constructed of the same material.

Ponds where successional stages in which cattail was abundant seemed to supply optimum breeding habitat for both species. Nesting densities generally increased with the relative increase of cattail.

With the information available at present it is impossible to ascertain reasons for differences in nesting cover preferences in the three studies. They might be attributed to water levels with respect to available vegetation or other causes equally difficult to isolate.

When nest locations were plotted on cover maps a relationship was noticed between nest location and edge of heavy cover. Both soras and Virginias preferred nesting in close proximity to open water or similar breaks in the vegetation type. No figures are available on width of preferred cover with respect to the edge, but the strip is not believed to exceed 20 to 30 feet. Stewart (1951) noted a similar condition while working with clapper rails (**Rallus longirostris**) in Virginia.

Time of nesting - Since the period required for nest construction was not exactly determined, only an estimate can be made of the time when nesting began. If a maximum estimated time of 4 days for construction is used to plot back from the first egg found, the following dates are obtained. Sora nesting began on or about May 18 in 1950 and approximately May 4 in 1951. The same dates for the Virginia were estimated to be May 20 in 1950 and May 11 in 1951.

Rate and Manner of Egg Laying - Laying was usually accomplished at the rate of one egg per day although three exceptions were noted on 45 active nests. In 1950 one Virginia clutch and in 1951 a clutch of each species showed two eggs deposited on one day. Six instances (five soras) of delay in laying were noted where egg numbers remained static from 2 to 4 days before laying was resumed. Time of day when the egg was deposited varied from early daylight to

afternoon with most eggs being laid in the early morning. Individual rails were noted to vary considerably in time of egg deposition. Human interference was not thought responsible since most visits to nests were made in the late morning or early afternoon.

Clutch Sizes - Clutch sizes and changes were closely recorded in order to have accurate information upon which to calculate the production of the study areas. Clutches varied greatly in size in both species. Average clutch size appeared to differ in both species from 1950 to 1951. During 1950 average clutch size of the sora was 9.5 per clutch based on 16 nests with a range of 6 to 12 eggs. The Virginia for the same period averaged 6.0 per clutch based on two nests of four and eight eggs. No second nesting was noted in 1950 possibly due to the drought conditions which eliminated the water supply on the study area and no comparative figures for second nesting are available. First nesting average of the sora for 1951 was 10.4 eggs per clutch based on 13 nests with a range of 8 to 14 eggs. Average first clutch for the Virginia was 8.2 eggs on six nests with a range of 5 to 11 eggs.

Second nesting for 1951 was represented by one sora nest with a clutch of six and two Virginia nests with five and nine eggs. Trapping of juveniles in late summer indicated the second nesting to be more extensive than recorded above. The 2-year average clutch was calculated at 9.9 for the sora and 7.5 for the Virginia.

It is difficult to ascertain whether increase in clutch size from 1950 to 1951 is the result of too small a sample or is actually a valid difference in clutch size.

Incubation - It was determined that in the case of the sora, incubation was begun before the clutch was completed. This probably began at some point near the middle of laying or later, but the exact point could not be established. This conclusion was substantiated by the manner in which the clutches hatched. Spread of hatching of individual clutches ranged from 3 to 13 days during the 2 years, and although the size of the clutch often influenced the span of hatching, it was apparently not the sole determining influence in span of hatching. A few cases are listed in illustration as follows: 14 eggs hatched in 6 days; 13 eggs hatched in 13 days; 12 eggs hatched in 12 days; and 12 eggs hatched in 5 days. From this it is seen that clutch size is not the sole controlling factor in determining span of hatching, and that initiation of incubation may be another factor.

The Virginia on the basis of 10 nests was thought to have begun incubation on or near completion of laying of the clutch. A narrow spread of hatching of 2 to 5 days with an average of 3.3 days would seem to substantiate this conclusion.

Approximately 15 field observations by the writer record both sexes of both species at the nest and sharing nesting duties. Walkinshaw (1940) and Allen (1934) reported both sexes of the sora as sharing incubation duties. Walkinshaw (1937) reported the same situation for the Virginia.

Since initiation of incubation was found so variable and could not be definitely established, it was decided to use the period from the laying of the last egg of the clutch to hatching of the last egg of the clutch as an index to incubation time. Twenty-two sora nests of known status were examined and showed a range of 11 to 22 days from completion of laying to

plumage variation no clear-cut criteria could be established, and it sometimes became necessary to utilize more than one plumage character in sexing. In extremely difficult cases measurements were relied upon for supporting evidence.

Techniques developed were applied to specimens of the sora collected to check the accuracy of the methods. In 1951 they were utilized on 25 specimens which were later examined internally. Twenty-three were properly sexed, and the remaining two had been listed as doubtful before internal sexing. Methods were also applied to trapped and released sora in 1951. Measurements of these field-sexed birds were later compiled and compared favorably with data from measurements of internally sexed birds.

Information from museum specimens, collected birds, and banded birds was entered on a field form which made data easily available for analysis and comparison. Outline drawings of the head allowed provision for sketching plumage patterns from fresh specimens.

Adult plumage characters -Three plumage characters were originally selected as the basis for the sexing technique. These included: extent and pattern of the auricular patch, continuity of the superciliary line, and extent of black feathering on the throat and breast . Extent of black on the throat was dropped from major consideration when it became apparent that extent did not correspond consistently with sex. This character was retained to be used as a supplementary aid with difficult specimens.

It was found that an auricular patch which was isolated posteriorly, or both anteriorly and posteriorly, usually represented a male (Figure 1). Those patches connected both anteriorly and posteriorly were noted to be females in most cases. Examination of 48 individuals of known sex showed these characters to hold true in 26 of 27 cases in the male and for 15 of 21 females.

Continuity of the superciliary line was also found quite consistent with sex. A clearly broken or even indistinctly broken superciliary line generally could be relied upon to indicate a male. Those specimens in which the superciliary line was continuous across the forehead were usually females. This character was noted to be more reliable than the auricular patch since it was found to hold true on 27 of 27 males and 19 of 21 females when applied to known-sex birds. As with the auricular patch, several degrees of intergradation were found, but even the slightest break would be indicative of a male.

Extent of black on the throat and breast was noted to be extremely variable on the individuals examined.

While the males often carried a greater extent of black, this character could only be utilized as supporting evidence on difficult individuals.

Another character which apparently is true for the breeding season is bill color. Comparision of specimens encountered revealed that in most cases the bill of males was brilliant chrome-yellow from tip to base with a narrow band of white apearing at the base of the upper mandible. The bill of females lacked the band of white and usually shaded from chrome-yellow to olive-green at the tips of both mandibles.

Related Measurements - Some of the standard measurements were taken on all soras collected and trapped to esta-

nest location was probably experienced by predatory species.

Analysis of possible causes of an increase in nest success revealed that changes in two factors may have been responsible for the increased production. More favorable weather conditions during 1951 which resulted in an early nesting, favorable conditions of sustained water levels, and early development of protective cover were possibly responsible for a portion of the increase. A change in technique for nest observation in 1951 might account in part for the decrease in predation and desertion which might have been caused by human interference. During 1950 nests were visited daily, or at most at 2-day intervals throughout the laying and hatching season. Some cover was destroyed by these daily visits, and this undoubtedly opened avenues of approach for predators. In 1951 periods of inspection were spaced approximately three days apart during laying and incubation to allow recovery of the vegetation. The status of nest was interpolated for these periods of non-observation.

Egg Success - Egg hatching success in both species was high on those nests observed in the two years. The sora showed a decided increase in success from 71.1 percent in 1950 to 84.6 percent in 1951, while Virginia rail egg success decreased sharply from 66.7 percent in 1950 to 46.2 percent in 1951. Walkinshaw (1940) in a study of sora rail egg success reported 177 young brought forth from 266 eggs, or an egg success of 66.54 percent.

Losses were not classified. Billard (1948) in a nesting study of the Virginia rail reported 15 nests with a total of 139 eggs. Of these, only six eggs failed to hatch due to infertility.

Egg success may vary considerably from nest success in these species due to partial predation or unhatched eggs which are factors that do not enter into calculation of nest success. Thus, in the case of the Virginia rail in 1950 where nest success was 50 percent, egg success was 66.7 percent. Egg success will generally present a more accurate picture of production. The term "partial predation" was applied to those nests in which eggs occasionally disappeared and could not be located at or near the nest site. This was noted to occur on one sora and one Virginia nest.

Types of Losses - Nest and egg losses were analyzed to determine source of loss. Predation was found to be the primary factor with desertion and unhatched eggs following in importance.

Nest and egg losses of the sora due to predation remained fairly constant for the 2 years. Nest loss in 1950 was 2 of 16 and 2 of 18 in 1951. Egg losses were 15.7 percent and 14.7 percent for the 2 years. Egg losses included individual eggs lost to predation in addition to entire clutches lost.

Virginia nest losses were one of two in 1950 and three of six in 1951. Egg losses were 33.3 percent and 51.2 percent, respectively.

The situation encountered with respect to predation was similar to that discussed by Olson and Marshall (1952) in which predation on loon nests, while recognizable as such, could seldom be attributed to any specific predator. Categories of predation utilized in this study are similar to those used by the above authors:

I. Eggs completely missing, nest intact.

II. Eggs broken into small fragments, nest partially or totally

destroyed.

III. Eggs either in large fragments or with evidence of mammal tooth marks and usually not found at nest site.

IV. Eggs essentially entire but punctured, usually found away from nest site.

No case of predation was actually observed, and consequently it was difficult to affix responsibility for losses to a particular predator. In general, from analysis of type of damage to nests and conditions of egg shell remains in the first three classes mentioned, predators were thought to be mammalian. Damage was attributed to muskrat in two cases where the nest had been totally crushed. Egg shell fragments were present, and evidence of muskrat using the nest as a feeding platform was found on the nest sites. Since shell fragments were found under water and washed clean, it was difficult to determine whether nest destruction was deliberate or accidental. Some of the species of mammals present which might have been responsible for other predation were muskrat, mink, weasel, skunk, and raccoon. Mink predation on waterfowl nests as described by Rearden (1951) resembles the situation described in Class I predation of this study with the exception that egg shells were found at the nest sight by Rearden. Difference in egg size between waterfowl and rails might account for a difference in mink behavior.

Avian predation (Class IV) constituted a small portion of the total damage. In these cases a single egg would usually be found in the marsh at a distance from the nest. This type of partial predation was undoubtedly responsible for the nest disturbances in which single eggs would disappear from the clutch.

The following species were nesting associates and were closely situated with respect to opportunities for predation: least bittern, American bittern, black-crowned night heron, black tern, red-winged blackbird, yellow-headed blackbird, and the long-billed marsh wren. The crow, although not an immediate nesting associate, was found in considerable numbers in the area. Walkinshaw (1937) reported the marsh wren as pecking on the eggs of the Virginia rail without success. Allen (1934) reported successful predation by marsh wrens.

Desertion was found to be second in importance in accounting for nest and egg losses. Definite determination of causes of desertion was considered impossible with the numerous factors which could enter into consideration.

During 1950 two sora nests were lost to desertion from a total of 16 at a time when the clutches had been completed. One of the nests abandoned had been left on relatively dry land as a result of a drop in water level, and it was thought that this was the most important contributing factor to desertion. The second instance recorded was a nest constructed in an open situation in a thin clump of water plantain. The clump failed to sprout and the nest was left without adequate protective cover. Since this nest could be observed from a considerable distance without disturbing the rails, and visits were fewer than at other nests, it was felt that the open situation was the prime cause of desertion. The 1951 season had a rather low loss of one sora nest to desertion from a total of 18. One egg had been laid when the nest was located. An ornithology class being taken through marsh habi-

tats was considered to have been responsible for the excessive disturbance causing desertion. No losses due to desertion were noted for the Virginia rail for the 2 years.

Smallest losses to be accounted for were those due to unhatched eggs. Sora losses in 1950 were seven eggs, or 4.6 percent of the total, and the Virginia rail had no loss because of unhatched eggs. During 1951 the sora loss was one egg, or 0.7 percent of the total number. Virginia rail egg loss for 1951 was also one egg, or 2.6 percent of the total number of eggs. Approximately 50 percent of the eggs left in the nest after completion of hatching showed some development. In general, only one such egg would be found in a clutch, although occasionally two were found. During incubation eggs were found that had been pushed from the nest. Attempts to place these with the rest of the clutch were futile as later examination revealed no development.

Second Nesting - Little information is available in the literature with reference to second nesting and renesting. Baird Brewer, and Ridgeway (1884) stated that the clapper rail and the Virginia were supposed to raise two broods per season. This statement, while only suggestive, seems to be corroborated by 1951 nesting data as follows:

First, a clear-cut interval existed between first and second nesting (Figure 2). In the case of the sora this period was 16 days from laying of the last egg in the first nesting to the first egg of the second nesting, and 10 days for the corresponding period in the Virginia. Twelve days elapsed from hatching of the first complete sora brood to the laying of the first egg of the second nesting. The same period for the Virginia was 10 days.

Second, nest breakup due to predation and desertion did not occur at a peak but was spread over a period of 15 days in the sora and 19 days in the Virginia. Clutches of all nests lost, except one, had been completed within one to two days of the time of predation. This exception occurred at the time when two eggs of the clutch had been deposited and was the one case of desertion noted. Asuming a delay for readjustment of the physiology of the bird after nest predation, it seems hardly likely that these birds whose nests had been destroyed over such an extended period could renest as a unit. If the species were colonial where breeding requires the presence and stimulus of the group, the situation might be different.

Third, a close accounting was kept of the frequency of calling in spring and early summer. Particular notice was made of the sora "whinny" which was a call used during courting. The "whinny" was observed to occur in two different peaks (Figure 2). The first of these extended from May 4 (light calling) with a gradual build-up in intensity to May 16 when calling dropped off abruptly. The nesting period corresponding to this period of calling extended from May 9 to May 22. One "whinny" was heard on May 29, but was the only call heard until calling began again with some intensity on June 6 and increased up to June 15. After this date calling ceased entirely. Second nesting occurred on and about June 18. Field observations were made daily or every second day, and thus call records were complete.

Fourth trapping of young throughout the summer failed to reveal an intergrade in size of chicks that would indicate an overlap between the two

broods older than the downy young stage were seen with adults, it is felt that this period is of rather short duration.

Movements of Broods - During the first week the broods appeared to remain in the vicinity of the nest and to be together as a unit. However, in 1950 a sora chick marked when three days old was found two days later at another nest approximately 75 feet from the hatching site and apparently mixing with an entirely different brood of soras occupying that area.

Drought conditions in 1950 resulted in water loss on all the areas during the brood season and presented an opportunity to study movements from dry to moist areas. Trapping operations on those marshes containing some water revealed movements of at least three individuals of up to several hundred yards from marshes with failing water supplies. These movements would probably be more extensive if sources of water were not available within short distances.

At least a certain amount of random wandering from pond to pond exists in the case of the Virginia. Four instances were observed of adult Virginias leading downy broods between ponds when the conditions of water and food were apparently not critical on any of the ponds. In most cases it is considered doubtful that broods would permanently desert the home marsh unless catastrophe such as previously mentioned for Pond I would so alter the habitat conditions that emigration would become necessary.

It is known that rails will leave the marshes for short periods in late summer and fall to feed on the upland. Thus approximately 15 observations were recorded of both species of rails in the upland, and the presence of seeds of upland species in the food analyses supports this.

Rate of Growth of Young - Development of juvenile rails is a rapid process with adult proportions being attained by the sixth week of life. The following series of measurements were taken from juvenile rails of known age. Younger age classes are represented by a larger number of specimens with later classes often containing measurements from only one species. Data for the Virginia are few and do not present as continuous a series as the sora data.

A series of 81 day-old soras yielded an average weight of 6.1 grams and a range of 4.4 to 8.0 grams. At two days the average weight of 30 specimens was 6.9 grams with a range of 5.1 to 9.0 grams. Average of nine chicks at three days was 7.9 grams with a range of 6.3 to 10.0 grams and at four days the average of five chicks was 12.3 grams with a range of 8.3 to 16.0 grams. Older birds were represented by one individual for each age as follows: at two weeks (14 days) the weight was 47.6 grams; at four weeks (25 days) a weight of 43.0 grams; at six weeks (39 days) the weight was 76.5 grams; and 66.0 grams at seven weeks These birds could not be sexed by plumage. Variation in weights in the older age classes probably reflects a sex difference since adult males in general are found to be heavier than females. Weights given in the last two age classes are within the lower limits of adult weights.

Data for the Virginia rail are available only for 1951, because no juveniles of known age were taken in 1950. A series of eight 1-day-old chicks had an average weight of 7.3 grams with a range of 6.2 to 8.5 grams, and at two days the average of two chicks was

9.3 grams with a range of 9.0 to 9.5 grams. One specimen at approximately 10 days weighed 25.5 grams. At two weeks a weight of 30.8 grams was found and 50.0 grams was the weight of a specimen taken at three weeks. The last weight given did not approach the lower limits of adult weights.

Bill length, the most easily taken and most accurate measurement, was utilized as a criterion of the rate of growth and the following present a continous series. At one day the 81 sora chicks had an average bill length of 8.1 millimeters with a range of 7 to 9 millimeters. This increased to 8.5 millimeters at two days for 30 birds with a range of 8 to 9 millimeters. At three days nine chicks averaged 8.8 millimeters with a range of 8 to 10 millimeters. At four days five individuals averaged 9.8 millimeters and a range of 9 to 10 millimeters. At two weeks (14 days) the bill length was 14 millimeters; at four weeks (25 days) the bill length was 15 millimeters; at six weeks (39 days) the bill length was 21 millimeters; and at seven weeks (49 days) the bill length was 18 millimeters. As was the case with the weights, bill measurements reached the lower limits of the adult scale of measurements and showed variation thought to be a sexual difference.

Eight Virginia rail chicks had an average bill length of 8 millimeters at one day with a range of 7 to 9 millimeters. Two second-day chicks had an average of 9 millimeters with both measuring 9 millimeters. A 10-day chick had a bill length of 16 millimeters. At approximately two weeks the bill measured 18 millimeters and at three weeks the measurement was 25 millimeters. The adult range of 35 millimeters or over was not attained at this age.

Plumage Development of Young - Sora rail chicks have a glossy black natal down with a tuft of orange bristles beneath the chin. A fleshy red operculum and egg tooth are also present during the early phases of development. The tuft of down and the egg tooth were lost between the first and second week, but the operculum remained evident, though transformed, until the fifth week.

Postnatal molt begins during the second week when contour feathers of juvenal plumage become visible in all feather tracts. This period is usually in the middle of June. The egg tooth has been lost at this stage. In the third week down is still evident along the dorsal and ventral feather tracts. First primaries have reached 10 millimeters and no tail is evident. The operculum is no longer fleshy but is still evident as a darkened area. Fourth and fifth week birds are quite similar in appearance with vestiges of down remaining on the crown and rump. The operculum is further reduced and primaries range from 12 to 20 millimeters in length. A tail 11 millimeters in length was noted on a fifth week individual. Full juvenal plumage is attained by the sixth week with loss of any traces of the operculum.

Ridgeway (1941) describes the juvenal plumage as follows:

"Similar to the adult, but with no black on the forehead and lores, which are olive-brown, and no black on the chin and middle of throat, the chin being whitish, the middle of the throat dusky lime, the breast, auriculars, side of neck, and the lower throat extensively washed with buffy olive-brown; the flanks and sides tinged with buffy brown."

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14 weeks when a postjuvenal molt begins. This molt usually begins around the middle of September and includes only the body feathers with flight feathers being retained. Many rails in the late fall are still found with evidence of being in postjuvenal molt. Rails leaving in the fall migration were found in varying stages of molt.

Juvenile Mortality - Juvenile sora rails found dead were examined to determine possible causes of death. This approach consequently resulted largely in consideration of those juveniles lost to exposure and disease and did not deal intensively with predation losses. The dense cover and aquatic nature of the study area made finding of predation losses difficult. Areas in the vicinity of active nests were the only portions of the marsh to be surveyed intensively.

Actual losses noted in the field totaled nine juvenile soras in 1950. Of these eight were in the first week of life and the remaining one was estimated to have been approximately six weeks of age. This bird died as a result of injuries inflicted by cats. During 1951 a total of 13 soras and 3 Virginia rails were found dead from various causes. Of these, 12 were in the first week or two of development. Eight were apparently victims of exposure or diseases and four were trap fatalities. The remaining four were victims of cat predation at ages of five to six weeks.

All but two of the dead week-old birds that were examined were judged to have been victims of exposure. The two exceptions were superficially examined on the day previous to death and were known to be ill with a noticeable lack of muscular control, especially of the neck muscles. Laboratory facilities were not available for bacteriological investigation at the time, and no further information was obtained. These individuals judged to have died as a result of exposure or disease were not found in the nest, but were generally found in the water where they had either fallen or been pushed from the nest. It was assumed that some of the cases resulted from chicks straying from the brood and being subjected to adverse conditions. Other cases were probably weaklings that had died and had been removed from the nest. It was realized that disease could have been responsible for a larger share of the losses than acknowledged.

Comparison of losses between marked and unmarked individuals failed to reveal a significant difference in the ratio of mortallity noticed. In 1950 approximately 36 percent of the known juvenile population of 116 was leg-banded, and losses of marked birds amounted to 33 percent of the total known losses. In 1951 about 59 percent of the known juvenile population of 152 was wing-tagged and 33 percent of the total recorded losses were tagged birds. From this it is assumed that handling was not an important factor in causing mortality.

Cover Utilization by Broods - Immediately following hatching the chicks could be found in the plant cover surrounding the nest. Most often this cover consisted of cattail water plantain, or bulrushes with considerable debris in the water. As the whole brood accumulated and for a short period thereafter young and adults were found still utilizing the denser cover at the nest, but as the young became capable of movement the broods were usually taken to the border of the marshes. Border vegetation generally consisted of grasses with reed meadow grass being the dominant species, but sedges, some sagittaria, water plantain, and cattail were often

present. The denser canopy found in this belt of vegetation was probably more favorable for avoiding detection by some predators. This move to shallower shore waters did increase the opportunities for predation by some species. Shallow waters with abundant aquatic insects, mollusks, and crustaceans were also favorable feeding grounds. While use of all portions of the marshes by adults continued, broods and independent juveniles preferred the denser shore cover for the first few weeks.

Trapping operations in the moist grass belt above the water line yielded a larger return of juvenile Virginias than soras, and on this basis it is suggested that a differential use of vegetation may occur between the species. In 1950 trapping of juveniles was carried on largely in the vegetation of the ponds, and returns were predominantly sora with a ratio of 2 to 1. The 1951 trapping included the grass belt above water line and Virginias appeared more often in the catch with the ratio 2 to 1 in their favor.

POSTNESTING SEASON

Following completion of nesting, sora adults begin the postnuptial molt. Witherby **et al.** (1941) describe the postnuptial molt as a complete molt with wing and tail feathers being molted simultaneously. Period of molt is outlined as July to September with the molt occasionally beginning as early as June.

No rails were trapped during the period when flight feathers were dropped, but 10 adults of both species collected in August and September showed evidence of body molt. Billard (1947) trapped a Virginia rail in Connecticut on July 26 that had lost the primaries and secondaries, and another on August 26 that had primaries sheathed for approximately one-fourth of their length. Molt on adult body plumage is gradual and is more easily seen on the inner skin surface since the plumage color does not change on adults except for the slate tips on the black feathers of the throat.

No evidence was found that rails changed habitat preference during the period of molt. It is doubtful that any change of this nature does occur in view of the relative homogeneity of the marsh vegetation at this season.

FOOD HABITS

Juvenile—Analysis of the food and feeding habits of juvenile rails proved to be difficult especially after the young became active enough to leave the nest site and forage for themselves.

Approximately 15 percent of the young were found with unabsorbed yolk sacs at hatching. Although the yolk sacs were absorbed within 1 to 2 days after hatching, young were found to be taking food with the yolk sac still present externally.

Information available on food habits was obtained from three sora rail chicks found dead at approximately 24 hours of age. More chicks were found, but were generally in advanced stages of decomposition. At 24 hours the chicks were capable of considerable coordinated movement, but were not thought to be capable of capturing live food. Analysis showed the following materials to be present: earthworm, wasp, unidentified larva, ragweed seeds, tadpole, and various insect remains. On the basis of these stomach contents and behavior of the young it is assumed that parents feed the young for the first few days. Young rails very soon gain enough strength and coordination to be capable of self-feeding, and it is thought that within the first week after hatching the

young are capable of foraging for food.

Adult—The food habits study was done from 19 sora and 7 Virginia rails collected or trapped in 1951 (Table 1). Analyses were performed on contents of dead specimens and also on samples obtained from living birds with a flushing tube.

Difficulties were experienced in obtaining specimens in which the stomach contents could be successfully analyzed. Birds were collected during periods ranging from 4:00 A.M. to 6:00 P.M. but invariably stomachs were found with little or no food. Analyses were performed largely on gizzard contents, and this fact undoubtedly biased the data because easily damaged food was unrecognizable, or had been passed on to the intestine. Hard materials such as seeds often were damaged beyond recognition. Quantitative study of the samples was ruled out in favor of rate of occurrence.

Examination of Table 1 reveals a wide variety of foods utilized by both species. Food materials include seeds leafy plant materials, insects, and snails.

The largest part of rail feeding was done along the edges of heavy cover or in thin cover where adequate plant stem debris allowed movement without resort to swimming. Both species are swimmers, but feeding was generally done from a standing position. On two occasions soras were observed feeding in open water like a coot. In these instances the birds were noted to lack bouyancy on the forward half and floated so low that the head appeared to be separated from the body.

Although the data obtained were not sufficient to clearly document a variation in diet with the season, some indications of seasonal differences can be cited. Diet during early spring and extending into June consists largely of seeds with animal material being in the minority. During this period seeds of the previous fall are abundant and comprise the large part of the diet. As summer advances, a period of seed absence or shortage occurs from June to July, and the diet changes to the increasingly abundant animal material. Duckweed and pondweed are also more heavily utilized. With the maturing of the seed crop on aquatics and also some upland species, diet again reverts heavily to seeds. Feeding on upland species is perhaps more extensive than the data in Table 1 would indicate.

Examination of Table 1 clearly indicates a large overlap in food species utilized by the two rails. With a larger sample the diets might prove to be identical. If a shortage of food occurred, competition might become an important factor, but from observations made over two years it appeared that the species are tolerant of one another. The abundance of food available in the marsh during the summer probably obviates the factor of competition to a great degree.

TABLE 1. GIZZARD ANALYSES OF 19 SORA AND 7 VIRGINIA RAILS.

Food species	Number of soras containing	Number of Virginias containing
Seeds		
Scirpus acutus	8	
S. validus	11	2
S. fluviatilis	11	1
S. torrayi	1	
Carex spp.	7	
Eleocharis sp.	4	
Cyperaceae unidentified	3	1
Leersia oryzoides	4	1
Setaria lutescens	1	
Gramineae unidentified	1	
Polygonum spp.	2	
P. pennsylvanicum	1	
Bidens sp.	1	1
Compositae unidentified	2	2
Chenopodium sp.		1
Miscellaneous seed coats	17	2
Leafy materials		
Lemna minor	4	3
Potamogeton sp. stems and leaves	3	
Unidentified vegetable material	4	2
Insects		
Diptera adult	2	
larva	3	
pupa	2	1
Tipulidae larva	1	
Coleoptera adult	1	2
larva	1	
Hymenoptera adult	1	
Collembolla (Sminthuridae)	1	
Hemiptera nymph	1	
Lepidoptera adult		1
Curculionidae adult		1
Unidentified insect remains	14	5
Gastropoda		
Physa sp.	2	1
Unidentified snail remains	4	4

PARASITES

Collections were begun by trapping on a series of ponds in Ramsey County, but because of changes in the behavior of rails it became necessary to resort to collecting with firearms on Lake Peltier, Anoka County. Change in collecting site and resulting discontinuance of the series on one area introduced variables which made analysis of parasite changes impossible.

Specimens were made available for laboratory examination as soon as possible (usually within 3 hours) after collection in order to avoid losses due to deterioration. Internal examination included close scrutiny of the respiratory tract, digestive tract, musculature, and internal organs. No attempt was made to determine the presence of blood parasites. Some of the specimens were examined for external parasites, and no evidence of infestation was noted on those ex-examined.

All rails examined were found in good physical condition with respect to weight and vigor, and it is felt that none of the specimens contained an infestation large enough to be seriously detrimental. Fifteen of 19 sora rails and six of seven Virginias examined were noted to contain at least one parasite indicating a widespread infestation (Table 2). Parasites of the individuals examined showed a remarkable parallel between the two species. The similarity would possibly increase with an adequate sample of Virginia rails.

PRODUCTIVITY

Analysis of data on egg hatching shows a relatively high rate of success in the production of young per adult. Average clutch size of the soras in 1950 was 9.5 eggs. The average brood hatched was 6.8 chicks. The clutch size of Virginia rails in 1950 averaged 6.0 eggs, and the average brood brought off was 4.0 chicks. In 1951 the sora averaged 10.4 eggs per clutch with a brood average of 8.6 chicks, while the average clutch size for the Virginia was 8.2 eggs and the broods averaged 4.4 chicks.

In calculating production on an area basis, the total areas of the ponds were utilized in order to standardize the calculations. Production per acre varied considerably from pond to pond with a range from zero (because of predation) to a high of 18.8 sora young per acre on Pond IV in 1950 and a high of 11.4 Virginias per acre on Pond II in 1951.

TABLE 2. HELMINTH PARASITES RECOVERED FROM 19 SORA AND 7 VIRGINIA RAILS

Parasite	Location in host	Number of soras infected	Number of Virginias infected
Nematodes			
Echinuria horrida	Wall of proventricula	2	
Tetrameres sp.	" " "	2	1
Hystrichis sp.	Proventriculus	1	
Spiruridae	Small intestine	1	1
Cestodes			
Ligula gallinula	Small intestine	4	1
Hymenolepis sp.	" " "	2	2

Trematodes

Echinostoma revolutum	Large intestine	2	2
Echinostoma sp.	Small intestine		1
Levinsenilla sp.	" " "	2	1*
Cyclocoelom mutabile	Air sac	1	
Psilostomum reflexae	Small intestine	9	2
Notocotylus porzanae	Large intestine	5	3
Strigeid metacercaria	Fascia and muscles of breast region	2	1

Acanthocephala

Corynosoma constrictum	Small intestine	1	

*Levinseniella sp. found in large intestine in Virginia rail.

In order to indicate an average productivity of the cattail marshes of the area all of the ponds were consolidated and considered as a single plot of marsh habitat. Calculations of production on this basis revealed that in 1950 on 7.5 acres the sora production was 14.4 birds per acre and Virginia production was 1.1 birds per acre. In 1951 on 13.5 acres soras produced 8.9 young per acre and the Virginias 2.4 young per acre.

Since it was impossible to follow the progress of rail broods after they had abandoned the nest site, all production figures were based on successful hatching of eggs rather than on production to the flight stage.

SUMMARY

1. During the summers of 1950 and 1951 the senior writer carried on intensive field studies of sora and Virginia rails on seven semi-permanent marshy areas ranging from 0.5 to 3.5 acres in Ramsey County, Minnesota. These areas are described briefly as to history, vegetation, and vertebrate fauna.

2. Emphasis was placed on developing techniques for field study of these little known birds. Among techniques developed were:

a. Drive-trapping, which yielded 78 adult rails during the spring months.

b. Overnight trapping sets, which yielded 4 adults and 21 juveniles during the summer months.

c. Marking of adults by colored leg-bands, painting with airplane dope, and dyeing of undertail coverts; fingerling fish tags were placed on the wings of very young chicks. The latter proved most successful from the standpoint of returns obtained.

d. Nest census by intensive drives of marshy areas.

e. A sexing technique for adult soras based on the characters of the auricular patch and the superciliary line. This was found to be successful in 23 of 25 individuals sexed internally.

3. Spring arrivals occurred in late April or early May and apparently coincided with the appearance of new cattail and bulrush vegetation in both years. Twenty sora rails collected during the 1951 spring migration showed an adult:young ratio of 130:100 and a male:female ratio of 190:100. Fall departures were apparently pre-

ceded by concentrations in larger marsh areas in August and occurred between September and November.

4. A prenesting period of 16 to 18 days from first arrival to egg laying was noted for the sora. This period of courtship was characterized by the sora "whinny," which was observed to precede and overlap each period of nesting.

5. One hundred and twelve nests of both species were located with most occurring in early May. An estimate of three to four days for nest construction was made. No data were available on delay between nest completion and egg laying. Both species nested in cover comprised primarily of cattail with soras averaging 21.6 centimeters of water at the nest and Virginias averaging 21.2 centimeters. Few adverse effects were noted from water level fluctuations. Soras averaged 31.2 feet between nests; Virginias averaged 150 feet; and the distance between the nests of the two species averaged 25.3 feet. Both species constructed dummy nests in large numbers. An apparent correlation was noted between nesting site and edge of heavy cover.

6. Egg laying usually occurred early in the day and progressed at the rate of one egg per day in most cases.

7. The average sora clutch size increased from 9.5 eggs in 1950 to 10.4 eggs in 1951, while the Virginia showed an increase from 6 to 8.2 eggs per average clutch.

8. Incubation was found to vary from 11 to 22 days with an average of 18.7 days for the sora and from 13 to 20 days, within average of 17.3 days, for the Virginia.

9. Hatching period averaged 7.2 days per clutch in 1950 and 7.5 days per clutch in 1951 for the sora with 2 days and 4 days, respectively, for the Virginia.

10. Nest success for the sora increased from 75 percent in 1950 to 83.3 percent in 1951, while the Virginia nest success remained constant at 50 percent for both years. Second nesting had 100 percent success in 1951 for both species.

11. Sora egg success increased from 71.1 percent in 1950 to 84.6 percent in 1951, while the Virginia experienced a drop from 66.7 percent to 46.2 percent.

12. Losses were attributed to predation, desertion, and unhatched eggs in the order mentioned. Mammalian predation was the most important loss factor.

13. Second nesting was thought to occur in 1951 on the basis of: a clear-cut interval between nestings; the pattern of predation with respect to the second nesting period; the pattern of courtship-calling peaks; and the results attained from trapping of young.

14. Nesting densities ranged from zero to highs of 3.5 sora pairs per acre and 1.5 Virginia pairs per acre. A ratio of 3.5 soras to 1 Virginia was also noted.

15. Predation on adults was observed only in those instances where house cats were responsible. These losses (from one pond) included 10 rails in 1951 and three in 1952.

16. Both sexes were involved with brood care. The duration of parental care is unknown, but is thought to be of short duration. One instance was recorded of brood intermingling.

17. Movement was noted between ponds during the dry seasons, but some random movement of broods with ad-

ults was also observed.

18. Growth and plumage development were tabulated by week classes using data from a group of 129 juvenile rails weighed and measured. The downy young begin a postnatal molt in the second week with a gradual molt lasting until the sixth week when full juvenal plumage is attained. At 12 to 14 weeks the postjuvenal molt begins, and may be in progress at the time of fall departure.

19. Juvenile mortality was observed in 25 cases. Nearly all deaths were due to exposure or disease. No significant difference was noted in the mortality rate between birds that had been handled for marking and those not marked.

20. Broods utilized the cover at the nest site for a short period and then moved to shallow waters and border vegetation of the ponds. Trapping operations appear to indicate a differential use of border vegetation with more Virginias utilizing the moist grassy areas surrounding the ponds.

21. In the postnesting season the adult rails undergo a complete molt with wing and tail feathers dropped simultaneously during late July. No evidence of change in cover preference was noted during this period.

22. Stomach analyses of three juvenile sora rails showed feeding to begin on the first day apparently with parental assistance. Several instances were recorded of young feeding with yolk sacs present externally. Self-feeding by young is achieved during the first week.

23. Gizzard analyses of 19 adult soras and seven Virginias revealed a wide variety of foods being utilized with no noticeable diet difference between the two species. Diet appears to vary with the season and availability of certain foods. No evidence of interspecific competition was found.

24. Examination of the respiratory tract, digestive tract, musculature, and internal organs of 19 sora and seven Virginia rails disclosed 14 species of parasites, several of which have not been previously described for the rails. Fifteen of 19 sora and six of seven Virginia rails were found to contain at least one parasite, but none were noted to be heavily infected.

25. Production per pair of breeding adults was estimated on the basis of successful hatching. Average brood size in 1950 was 6.8 chicks for the sora and four chicks for the Virginia. Broods averaged 9.6 sora chicks and 4.4 Virginia chicks in 1951.

26. On an areal basis the highest production noted was 18.8 soras per acre and 11.4 Virginias per acre on individual ponds. In 1950 the 7.5 acres of study area had a production of 14.4 soras and 1.1 Virginias per acre. The 13.5 acres studied in 1951 produced 8.9 soras per acre and 2.4 Virginias per acre.

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Seasonal Report

by

Mary Lupient.

The weather was about normal during and after the holidays. Then a spell of bitter cold came down from Canada about the middle of January causing temperatures to drop from 44 below zero in the north to 25 below in the south. This extreme weather lasted only a week. It moderated January 23, and so far February has been fair and springlike. To date of this writing, February 10, temperatures in the south half of the state ranged from 30 to 40 degrees above zero. There was little precipitation, and the ground was almost bare except in some sections in the north where there was heavy snowfall.

At Rochester 501 Canada Geese were counted by William Longley, Regional Biologist with the Minnesota State Conservation Department. For some years a flock of about 500 Canada Geese and some ducks have wintered on a small open lake within the city limits of Rochester. A raft of about 500 American Golden-eyes on the Mississippi River near Minneapolis was reported December 30 by Dr. Walter J. Breckenridge. Small flocks of Mallards and Black Ducks wintered in open water adjacent the rivers near the Twin Cities and in southeastern Minnesota. A flock of eight Old Squaw Ducks was seen at French River January 23 by P. B. Hofslund. He reported also that Glaucous Gulls are wintering in Duluth Harbor.

Sparrow Hawks were seen by several observers in various sections of the southern half of the state. Other species reported were Red-tailed, Rough-legged, and two records of the Marsh Hawk. Three Red-shouldered Hawks and one Broad-winged Hawk were observed February 7 in Rice County by Orren Rustad. Near Worthington a Prairie Falcon was seen January 3 by Carl Johnson. He stated too that a flock of six Hungarian Partridges were seen daily on a farm near Dovray.

In adition to the records listed in the Seasonal Report in the December Flicker, the following Snowy Owl reports were received: Worthington, December 24, Carl Johnson; between Minneapolis and Anoka, January 2, Minneapolis Bird Club; near Bloomington, January 4, E. H. Hermanson; Stacy January 9, Brenden Connolly; Ogilvie, January 27, Walter Jeracek; St. Joseph, January 27, Walter Jeracek; Dakota County, February 7, Orren Rustad; Kasson, January 24, Dag Grudem; near Shakopee, January and early February, two Snowy Owls, James Wilkie. A note from Milton Stenlund, Ely stated that Snowy Owls were feeding on the Chukar coveys at the local mines again this winter.

Two notes sent to Dr. Breckenridge from Burton Ellig, Pine City, related an interesting incident regarding a Snowy Owl record. It follows in part, "January 31 I witnessed a Snowy Owl carrying a full grown Pheasant. It flew about 175 yards at a height of 10 ft. and when it was again flushed it flew about 50 yards when it abandoned its prey. It stayed near while I retrieved the pheasant which I weighed several hours later. The weight was two and one-half lbs. The

owl had completely decapitated the pheasant before he carried it away.

The bird distinctly was not a traffic casualty. It was killed at a roosting spot about 75 yds from the highway where it had scratched out little holes in an old grain field. It appeared to be a healthy bird probably of last years hatch." Great-horned Barred and Screech Owls were reported in the usual numbers. William Longely stated that an occasional Short-eared Owl appeared in Dodge County, and Carl Johnson saw three near Adrian, December 26.

From various sections in the southern half of Minnesota large numbers of reports on mourning doves was received. A flock of 19 was observed by Orren Rustad in Rice County. December 31.

Prairie Horned Larks arrived in Dodge County January 31 according to William Longely. Orren Rustad saw a migration of them in Rice County February 7, and a few individuals were reported by Sally Davidson at Ft. Snelling, February 7. Their arrival was about on the usual dates, although some seasons bad weather delays the migration.

A Canada or Gray Jay was observed by this writer near Bloomington January 7. A Red-headed Woodpecker was recorded by Mrs. Josephine Herz, February 4. It was near Excelsior.

Reports of Tufted Titmice were received all through the season. An interesting note by William Longely reads as follows, "Tufted Titmice have been heard in all of the counties east of Steele this winter. They haven't been overrunning the area, but certainly they are much more widespread then I have ever known them to be. One even turned up in southwestern Dodge County in a prairie windbreak a few days ago. It was with a couple of chickadees. It always seems strange to see chickadee far out on the windy prairies, but it is not uncommon."

Mr. Longely stated that Snow Buntings were numerous. Several flocks of Snow Buntings and Lapland Longspurs, numbering altogether about 500, were seen in Dodge County. Snow Buntings were numerous on the North Shore.

Redpolls appeared to be much less numerous than usual. Tree Sparrows in flocks numbering hundreds were commonly seen in the country side near the Twin Cities. Last year at this time there were very few tree sparrows in the area mentioned, but Redpolls were abundant.

The usual number of Purple Finches and Goldfinches was reported, Pine Siskins were less abundant.

Pine and Evening Grosbeaks were not in evidence as much as usual. P. B. Hofslund reported that they were in Duluth, but not in as great numbers as last year. Walter Jeracek saw Pine Grosbeaks at Minaca. January 27, and Roland E. Cole saw eight in Vadnais Forest near St. Paul, January 26.

There are a few reports of waxwings. Dr. Breckenridge had from 12 to 15 Bohemian Waxwings at his feeder all winter.

As usual there were several reports of Oregon, Montana and Pink-sided Juncos.

Normally only a few Northern Shrikes appear, and occasionally a season passes without a record in all

but the northern part of the state. This year there were many reports from all sections.

Apparently the mild weather caused an exceptionally large number of Meadowlarks to remain in the south half of the state. James Wilkie saw a flock of more than 25, January 24, and they were reported in lesser flocks by many observers. They survived the cold weather in January as did several bluebirds.

The following interesting note was received by Harvey Gunderson from Carl Johnson, Worthington. Date of observation, January 3. "The most gratifying part of the observations was the experience with the Longspurs. Their numbers were fantastic. We parked on a gravel road near Okabena and let a flock of them settle down around us. The birds covered most of the section line, and were so thick in the plowing and stubble in the fields that the ground seemed alive with them. Considerable time was spent closely examining individuals that appeared larger than the others. Not a single bird was observed that appeared to be a Smith's Longspur."

Rev. Adelarde, St. John's University, Collegeville, reported to Dr. Breckenridge that a Mockingbird was seen there last December 1. It remained until January 17 when it died. A skin was made and is preserved at St. John's University.

The record of a Varied Thrush appeared in the December Flicker in Encampment Forest. According to P. B. Hofslund it was still there January 23. A bird believed to be a Varied Thrush appeared at a feeder owned by Curtis Truman at Two Harbors. It was there all fall and winter to date of January 12, when the report was written. **Mpls. Minn.**

THE CANADIAN LAKEHEAD

Edited by

A. E. Allin

Both the precipitation and temperature were above normal at the Canadian Lakehead during 1953. The mean daily temperature of 38.3° was two degrees above average, and the precipitation of 26.92 inches was 2.76 inches above normal. Extremes of 90.5° on May 8 (an all time high for May) and 31° below zero on December 30 were experienced. The last killing frost occured on May 22, and the first killing frost on October 7, giving a frost-free period of 138 days compared with a long-time average of 117 days.

November was very mild with a precipitation a third above normal, but the snowfall of 1.1 inches compared with a normal of 5.2 inches. All-time maximum temperatures were reached on November 13. 16, 17, and 18. Marshes and small lakes had frozen on November 3, but many re-opened during this mild spell when temperatures were ten degrees above average. The 19.1 inches of snow and the 0.58 inches of rain which fell during December were more than twice normal. The temperature was well above average until the end of the month with lows of 23° below zero on December 23 and 31° below on December 31. January, 1954 was a very severe month with the temperature dropping to 31° below zero at the Lakehead on January 31. At Armstrong 125 miles to the northeast a low of -67° was reported on January 12. The snowfall during the month was very heavy, a 24-inch fall occurring on January 9. At the end of the month there was approximately 20 inches of snow on the level.

Undoubtedly these weather conditions affected the winter bird population. Very few seeds were present on the evergreens, white birch, black ash, and Manitoba maples, and the deep snow covered the weed seeds.

Although there had been a heavy crop of rowan berries, they were completely consumed by the immense flocks of robins present during October. As a result of these conditions, there have been few redpolls, siskins, evening and pine grosbeaks since early fall. No wintering goldfinches, purple finches, snow bunting or Bohemian waxwings have been reported. Western Canada on the contrary has been visited this winter by many birds of numerous species including large flocks of Bohemian waxwings. A female Baltimore oriole remained in Saskatchewan until December 20. Red-bellied woodpeckers and cardinals were reported recently in Southern Manitoba. Although remote from the Canadian Lakehead it is of interest to record that one of our members, Mrs. R. M. Beckett, saw one juvenile and two adult whooping cranes at Port Churchill on October 1.

Three species of northern birds have occurred in unusual numbers during the fall and winter season. There was an unnusually heavy migration of American rough-legged hawks during October and November, and two were seen on December 26, the first to be reported on a Lakehead Christmas census. A northern shrike was seen on October 4, and several have been seen during the winter. They have been even more common to the east and south, no less than 28 being observed by the Brodie Club at Toronto on their Christmas census. This has also been a snowy owl year although

the flight has been smaller than anticipated. It will be recalled we experienced a very heavy flight of these birds in 1949-50 with "echo" flights in 1950-51 and 1951-52. Last season they were very scarce. The first snowy was reported this season on November 26, and many have been reported subsequently, but they, too, appear to be more abundant in southeastern Ontario. It is recognized the snowy owl moves south every few years, the movement coinciding with a decline of their chief food supply, the lemming. Lemmings have been very scarce in the north this past season. The pathogenic bacterium **Listeria monocytogenes** has been isolated from several of the little mammals, but it has not been determined that this organism plays a part in their cyclical decline.

Other than the snowy, owls have been scarce during the past year. A great grey owl was seen on December 26 by Ken Campbell, and we saw a barred owl on November 9. No saw-whets were reported, and Richardson's owl were also unlisted, although we have learned to expect them during March-April and again in October-November. Two short-eared owls found killed in November were the first to come to our attention since 1951. On December 31 the local press carried an authentic report of an attack by a great horned owl on two wood-cutters, which resulted in one of the men requiring stitching of a torn ear.

Few ducks were present when the lakes froze in early November, but flocks arrived in mid-November and rafted on Lake Superior. For the second consecutive year mallards and blacks remained throughout December. Three mallards were seen on December 25 (A. E. A.) and two blacks on December 26 by K. Denis. Numbers of American golden-eyes were also present until the end of December. The majority of the herring gulls left with the advent of severe weather late in December. A glaucous gull was seen at Port Arthur on January 21 by Don Beckett.

The most conspicuous bird of the winter has been the raven. Not only have they been encountered in the country, but several are seen daily over the city, usually sailing silently overhead, but occasionally uttering their dismal croaks. Four were scavenging in down-town Fort William on January 17 when the temperature fell to 28° below zero. Possibly they have been driven into the cities by a scarcity of food in the surrounding country. To date there have been few reports of deer being killed by wolves and it is too early for deaths from starvation.

Ruffed grouse and spruce grouse are present in greatly reduced numbers, and the majority of the birds are adults. They were first observed budding on November 11. As in 1952, only one grouse with a copper-ruff was seen in 1953. The Hungarian partridge had a succesful year, but crashed in Southern Ontario where very few young birds survived.

The Thunder Bay Field Naturalists' held their annual Christmas Census on December 26. Twenty-seven observers in 15 parties travelled 33 miles on foot and 122 by car during a total of 26 party hours, 20 of which were on foot. Early in the day the weather was cloudy, but cleared at 11:00 a. m. The temperature varied from 8° to 11°F during the day. The wind varied from north-northwest at 8 miles to west at 4 miles. A total of 3785 birds of 22 species were observed. These included 2 black ducks, 47 American golden-eyes, 2 American rough-legged hawks, 215 herring gulls, 1 snowy owl, 1 great grey owl, 7 hairy woodpeckers, 9 downy

woodpeckers, 4 Canada jays, 18 blue jays, 36 ravens, 6 crows, 91 black-capped chickadees, 2 red-breasted nuthatches, 1 robin, 2 northern shrikes, 219 starlings, 2137 house sparrows, 7 evening grosbeaks, 65 pine grosbeaks, 20 common redpolls. 893 rock doves. A brown-headed chickadee was seen on January 2, and a pair of mallards on December 25.

The census was not as successful as that of 1952 when 24 ravens, 5 brown-headed chickadees and 654 pine grosbeaks led all Audubon parties. It is of some interest to compare our 22 species with the 27 species seen at Duluth and the 31 seen by the Minneapolis Bird Club. At Toronto, for comparison, 99 observers in 24 groups on December 27, 1953, covering an area within a radius of 30 miles of the Royal Ontario Museum, saw 16,326 individuals of 78 species. At Winnipeg, Manitoba, 24 species were recorded.

The annual meeting of the Thunder Bay Field Naturalists' Club was held on January 26 with the following officers elected: Honorary President, L. S. Dear; Past President, A. E. Allin; President, Keith Denis; Treasurer, Jack Murie and Secretary, A. Addison. A successful year was reported for 1953. The membership now stands at 103, and in the past few years our funds have increased from nil to over $700.00, despite the fact we contributed $200.00 in 1953 to our parent body, the Federation of Ontario Naturalists. During 1953, five **Newsletters** were published, conservation programs were sponsored in rural schools, and three outings were held as well as indoor meetings. The Audubon Screen Tours again visited the Lakehead under the Club's auspices.

A few years ago the Club members would have been satisfied with a bird-list of 150 species, but 194 species were seen during 1953. New to the Lakehead, were the crested flycatcher and Baird's sandpiper. The gadwalls observed on May 22, were the first seen in recent years, although there is a record in the older literature. The rough-winged swallow was added to our local breeding list.

At times we have wondered whether we have accomplished anything in the promotion of conservation, but we believe we are beginning to see the effects of our own efforts and those of our fellow naturlists. Surely the success of the Audubon Screen Tours is responsible for the production of the Disney nature films which now reach millions of people annually who would never have attended a Screen Tour. One of the sources of income of the Federation of Ontario Naturalists is a donation by the Federation of Hunters and Anglers of Ontario. In too many areas these two factions have in the past been at loggerheads instead of co-operating in what is really a common cause. Recently, Bob Turnbull writing in "Outdoor Trail", Toronto Globe and Mail, devoted a full article to conservation, stressing the wanton destruction of snowy owls and quoting the secretary of the **F.O.N.** as to their value. In the Toronto Daily Star, King Whyte in "Out of Doors" discussed the same subject. Keith Denis, Vice-President in 1953 of the Thunder Bay Field Naturalist's Club, was a member of a Northwestern Ontario Chamber of Commerce Committee which was set up to study the future of the Quetico. Their recommendations to the Premier could not have been improved upon had that committee consisted entirely of naturalists. These advances can only be maintained, however, by our constant efforts. — **Regional Laboratory, Ontario Department of Health, Fort William, Ontario.**

Notes of Interest

FALL WATERFOWL MIGRATION IN MINNESOTA, 1953—The fall of 1953 was considerably warmer and much drier than usual. The average precipitation for September, October, and November was 3.78 inches, or 2.06 inches less than the mean for the past 63 years. No great extremes of temperature occurred in September. A killing frost occurred on September 13, mostly in northern areas, and on September 22 there was a more general frost. Only twice in the past 63 years has October been warmer and only six times has it been drier than in 1953. Killing frosts occurred from October 4 to October 7 in various parts of the state. The first snowfall of the season was a trace in International Falls on October 25. Unseasonably warm weather prevailed from November 13 to November 20. A severe glaze, sleet, snow ,and windstorm occurred on November 20-21 in southwestern Minnesota, and in the following days snow and wintry weather prevailed in most parts of the state. The final freeze-up of many lakes was on November 26.

Blue-winged teal were present in good numbers in early September. Many had assembled into small flocks and it is likely that some were already starting to move south. On the first of September 2100 blue-winged teal were counted in the Weaver Marshes, Wabasha County. Blue-winged teal seemed to become progressively less abundant during September; and on several census areas the species was present on September 29 and 30 in numbers 50 per cent or less than their earlier abundance. Blue wings were present in larger than usual numbers on the opening of waterfowl season, October 3, and these ducks were well represented in the first week hunters' bags. Some blue wings were still around in mid-October.

There was a noticeable absence in early September of large concentrations of waterfowl which had been observed in previous years. For example, only 50 ducks were counted in the Minnesota River Bottoms between Minneapolis and Shakopee where an estimated 5,000 were noted in 1952. At Thief Lake, Marshall County, 3,860 ducks were tallied compared with 15,000 last year. However, observations of several species during September indicate that they were gathering and starting their migration. Examples of such observations are as follows: 1,100 pintails at Oak Glen Lake, Steele County on Sptember 11; 1,300 coots in the Weaver Marshes, Wabasha County on September 14; 600 wood ducks at Skunk and Rice Lakes, Morrison County on September 18; 970 baldpates at the Weaver Marshes on September 29; 2,000 redheads at Hidden Lake, Otter Tail County on September 30; 800 black ducks at Big Rice Lake, Cass County on September 30; 1,000 ringnecks at Big Rice Lake on September 30.

Hunting was generally good on the opening week end of the season. However, the next two week ends were not so favorable for the hunter due to the weather that prevailed. About 2,000 canvasbacks were at Lake Christina on October 5, and their numbers increased to a peak soon after the middle of the month. About this time several large concentrations of ducks were noted or reported in the state. Examples of such observations are as follows: 18,000 redheads on Dead Lake, Otter Tail County on October 14; 1,500 ruddy ducks and

1,000 lesser scaup on Lake Ann, Pope County on October 14; 3 300 mallards on Big Rice Lake, Cass County on October 15; 12,000 lesser scaup at Egg Lake, Becker County on October 17; 65,000 ducks reported on Dead Lake Otter Tail County on October 18; 10,000 mallards moved out of Big Rice Lake, Cass County on October 19. Peak numbers of ducks in the Weaver Marshes were noted on October 27 when 16,000 ducks and 28,000 coots were estimated to be present there.

The main migration of Canada Geese and snow and blue geese started on or about October 11 and lasted into early November. The peak of this migration was from October 14 to October 17. Snow and blue geese came through in unusually large numbers.

A flight of about 1,000 pintails was noted at the Roseau River Refuge on November 1.

Mallards were building up in numbers in southern and southwestern Minnesota on November 3; and on November 5 there was a marked movement of mallards into west central Minnesota. From then on to the end of the hunting season mallards were present in many localities in the southern half of the state, and much grain field shooting was provided for the hunters.

On November 12 approximately 14,000 ducks were in the Weaver marshes; the three most prominent species were lesser scaup, pintails, and mallards.

The stormy weather which started on November 19 and lasted through November 26 closing date of the season, brought about the final migration through and out of the state. Thousands of mallards were feeding in the fields in southwestern Minnesota. Some flights of lesser scaup came down through the larger lakes. Numerous whistling swans and some geese were heading south. In many localities hunting was good on November 26; however, very few ducks remained on November 27. The closing date of the hunting season correlated very well with the fall flight for the advantage of the hunter. The most notable post season concentration was at the Weaver Marshes where approximately 9,000 ducks remained on November 27. The three most abundant species were mallard, lesser scaup, and pintail. **Forrest B. Lee, Minnesota Division Of Game and Fish.**

(Editor's Note: The foregoing summary of the fall waterfowl migration was published in the January 15, 1954 Quarterly Progress Report, Volume 14, Number 1, of the Pittman-Robertson Game Research Project, Minnesota Division of Game and Fish. Data were collected by Area Game Biologists who made periodic checks of waterfowl migration areas.)

A MALLARD COWBIRD—Last May while nest hunting in the Umatilla, Oregon meadows southwest of McNary Dam, I sent my students ahead to check magpie nests for egg counts. Two of them returned greatly excited and reported that a duck flew out of a magpie's nest. Doubting their story I climbed the willow tree and saw six mallard eggs in a down lined magpie's nest seven feet from the ground. In the surrounding trees there were numerous magpie nests occupied with young or eggs. We quickly departed so that the mallard could

return to her eggs.

A couple of days later I returned to the nest and saw the female mallard fly out of the nest. Upon examining the nest I found that the number of eggs had increased to eight. Several days later I found all the eggs broken and the contents drained. I couldn't help but believe that this had been the work of the magpies —**Robert Galati, Richland, Washington.**

LIVING IN HARMONY—While on a field trip in Umatilla County, Oregon, I discovered a Swainson's Hawk nest approximately 20 feet up in a cotton wood tree. As I approached it, the female parent flew from the nest and began soaring. Putting the strap of my movie camera between my teeth, I quickly climbed up to the nest, and was greeted by two downy young. Holding on to a branch with one hand I leaned back and began taking pictures. Suddenly I felt something run through my hair and barely tick my scalp just as my wife yelled, "Look out for the hawk!" A shock ran through me as I felt the talons swish through my hair. The female hawk quickly ascended and made another dive. I hurriedly broke a branch from the tree and waved it at her as she came in the second time. In between her dives I managed to do my picture taking. As I began to decend from the tree a bird flew out from the side of the hawk's nest and almost startled me into losing my grip. Peering into the side of the hawk's nest I discovered another nest with four young birds in it. The parent flew to a near by tree and I identified her as an English Sparrow. How tolerant the Swainson's Hawk must be! **Robert Galati, Richland, Washington.**

A FIGHTING YOUNG SANDHILL CRANE—On May 30, 1953 while photographing Sandhill Crane in the Malheur National Bird Migratory Refuge in southeastern Oregon, I was confronted with two greatly excited parent crane in the midst of a tule patch. While one ran around me within 50 feet making its guttural raspy call, the other flew overhead and periodically landed near me. As I scanned the surrounding area carefully my eyes fell upon a young crane flattened out in the water. I walked up to it and put my hand on its back. Immediately it rose with its wings out stretched and attacked me with its bill. After it pecked my leg for a few minutes, it went into the grass and flattened out. As the parents continued to circle around, Red-winged Blackbirds would periodically land on their backs and peck them. Apparently the crane were treading near their nests. I quickly did my photographing and left them to their tule patch. **Robert Galati, Richland, Washington.**

HERON ROOKERY ON LAKE KORONIS—Last July (1953) I visited the Great Blue Heron Colony on Lake Koronis in Stearns County, and was surprised to find approximately half of it destroyed. Almost a dozen elm trees 40 to 50 feet in height had been blown down during a previous rain storm sending many young herons to their death. I counted 67 dead in or near their fallen nests and 29 still alive running around on the ground.

Several times during the day I saw two American Egrets flying over the rookery. I thought that possibly they had a nest somewhere in the midst of the rookery as I had found one with five young the previous year, but I was unable to locate one. **Robert Galati, Richland, Washington.**

AUDUBON SOCIETY TO OPERATE MIDWEST CAMP FOR ADULTS

New York—A gift of land by Miss Frances Andrews of Minneapolis will make possible the establishment of a nature and conservation training center in northwestern Wisconsin, it was announced here today by John Baker, president of the National Audubon Society.

Mr. Baker said that the Audubon Camp of Wisconsin, which will be located on a 300-acre tract near Spooner, will operate summer sessions for youth leaders and other adults who wish to receive field instruction from trained naturalists and conservationists in an "outdoor classroom."

The Society also announced that Whitney H. Eastman of Minneapolis, who has long been active in Audubon affairs will serve as chairman of a Minnesota fund-raising committee for the project. A similar committee in Wisconsin is headed by Mrs. F. L. Larkin of Milwaukee. Educators, conservation organizations, garden clubs, natural history groups, and many individuals in both states have indicated their support of the project.

This will be the first Audubon Camp in the midwest and will follow the pattern of the successful camps operated by the National Audubon Society in Maine, Connecticut and California. It will be within easy travel distance of large centers of population: 250-300 miles from Milwaukee and Chicago, 50 miles south of Duluth-Superior, and 125 miles from Minneapolis-St. Paul.

According to Mr. Baker, the camp site near Spooner is to be given to the Society by Miss Frances Andrews of Minneapolis. She and her father, the late A. C. Andrews, preserved its natural beauty for many years in the hope that it might some day serve an educational purpose. The gift will be a memorial to Miss Andrews' mother, Mary Hunt Andrews, and her brother, William Andrews.

Based on an architect's estimate and initial equipment needs, financing in the amount of $68,500 will be required. Of this sum, $18 500 has already been contributed. Separate committees in Minnesota and Wisconsin are now actively seeking to raise the remaining $50,000 needed to finance the construction and alteration of buildings, and necessary equipment for the camp. The funds will have to be available by this spring, Mr. Baker said, if the camp is to open for the 1955 summer season.

In commenting on the decision to operate an Audubon Camp in the midwest, Mrs. Larkin said, "This is thrilling news for everyone who is concerned about the conservation of our natural resources. Many of us have experienced the wonderful educational job being done at the other Audubon Camps, so we know just how fortunate we are to have such a project located here. Now we must hasten to raise the necessary funds so the camp can

open in 1955."

Mr. Baker said that the new camp will border on Devil's Lake which is four miles from Sarona in Washburn County. He described it as an "ideal spot" because of its variety of habitats which are in a natural condition.

"The site," according to Mr. Baker, "has a mixed hardwood forest, a scattering of pines, and a spruce-tamarak bog. There are two lakes entirely within the property and the terrain is varied. A high ridge offers a magnificent view of 30 miles across the scenic countryside of rolling hills, lakes and forests."

The National Audubon Society plans to conduct five 2-week sessions at the camp each summer. Enrollment capacity will be 50 a session. It will be operated on a nonprofit basis and the Society knows, from experience elsewhere, that the camp will attract teachers and other youth leaders from all over the continent, although most of its enrollees will come from the midwest, especially from Wisconsin and Minnesota. The staff will be composed of leaders in the nature and conservation field.

Minnesota Ornithologist's Union

Affiliated Societies

Albert Lea Audubon Sociey

Officers: President, Helen Johnsrud; Vice-president, Iva M. Loy; Treasurer, Loes P. Scott; Recording secretary, Esther Jorgenson; Corresponding secretary, Mrs. C. Flugum.

Meet the second Tuesday, September through May.

Avifauna Club

Officers: President, Burton Guttman; Vice-president, Betsy Jerabek; Secretary-treasurer, Jeremy Berman.

Duluth Bird Club

Officers: President, O. A. Finseth; Vice-president, Evelyn Palmer; Secretary, Catherine Lieske; Treasurer, Harvey Putnam; Field Chairman, J. K. Bronoel; M. O. U. representative, O. A. Finseth.

Meetings are held at the University of Minnesota, Duluth on the second Thursday of each month, September through May.

H. J. Jager Audubon Society

Officers: President, Dr. H. A. Northrop; Vice-president, Lawrence M. Lee; Secretary, Mrs. H. A. Northrop; Treasurer, Mrs. John P. Zimmerman; M. O. U. representative, Mrs. H. A. Northrop.

Meetings are held every fourth Monday evening at the Owatonna Library.

Minneapolis Audubon Society

Officers: President, Mrs. Whitney Eastman; Vice-president, Mrs. George Ludcke; Treasurer, Mrs. T. A. Peppard; Recording secretary, Mrs. Edgar Bedford; Corresponding secretary, Mrs. Myrtle Mahoney, Field secretary, Mrs. J. A. Tompson; Auditor, Mrs. E. D. Swedenborg; M. O. U. representative, Mrs. I. S. Lindquist.

Meetings are held the first Friday at the Walker Branch Library, October through June.

Minneapolis Bird Club

Officers: President, Wilbur S. Quam; Vice-president, Boyd Lien; Secretary, Florence Messer; Treasurer, Amy Chambers; Membership Chairman, Marie Vind; Field Trip Chairman, Helen Lien; Editor, Vera Sparkes; M. O. U. representative, Amy Chambers.

Meetings are held at the Minneapolis Public Library.

Minnesota Bird Club

Officers: President Robert W. Hanlon; Vice-president, Nelson Spratt; Secretary, Jessie Richardson; Treasurer, Lucille Hunter; M. O. U. representative, Walter J. Breckenridge.

Meetings are held at the Minnesota Museum of Natural History.

St. Paul Audubon Society

Officers: President, Mrs. J. H. Reisinger; Vice-president, Mr. John Hall, Sr. Corresponding secretary, Virginia Yelland; Recording secretary, Mary Chapin; Treasurer, Marvin Adams; Assistant treasurer, J. E. Mcdonald; Directors at large, John Haag, R. A. Kortman, John Neihart, V. L. Whipple, J. H. Reisinger; Ex officio, Mrs. C. E. Hart.

The Flicker

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THE FLICKER

Organ of the *Minnesota Ornithologists' Union.* Published quarterly in March, June, September and December. *The Flicker* is sent to all members not in arrears for dues. Dues for members: Active, $1.00; Sustaining, $5.00; Life, $50.00. All articles and communications for publications and exchanges should be addressed to the editor. Subscriptions, memberships, and requests for back numbers should be sent to the treasurer.

THE COVER

Semipalmated Plover — (*Photo by Harvey Gunderson*)

THE PRESIDENT'S PAGE

The new format of the *Flicker* surely comes as a surprise to subscribers — a pleasant surprise, we hope, in striking contrast to the previous issue which your Policy Committee decided was a "last straw" both in appearance and tardiness.

Mrs. Mary Lupient, MOU treasurer, and W. J. Breckenridge were appointed as a Publications Subcommittee to which a third member, Dr. D. W. Warner, was added later. This subcommittee's function was to select a new printer. Seven printers were contacted and bids were received from five of these. After carefully considering all proposals, we have decided to accept the offer of the Grand Rapids *Herald-Review*, the owners of which have taken a very real interest in getting us successfully over this major hurdle in the financial life of the MOU.

We are sure you will approve of the fine appearance of this new issue which will be a real credit to our organization. Furthermore, the fact that the material for this issue did not get into the hands of the printers until November 17 may convince you that we have real promise of getting the *Flicker* back on schedule with the appearance of the next couple of issues.

Along with the good news we must accept additional responsibility. The fact that we must face the need for increased membership as well as a raise in dues should, and we hope will, be actually good fortune in that our MOU must now rise to the occasion and become a really active organization. The result will be a widened interest in birdlife and natural history in our area as well as a much more active membership which will be putting more into this work and, as a consequence, getting a lot more out of it.

More specifically, we are now faced with the necessity of raising at least $1,500 annually if we are to continue receiving *Flickers* like the present issue. This means that at the annual meeting on December 4, 1954, we must act to raise our annual dues to perhaps as much as $2.50. With such a subscription figure, our minimum membership must be built up from 450 to 600. In case annual dues are raised to $2.00, 750 members must be our goal. We are in the very fortunate position of having a backlog in our treasury of $1,400 to cushion the slack of almost certain losses within the next few months.

We have very frankly outlined the society's position with the hope that you, as an MOU member, will realize that a real job of selling our magazine and our organization faces us. *All* members must feel a personal responsibility to secure at least one or two new members. If each one will do just this small job for the MOU, we can make a success of this venture. A membership committee headed by Robert Hanlon of Mankato will soon be activated and will put forth a real effort to expand our membership, but only a little really effective work by each and every member will put us over the top in this crucial period. Please see that interested birder friend of yours and prove that your Policy Committee did not overestimate the ability and enthusiasm of the MOU members.

Mrs. Mary Lupient
W. J. Breckenridge
Dwain W. Warner
Publications Committee

The Birds of Churchill

by

W. J. Breckenridge, Harvey Gunderson and John Jarosz

Much has been said about the fact that birding near home can be fun as well as productive of new scientific facts; still faraway places not only beckon but, at times, call loudly to the inquisitive birder. The "Arctic" was a particularly unattainable faraway place to most naturalists until the completion of the railroad to Churchill on the west coast of Hudson's Bay back in 1931. Then at least the subarctic became attainable for many. Many, too, have reported on their findings in the region (see Literature Cited), but it remains an intriguing place to get better acquainted with the subarctic, and its possibilities in nearly all natural history fields are far from exhausted. The senior author became inoculated with the lure of the north country back in 1933 by a brief collecting trip, but not until last summer (1953) did the opportunity present itself for him to return for a more extended exposure.* In 1933 the huge air base and arctic research center had not been thought of, and the towering grain elevator and loading docks had just been completed. Collecting was then new, unhampered, and filled with exciting possibilities for new finds.

Although still interesting, things have changed around Churchill. Even about the environs of this frontier village of 500, mostly Chipewyan Indians, the pressure of destruction by collecting naturalists as well as by thoughtless civilians and army personnel, has become so marked that local conservationists have asked for, and very rightly secured, restrictions on collecting within five miles of the station in Churchill to save the wildlife for local as well as visiting naturalists who come without collecting ambitions. This is preserving much of the wildlife in the Rosabelle and Isabelle Lakes area between the village and the army post, Fort Churchill, five miles south and east of the town. The army post and air base have taken over several thousand acres of the rocky shore of the Bay while numerous outlying operations centers such as radio stations, gravel pits, landing docks and experimental developments at points several miles distant are connected with the main post by roads. These roads now give easy access for the inquistitive naturalist to much relatively undisturbed terrain.

Churchill might be said to straddle the tree line at this point on Hudson Bay. The isothermal lines and the resulting limit of trees extend from Churchill roughly northwestward some 1500 miles to the mouth of the Mackenzie River. Thus, at Churchill, one has access to treeless tundra and its arctic life along the shore of the Bay while only a few miles inland vast expanses of spruce and sphagnum bogs harbor the northernmost of those plants and animals requiring forest cover for their existence. Our expedition's U. S. Army Quartermaster's connections allowed us to stay at the Army Post and to travel in army vehicles, mainly jeeps.

In planning our work we were convinced that concentrating our observations in one small area would produce

*The expedition originated from a generous offer of financial assistance from R. J. and J. W. Wilkie of the Wilkie Foundation. An outline of the aims of the expedition brought substantial financial aid from the Quartermaster Corps of the U. S. Army and, through this connection, the RCAF extended much appreciated assistance in the form of aerial transportation. Further aid and cooperation were secured from the Wildlife Management Institute, the U. S. Fish and Wildlife Service, and the Geological Society of America. The expedition personnel included Dr. W. J. Breckenridge, leader, Mr. H. L. Gunderson, Mr. John Jarosz, Mr. Richard Spence Taylor, Mr. Robert Wilkie, Mr. James Wilkie, and Dr. Lawrence Larson.

more valuable results than would scattered observing. Accordingly, after quickly sampling available areas we settled on about 400 acres situated along the northeast shore of Farnworth Lake. Locally, this lake is better known as Landing Lake, since it serves as a landing base for smaller seaplanes operating out of Churchill. The varying cover types found intermingled in the area are (1) nearly level, moist tundra with ground cover of reindeer moss, laborador tea, heaths and with sphagnum moss in the lower moist areas; (2) similar tundra with sparse growth of black spruce (possibly some white spruce) and tamarack; (3) denser stands of spruce up to 20 feet in height; (4) some lower marshy areas had the tundra plants replaced largely by grasses and sedges; (5) open treeless, peaty areas obviously rendered so by fires some years before. Here the reindeer moss was less abundant and patches of heaths with sedges and grasses were interspersed with much exposed dark brown, peaty soil; (6) disturbed gravely and sandy areas where bulldozers had scraped gravel for road construction. Landing Lake itself was frozen over completely except for a narrow margin of open water along the shore when we arrived on June 17, while many deep snow banks remained in the denser spruce stands. By the time of our last visit on July 10, the Lake was entirely open and only a few remnants of snow drifts remained in protected places.

Our field work got off to a highly successful start when, during the afternoon of June 18, we found White-crowned, Tree, and Fox Sparrows singing spiritedly on what undoubtedly were nesting territories. A male Rusty Blackbird was feeding a female as part of their courtship. Lesser Yellowlegs trilled their whistles as they alighted repeatedly on the spruce tops, obviously agitated over our intrusion into their nesting areas. Several male Willow Ptarmigan, conspicuous in their white an red-brown plumage, kept just ahead of us, stopping occasionally, stretching up their necks and giving their cackling courtship calls. A Short-eared Owl flushed from nearly underfoot almost assuring a nest location (it was found nearby a few days later). A Stilt Sandpiper rose from a nest in the brown peat to alight nearby and disappear in the hummocky marsh by lying flat among the half-dead woody plants. A

Hudsonian Godwit
(Photo by Harvey Gunderson)

Hudsonian Godwit flushed from its big greenish brown eggs on a hummock near the stilt nest. A Semipalmated Plover presented a marvelous example of ruptive coloration as it settled onto its nest among some small whitish stones which repeated exactly its pure white throat and breast with the neck ring forming a perfect shadow beneath a rock. All this, happening in a single afternoon as our introduction to birding at Churchill, naturally raised our enthusiasm to a high pitch. Such good fortune could hardly be expected to continue throughout the entire three weeks period. Usually, however, there came a bit of luck to revive our spirits each time long hours of unproductive trudging over the hummocky tundra with heavy camera equipment tended to drag down our spirits.

In our study we paid particular attention to nesting data and to the courtship

displays and social behavior of several not-too-well-known subarctic species. For example, whether or not the Willow Ptarmigan is polygamous has been open to some question, so we attempted to secure data bearing on this point. Even if the male ptarmigan's plumage were not conspicuously white we would soon have found the birds by their far-carrying calls. The same loud call of the males seemed to serve both as a courtship crow and to express alarm. The call started as a loud low series of clucks or cackles, given slowly at first, then gradually increasing in speed until it ended in a rapid "churr". It was given on the ground with the bird's head held high and somewhat forward or it might be given on the wing. Short flights within the territory would occasionally end with the bird mounting suddenly for a few wing beats, then settling directly to the ground on wings beating in very short arcs while the cackling call was given. The senior author spent one entire night and the early morning hours in an observation blind in an effort to further observe the ptarmigan courtship, but saw nothing other than the above described performance. Once a male flew to what was assumed to be the margin of his territory and called, while a second call coming from nearly the same spot only a moment later suggested that the male from the adjacent territory had flown to meet the calling male to proclaim the limits of his territory, and prevent intrusion by male number one. It was hoped that some courtship performance akin to the drumming of the Ruffed Grouse given at a definite central point within the territory might be discovered, but nothing of this nature was seen. During our entire stay we never saw more than one female with any male

Willow Ptarmigan Female on Nest — (Photo by Harvey Gunderson)

Willow Ptarmigan Male — (Photo by Harvey Gunderson)

or within his territory, although additional females could have been associated with the few scattered males under observation. Our experience, then, left us with the impression that the Willow Ptarmigan is monagamous.

The Hudsonian Godwit's nesting behavior has been studied closely only during the past few years (2) and we were lucky enough to find a nest and be on hand when the chicks hatched (July 5). The courtship flight song, seen and heard on several occasions, was described in field notes by Harvey Gunderson, "It held its wings at a high angle like a butterfly, soared, and gave a two-syllabled whistling call. It then flew a short way and repeated this performance and finally plunged straight down like a Horned Lark." Several aerial courtship evolutions of the various shorebirds were seen repeatedly at a distance without our being able to positively identify the performer.

We had always felt that the little Semipalmated Plover resembled a miniature killdeer, and its breeding behavior strengthened this impression. In its courting flight it flew with slow, stiff-wing beats after the manner of its larger double-collared cousin, and it gave many regularly repeated "ter-wit" calls of a quality similar to, but not quite so loud as, those of the killdeer.

Furthermore, its broken wing act near the nest with the dragging of the spread tail were also reminiscent of that well-known plover. Since none of the nests under observation had hatched during our stay, and a small downy young was seen on August 9, we concluded that this shorebird was somewhat later in nesting than some of the others.

The big striking Hudsonian Curlew was common, and its belligerence in chasing ravens and gulls made it a conspicuous member of the bird fauna. Loud, long series of staccato whistles, then sometimes single or paired sharp whistles were its common calls. At one time two birds were seen in courtship flight performance. The birds were flying tandem very closely together on quivering wings while one bird gave a long, clear, single whistle, a call we had heard repeatedly in the distance and which had puzzled us for several days.

Although we did not find any nests of the Dowitcher, it no doubt was nesting there since we saw and heard its courtship performance. It started with a slow series of whistling notes while the bird was on the wing at perhaps 100 feet high. These notes speeded up gradually and developed into several repeated sequences of musical twittering notes making up a very pleasing song. Somewhat similar musical twitterings were thought to have been given by Wilson Snipe in addition to their well-known winnowing and "cac-cac" calls, but often we could not be sure whether the songster was a dowitcher or a snipe, since their silhouettes at a distance against the sky were so similar.

The very petite Northern Phalaropes were very much in evidence, and their

Hudsonian Curlew on Nest — (Photo by Harvey Gunderson)

dizzy spinning as they fed on the clear pools always tempted us to stop and enjoy watching them. Jim Wilkie set up his movie camera in an effort to photograph one of these little "whirling dervishes", but instead of whirling, the bird, a male, suddenly threw back its head, puffed out its breast, suggesting a tiny Ruddy Duck, and began a deliberate series of bowing motions that completely submerged the head and neck, the tail end bobbing up sharply with each bow like a much exaggerated form of bathing. Whether or not this constituted a courtship display is not known, but the movie gives one a definite impression that it was, and Mr. Wilkie stated that the bird performed only when a female was present. The motion pictures came out well and are available for further study.

John Jarosz saw a thrilling episode in the life of a Northern Phalarope, when he spotted a Piegon Hawk in hot pursuit of a zig-zagging phalarope. Not able to outdistance the little falcon, the phalarope dived out of the air straight into a tiny tundra pond. The hawk hovered until the bird rose to the surface, then swooped down, forcing it under again and again. Not succeeding in its first attempts, the hawk alighted temporarily on a nearby snag, but returned to the chase when the little bird attempted to fly. Gradually, the periods under water shortened as the phalarope tired, and it began to appear that it would lose the contest. Suddenly a belligerent Bonaparte's Gull appeared unknowingly in the role of rescuer and opened up with a dive bombing attack on the Pigeon Hawk. The threat of actual bodily injury coupled with the disconcerting effect of its explosive raucous calls proved too much for even the nerves of a Pigeon Hawk and he left presumably to seek other less effectively befriended prey.

The presence of numerous arctic nesting Old Squaw Ducks was a constant reminder of the arctic conditions under which we were working. Courting pairs and even down-lined depressions on the shores of the tundra ponds assured us of their nesting, but no eggs were actually found. The soft resonant "ca-ca-wee" calls of a quality suggesting a subdued auto horn often called our attention to courting pairs on the wing. Calling in flight, males were seen to raise the head well above the horizontal on the last two syllables, while on the water they gave the first syllable with the head and neck out flat on the surface, the last two syllables coming as the head was raised straight up with the bill pointing vertically.

Not the most exciting but nevertheless interesting were the various sparrows occurring in the Landing Lake study area. The one that perhaps competed most with some of the larger species for interest was Harris's Sparrow. The first nest of this boreal species was found here in 1931 by Semple and Sutton (10). We succeeded in locating two nests and attempts were made to photograph the incubating birds but they proved very shy and uncooperative. The first one finally deserted the eggs because of our disturbance and the nest and five eggs were collected. On blowing the eggs we found that one egg contained a well-developed embryo while the other four were fresh — certainly not a typical condition, and a difficult one to explain. The most common nesting sparrow was the Tree Sparrow, the nesting of which was studied here in the Churchill area and reported on by Marguerite Heydweiller (Baumgartner) (9). The White-crowned Sparrow, together with the western race, the Gambel's Sparrow, were both numerous and their attractive whistles were common voices of the Landing Lake scrub spruce area. One nest was beautifully lined with white caribou hair. One nest of the somewhat unusual Fox Sparrow with two young already about four days old was found on July 1. Two incubation periods were determined for finches dur-

ing this study; one of 14-15 days for the Common Redpoll, and one of 15-16 days for the White-crowned Sparrow.

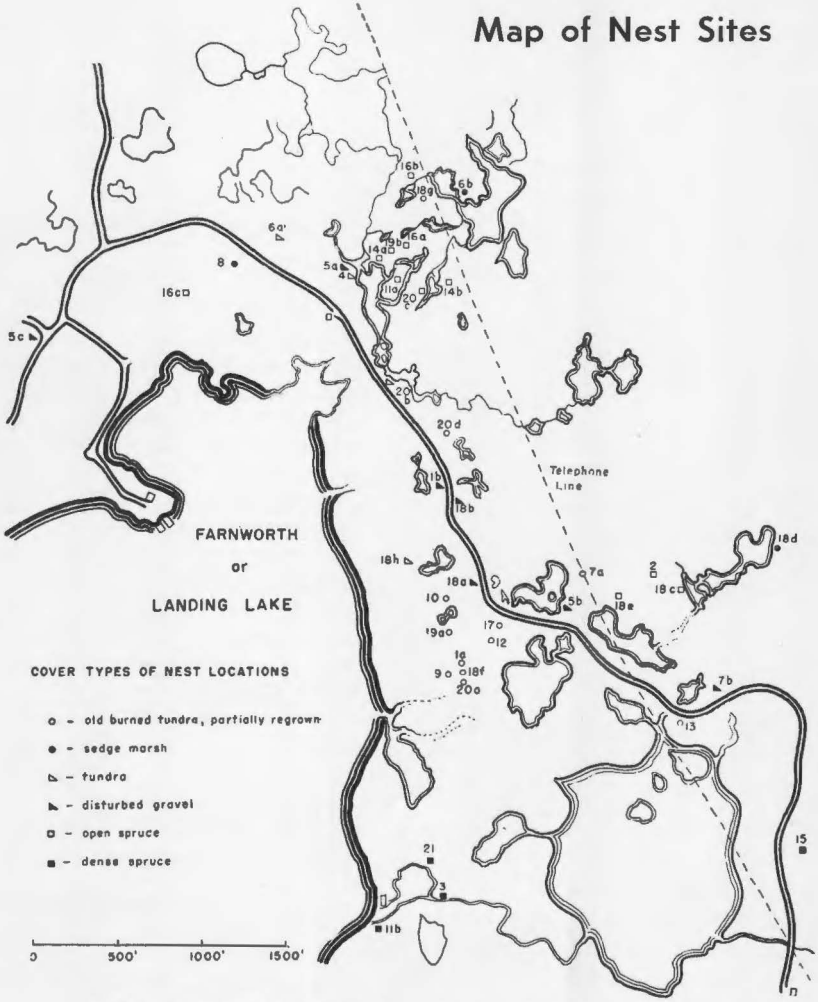
After returning for 6:00 dinner at the mess hall, we often had time during the long summer evenings for birding along the rocky ridge paralleling the shore of the Bay near Fort Churchill. Here the American Pipit, the most common of the smaller birds, was found walking about, over, and among the rocks, bobbing his tail almost as persistently as a Spotted Sandpiper. The courtship flight song of this apparently fragile but actually very hardy northerner suggested that of the prairie-nesting Sprague's Pipit. It would mount into the wind up to 100 feet or so in an undulating flight like a Horned Lark. It would then pour out its many-times repeated "cherr-cherr-cherr" in a jingling trill as on partly set wings it gradually lost altitude till the song and the flight ended together near the ground. The ringing, veery-like quality and the thrilling back to earth plunge of the Sprague's Pipit, however, were missing. One nest with six dark brown eggs was found as a bird flushed from a grass-lined cup buried deep beneath the gnarled twigs of a dwarf willow growing in a rock crevice.

Even though our observations at Churchill added no new species to the long list contained in Taverner and Sutton's *Birds of Churchill* (11) with further additions by Allen (1), Farley (3) (4) and (6), and Grinnell and Palmer (8), it nevertheless seems appropriate to include an annotated list of the 69 species seen. This list suggests the abundance of the various species, and records the breeding data from our restricted study area. Since this study was made several years later (1953) than the above reports, it will provide

A Young Pintail — (Photo by Harvey Gunderson)

data for comparison with past records as well as future reports showing progressive changes in Churchill's birdlife. In these condensed notes the abundance numbers are the combined totals of the daily reports of individuals seen by all three observers throughout the 26 days of observation. These should not be considered as population figures since many individuals were repeatedly recorded, but

Map of Nest Sites



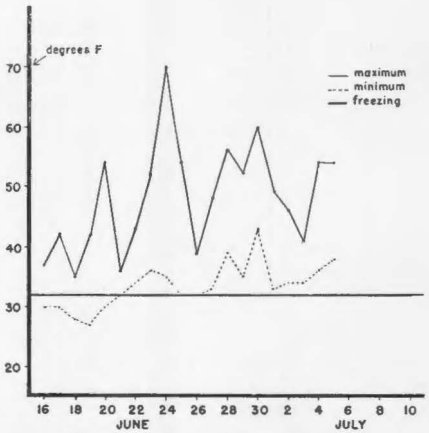
KEY TO NESTS IN LANDING LAKE STUDY AREA

1. American Pintail
2. Green-winged Teal
3. Red-breasted Merganser
4. Willow Ptarmigan
5. Semipalmated Plover
6. Hudsonian Curlew
7. Lesser Yellow-legs
8. Least Sandpiper
9. Stilt Sandpiper
10. Hudsonian Godwit
11. Bonaparte's Gull
12. Short-eared Owl
13. Tree Swallow
14. American Robin
15. Rusty Blackbird
16. Redpoll
17. Savannah Sparrow
18. Tree Sparrow
19. Harris's Sparrow
20. White-crowned Sparrow
21. Fox Sparrow

they are given simply as approximate keys to the relative abundance of the species. For the most part, these apply to the Landing Lake study area; notable exceptions are so indicated. Two cases where these are at wide variance with earlier observations concern the Lapland Longspur (7) (11) (12) and Semipalmated Sandpiper. The above observers indicate the Lapland Longspur as the most abundant small bird about Churchill. The small number we report must indicate that the Landing Lake area is not favorable for this species. The case of the Semipalmated Sandpiper is even more striking, since Allen (1) gives this species No. 1 ranking in abundance among shorebirds, while we did not find the species of all. Allen concentrated his observations around Isabelle-Rosabelle Lakes and did not spend much time in the Landing Lake area. Although it seems unlikely that there should be so much difference in these two areas, it is possible that this species (as well as the Least Sandpiper) find the two habitats very different. The comparison of our abundance ratings based on our figures with Allen's list is interesting.

COMPARATIVE LIST

	Order of Abundance B., G., & J.	Order of Abundance A.A. Allen
Hudsonian Curlew	1	4
Semipalmated Plover	2	3
Lesser Yellowlegs	3	6
Wilson Snipe	4	7
Northern Phalarope	5	5
Hudsonian Godwit	6	14
Least Sandpiper	7	2
Dowitcher	8	10
Sanderling	9	0
Stilt Sandpiper	10	8
Killdeer	11	12
Semipalmated Sandpiper	0	1
Redbacked Sandpiper	0	9
Spotted Sandpiper	0	13



Temperature Relationships During Breeding Season

The map shows the locations of nests found in the study area and the cover types in which they were situated. The nature of the temperature during this breeding season is shown on the graph.

Arctic Loon 21
Nest July 4, 1 egg, Isabelle Lake.

Red-throated Loon 3

Horned Grebe 2

American Bittern 4

Whistling Swan 9

Canada Goose 87
Nest, June 20, 2 eggs, later destroyed.

Common Mallard 7

Black Duck 2

Gadwall 2

Baldpate 17

Pintail 149
Nest No. 1, June 28, 6 eggs. Nest No. 2, July 3, 8 eggs; hatched July 5.

Green-winged Teal 28
Nest, June 21, 8 eggs; still 8 eggs July 5.

Greater Scaup 34
Includes several at Rosabelle Lake.

Old Squaw 123
Includes several at Rosabelle Lake.

Common Eider 4
All seen along Hudson Bay.

White-winged Scoter 2

Red-breasted Merganser 52
Female taken June 22 had egg nearly fully developed. Nest, July 1, 9 eggs.

American Goshawk 1
This one record was of a dead specimen probably killed during the preceding winter.
Marsh Hawk 3
Duck Hawk 1
Pigeon Hawk 2
Willow Ptarmigan 41
Nest, 9 eggs, June 24; hatched July 9.
Semipalmated Plover 128
Nest No. 1, June 18, 4 eggs. Nest No. 2, June 26, 4 eggs. Nest No. 3, June 28, 4 eggs. Nest No. 4, July 1, 4 eggs. Nest No. 5, July 4, 4 eggs. Downy young about 5-6 days old, August 9.
Killdeer 13
Golden Plover 11
Wilson Snipe 97
Hudsonian Curlew 174
Nest No. 1, June 27, 4 eggs; Nest No. 2, 4 eggs.
Lesser Yellowlegs 128
Nest No. 1, June 30, 4 eggs; hatched July 6. Nest No. 2, July 5, 4 eggs; hatched July 6.
Least Sandpiper 55
Nest, July 1, 4 eggs.
Dowitcher 37
Stilt Sandpiper 31
Nest, June 18, 4 eggs; hatched July 6. Eggs incubated at least for known period of 18 days.
Hudsonian Godwit 70
Nest, June 18, 4 eggs; hatched July 6. Eggs incubated at least for known period of 18 days. See Ellis (2) for account of one of the first nests found (1948).
Sanderling 33
Migrants seen along Hudson Bay.
Northern Phalarope 75
Parasitic Jaeger 16
Long-tailed Jaeger 1
Herring Gull 235
About half of these seen along Hudson Bay.
Bonaparte's Gull 256
Very noisy and constantly in evidence.
Arctic Tern 445
Mostly along Hudson Bay and at Rosabelle Lake area.
Short-eared Owl 21
Nest, June 21, 4 eggs. June 24, 6 eggs. June 26, 7 eggs. June 30, 8 eggs.
Flicker 4
Horned Lark 81
Nest, July 8, 3 half-grown young.
Tree Swallow 34
Canada Jay 11
Very dark full grown young June 18.
Raven 23
Crow 9
Robin 119
Nest No. 1, June 23, in freight house at Churchill, contents not seen. Nest No. 2, June 27, 4 young, about 4 days old. Nest No. 3, June 30, 4 young. Nest No. 4, July 1, 4 young.
Gray-cheeked Thrush 6
Ruby-crowned Kinglet 2
American Pipit 49
All seen on rocks along the Hudson Bay.
Northern Shrike 2
Starling 2
Seen only at elevator in Churchill.
Yellow Warbler 3
Seen only along Hudson Bay at Fort and at whaling station.
Blackpoll Warbler 29
Northern Waterthrush 7
Yellowthroat 1
English Sparrow 1
Seen only at elevator in Churchill.
Rusty Blackbird 90
Nest, June 22, 3 eggs; young several days old June 30.
Pine Grosbeak 1
Redpoll 103
Nest No. 1, June 18, bird lining nest along Hudson Bay at Fort; June 20, 8:30 p.m., no eggs; June 21, 9:30 a.m., 1 egg; June 25, 4 eggs; July 3, 3 eggs; July 5, 3 young; smallest just hatched; incubation period 14-15 days. Nest No. 2, June 26, 1 egg; June 30, 4 eggs. Nest No. 3, June 30, 4 tiny young. Nest No. 4, 4 eggs.
Savannah Sparrow 79
Nest No. 1, July 1, 4 eggs. Nest No. 2, July 6, 4 eggs, Bird Cove 10 miles

east of Churchill. Nest No. 3, July 6, 4 eggs, Bird Cove.

Tree Sparrow 283
Nest No. 1, June 20, being lined; July 5, 4 eggs. Nest No. 2, June 30, 4 eggs. Nest No. 3, June 30, 4 eggs. Nest No. 4, June 30, 2 eggs. Nest No. 5, June 30, 4 eggs; July 3, empty. Nest No. 6, June 30, 5 eggs; July 5, 5 eggs. Nest No. 7, June 30, 4 eggs; July 1, 5 eggs. Nest No. 8, July 1, being lined; July 5, 5 eggs. Excellent study of this species at Churchill in 1934 by Marguerite Heydweiller Baumgartner (9).

Harris's Sparrow 98
Nest No. 1, July 1, 5 eggs. Nest No. 2, July 2, 4 eggs. Nest and eggs of this species first discovered here at Churchill in 1932 by G. M. Sutton (10).

White-crowned Sparrow 136
Nest No. 1, June 19, 3 eggs; June 20, 4 eggs. First egg hatched July 1. First egg presumably laid June 17. This indicates an incubation period of 15-16 days. Nest No. 2, June 23, 4 eggs; hatched July 4. Nest No. 3, June 24, 5 eggs. Nest No. 4, June 24, 4 eggs. Major part of this population was *Z. a. leucophrys*. See (11) for discussion of these races at Churchill.

Fox Sparrow 9
Nest, July 1, 2 young about 4 days old and 1 infertile egg.

Song Sparrow 1
One only was studied at close range for several minutes near Isabelle Lake on June 28 leaving no doubt of its identity. Allen's (1) records of one seen and another heard in this same area in 1934 appear to be the only other records for this species at Churchill.

Lapland Longspur 20
No nests found. See Grinnell, L. I. (7) for accounts of Churchill nesting of this species.

Smith's Longspur 24

Snow Bunting 4
Seen only along shore of Hudson Bay.

Table 1

The following measurements of eggs of birds nesting in the Landing Lake Study Area were recorded in the field.

Pintail
56.0 x 39.0 mm
54.5 x 39.0
51.5 x 39.0
56.0 x 37.5
53.25 x 38.0
51.25 x 38.0

Green-winged Teal
43.75 x 31.50
45.00 x 31.00
43.00 x 33.00
46.00 x 32.00
45.00 x 32.50
44.50 x 33.00
45.50 x 31.50
43.50 x 31.25

Red-breasted Merganser
57.50 x 42.50
64.25 x 44.00
63.00 x 43.00
65.00 x 43.00
64.00 x 43.50
63.75 x 43.00
65.00 x 45.00
61.00 x 44.00
60.75 x 40.75

Willow Ptarmigan
43.00 x 28.75
41.50 x 28.50
44.00 x 29.00
41.50 x 29.00
42.75 x 30.00
41.00 x 28.00
43.50 x 29.00
41.00 x 29.00
44.00 x 28.00
49.00 x 28.00

Semipalmated Plover
Set No. 1 — length — 33.0 mm each
Set No. 2—34.0 x 24.0 mm
34.0 x 24.0
32.0 x 24.0
34.75 x 23.75

Set No. 3—30.5 x 23.5
31.5 x 23.0
31.5 x 23.0
30.0 x 23.5

Hudsonian Curlew

Set No. 1—61.0 x 41.0
59.5 x 40.0
58.0 x 39.5
54.0 x 41.5

Set No. 2—59.5 x 40.0 wt. 45.9 gr.
58.0 x 40.0 43.6
54.5 x 41.5 45.5
61.0 x 41.0 48.3

Lesser Yellowlegs

44.00 x 29.50
44.75 x 29.00
43.25 x 29.00
42.00 x 28.00

Stilt Sandpiper

38.0 x 26.5
36.5 x 25.0
36.5 x 26.5
37.0 x 26.0

Hudsonian Godwit

51.5 x 35.0
49.75 x 35.0
53.00 x 34.5
50.50 x 34.5

Short-eared Owl

37.75 x 33.50
38.25 x 32.50
33.00 x 32.00
40.75 x 32.00
38.50 x 32.00
38.50 x 33.00
39.00 x 33.50
39.00 x 33.00

White-crowned Sparrow

21.0 x 15.5
20.75 x 16.0
20.0 x 16.0
21.0 x 16.0

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Table 2

BIRDS COLLECTED AT CHURCHILL

June 15 - July 10, 1953

		Sex	*Museum No.*
Pintail	*Anas acuta*	m	10551
"	" "	f	10552
Old Squaw	*Clangula hyemalis*	m	10553
Red-breasted Merganser	*Mergus serrator*	f	10554
Willow Ptarmigan	*Lagopus lagopus*	m	10555
" "	" "	m	10556
" "	" "	m	10584
" "	" "	m	10585
" "	" "	f	10586
Lesser Yellowlegs	*Totanus flavipes*	m	10557
Stilt Sandpiper	*Micropalama himantopus*	f	10558
Hudsonian Curlew	*Numenius phaeopus*	m	10559
Hudsonian Godwit	*Limosa haemastica*	m	10560
Bonaparte's Gull	*Larus philadelphia*	m	10561
" "	" "	f	10562
Arctic Tern	*Sterna paradisaea*	f	10563
" "	" "	m	10564
Robin	*Turdus migratorius*	m	10565
"	" "	f	10566
Horned Lark	*Eremophila alpestris*	m	10567
Rusty Blackbird	*Euphagus carolinus*	m	10568
" "	" "	m	10569
" "	" "	m	10570
" "	" "	f	10571
Redpoll	*Acanthis flammea*	?	10572
"	" "	f	10573
"	" "	m	10574
"	" "	f	10575
"	" "	m	10576
White-crowned Sparrow	*Zonotrichia leucophrys leucophrys*	m	10577
" " "	" " "	m	10578
" " "	" " "	f	10579
Gambel's Sparrow	" " *gambelii*	f	10580
" "	" " "	f	10581
Fox Sparrow	*Passerella iliaca*	m	10582
Lapland Longspur	*Calcarius lapponicus*	m	10583

Parasites of Some Birds of Minnesota

An Annotated Bibliography

by Theron O. Odlaug

An article in the field of parasitology may seem out of place in a journal which is devoted primarily to ornithology; however, parasitism among birds is widespread and varied. As a matter of course, worm parasites, especially roundworms and cestodes, are encountered more frequently in game birds than in the non-game group, but the latter have their share and frequently heavy infections are found.

The world of animals-within-animals is well populated; since a large number of individual host species harbor one or more different kinds of parasites, there are actually more parasitic than free-living animals. Birds are no exception — cestodes are found in the intestinal tract, trematodes in the intestine, bile ducts, oviducts, and air sacs, nematodes in the intestine, liver, body cavity, eyes, muscles, gizzard, proventriculous, and caeca, protozoa and microfilariae in the blood, and protozoa and encysted worms in the muscles. Parasitic arthropods such as lice, mites and ticks find favorable habitats on the skin and feathers of many species of birds.

Over a period of three years, a number of birds taken in the Duluth area have been brought into the Department of Biology at the University of Minnesota, Duluth Branch. These birds represent about 42 species but in most instances consist of but one individual each. Identification of the birds was made by Dr. P. B. Hofslund. Only seven of the 42 were found to be parasitized:

Host	*Parasite*
Great Horned Owl (*Bubo virginianus*)	*Neodiplostomum delicatum*
Wilson's Snipe (*Capella delicata*)	*Echinostoma revolutum*
Cooper's Hawk (*Accipiter cooperi*)	*Cotylurus flabelliformis*
Sora Rail (*Porzana carolina*)	*Neoleucochloridium problematicum*
Herring Gull (*Larus argentatus*)	*Diplostomum flexicaudum*
Ruffed Grouse (*Bonasa umbellus*)	*Ascardidia bonasae*
*American Bittern (*Botaurus Lentiginosus*)	*Pegosomum spiniferum*

No parasites were found in the following birds:

Snowy Owl (*Nyctea nyctea*)
Iceland Gull (*Larus leucopterus*)
Purple Finch (*Carpodacus purpuereus*)
Pied-billed Grebe (*Podilymbus podiceps*)
Oven-bird (*Seiurus aurocapillus*)
Veery (*Hylocichla fuscescens*)
Sharp-shinned Hawk (*Accipiter velox*)
Rose-breasted Grosbeak (*Hedymeles ludovicianus*)
Black-capped Chickadee (*Parus Atricapillus*)
Long-eared Owl (*Asio wilsonianus*)
Connecticut Warbler (*Oporornis Agilis*)
Purple Martin (*Progne subis*)
Saw-whet Owl (*Crytoglaux acadica*)
Blue Heron (*Ardea herodias*)

*Collected in Itasca County by Mr. Bruce Warren.

Song Sparrow (*Melospiza melodia*)
Caspian Tern (*Hydroprogne caspia*)
Sparrow Hawk (*Falco sparverius*)
Golden-crowned Kinglet (*Regulus satrapa*)
Yellow-shafted Flicker (*Colaptes aureus*)
Yellow-bellied Sapsucker (*Sphyrapicus varius*)
Starling (*Sturnus regulus*)
Robin (*Turdus migratorius*)
Junco (*Junco hyemalis*)
Olive-backed Thrush (*Hylocichla ustulata*)
Hermit Thrush (*Hylocichla guttata*)
Black and White Warbler (*Mniotilta varia*)
Holboell's Grebe (*Colymbus grisegena*)
Hummingbird (*Archilochus colubris*)
Mourning Warbler (*Oporornis philadelphia*)
Tennessee Warbler (*Vermivora peregrina*)
Cedar Waxwing (*Bombycilla cedrorum*)
Nighthawk (*Chordeiles minor*)
Alder Flycatcher (*Empidonax trailli*)
Northern Yellow-throat (*Geothlypis trichas*)
White-throated Sparrow (*Zonotrichia albicollis*)

Following is a bibliography of papers relating to the parasites of some birds of Minnesota:

Abdel-Malek, E. T. 1953. Life history of *Petasiger chandleri* (Trematoda: Eichinostomidae) from the Pied-billed Grebe, *Podilymbus podiceps podiceps*, with comments on other species of *Petasiger*. Jour. Parasit. 39: 152-158. From Lake Itasca.

Allen, A. A. and A. O. Gross. 1926. Report of the Ruffed Grouse Investigation, Season of 1925-1926. Amer. Game 15:81-86. 21% of the Ruffed Grouse examined were infected with *Cheilospirura spinosa* found between the muscular wall and the chitinous lining of the gizzard. *Ascaridea lineata* was reported from the intestinal tract, free in the body cavity, in the muscles of the breast, and behind the kidneys and lungs.

Boughton, D. C. 1929. A note on coccidiosis in sparrows and poultry. Poultry Science 8:184-188. *Isospora lacazei* (Labbe) from the English Sparrow (*Passer domesticus*) and the crow (*Corvus brachyrhynchos*) in the vicinity of Minneapolis and St. Paul.

1937. Endoparasitic infestations in grouse, their pathogenicity and correlations with metero-topographical conditions. U. of Minn. Agric. Exp. Sta., Tech. Bull. 121. Birds were taken from the northeast to the northwest areas in the state. Parasites found in the Rough Grouse (*Bonasa umbellus*) were:

Davainea proglottina — small intestine
Raillietina tetragona — small intestine
Choanotaenia infundibulum — small intestine
Ascaridea bonasae — small intestine
Heterakis gallinae — caeca
Subulura strongylina
Cheilospirura spinosa — under lining of gizzard
Oxyspirura mansoni — under nictitating membrane

Physaloptera sp. larvae — encysted in muscles
Agamodistomum sp. — encysted in subcutaneous tissue of breast and in breast muscles
Harmostomum pellucidum — caeca
Eimeria dispersa — small intestine
Eimeria angusta — caeca

Parasites found in the Sharp-tailed Grouse (*Pediocetes phasianellus campestris*) were:

Choanotaenia infundibulum
Rhabdometra nullicollis
Ascaridia bonasae
Heterakis gallinae
Subulura strongylus
Cheilospirura spinosa
Seurocyrnea colini — wall of proventriculus
Agamodistomum sp.
Eimeria dispersa
Eimeria angusta

Chandler, A. C. 1948. New species of the genus *Schistotaenia* with a key to the known species. Trans. Amer. Micr. Soc. 67:169-176. *Schistotaenia tenuicirrus* from the Pied-billed Grebe, *Podilymbus podiceps*, from prairies 30 miles west of Lake Itasca.

1951. Studies on metacercariae of *Perca flavescens* in Lake Itasca, Minnesota. Amer. Mid. Nat. 45:711-721. *Uvulifer semicircumcisus* and *U. ambloplitis* from the Belted Kingfisher, *Megaceryle alycon.*

1954. New strigeids from Minnesota birds and mammals. Am. Mid. Nat. 52:133-141. *Tetracotyle bonasae*, encysted in connective tissue and fascia of the breast muscles and thighs of *Bonasa umbellis*, Itasca State Park. These were fed to kittens which yielded, on autopsy, both mature and immature *Alaria minnesotae* Chandler, 1954. Doubt as to the parasite-free condition of the hosts leads the author to state that "It would not be surprising if *Tetracotyle bonasae* should prove to be the metacercaria of some species of *Strigea*, . . . ".
Ophiosoma, sp., probably *Crassicole* Dubois, 1948 from intestine of American Bittern, *Botaurus lentiginosus*, Waubun, Minn.
Diplostomum marshalli, n. sp., from intestine of Lesser Yellowlegs, *Tetanus flavipes*, Waubun, Minn.

Coil, W. H. 1950. The genus *Ophiovalipora* Hsu, 1935 (Cestoda: Lidepidae) with a description of *Ophiovalipora minuta* sp. nov. from the Green Heron (*Butorides virescens* L.). Jour. Parasit. 36:55-61. The genus *Deudrouterina* described by Olsen (1937) is assigned to the genus *Ophiovalipora*, the species thus becoming *O. lintoni* (Olsen, 1937) Coil, 1950, and *O. nycticoracis* (Olsen, 1937) Coil, 1950.

Erickson, A. B. 1940. Sarcocystis in birds. The Auk 57:514-519. From the breast, neck, and leg muscles of Wilson's Snipe (*Capella delicata*), south of Minneapolis; the American Pintail (*Dafila acuta*), Heron Lake; the Blue-winged Teal (*Querquedula discors*), near Fergus Falls; the Cadwall (*Chaulelasmus streperus*), Clayton Lake, Martin County.
The report also includes examination of 279 ducks (18 species) in the Division of Entomology and Economic Zoology, University of Minnesota. Six infected mallards (*Anas platyrhynchos*) and two Shovellers (*Spatula clypeata*) were found in this group.

Records of the Minnesota Wildlife Disease Investigation showed three infected mallards from a group of 43 ducks examined.

Infected mallards have been reported from the Mississippi River below Spring Lake, from the Upper Mississippi Wildlife Refuge near Winona, and from Geneva Lake, Freeborn County.

1943. Wildlife Restoration and Management Planning Project, 11-R. Parasitology Division. Pittman-Robertson Quart. 3(1):19-21. *Leucocytozoon bonasae, Ascaridia bonasae, Cheilospirura spinosa,* and *Choanotaenia* sp. from Ruffed Grouse.

Ibid. 3(2):65 *Leucocytozoon simondi anatis* from a Ruddy Duck, Thief Lake; *Leucoytozoon bonasae* from a Ruffed Grouse, Pine County; *Sarcocystis rileyi* from mallards, Rice Lake National Refuge; *S. rileyi* from the Shoveller Duck, Elbow Lake.

Ibid. 3(3):136-137. *Ascaridia bonasae* from Ruffed Grouse from Marshall, Cass, Mille Lacs, Pine, and Beltrami Counties: *Davainea proglottina* and *Brachylaemus fuscatus* from Ruffed Grouse in Marshall and Beltrami Counties; *Cheilospirura spinosa, Physaloptera* sp., *Heterakis gallinae,* and *Trichostrongylus pergracilis* from the Sharp-tailed Grouse from Kittson, Marshall, and Beltrami Counties; *Polymorphus* sp. (*Acanthocephala*) from a mallard, Stanchfield.

Ibid. 3(4):184. *Prosthogonimus macrorchis* from a Chukar Partridge. Ibid. 1944, 4(1):28. *Raillietina tetragona* from a Sharp-tailed Grouse, St. Louis County; *Davainea* sp., *Heterakis gallinae,* and *Trichostrongylus tenuis* from the Sharp-tailed Grouse, Thief River Falls.

Ibid. 4(2):61. *Leucocytozoon bonasae* from Ruffed Grouse taken from an area extending from Bruno (Pine County) to Castle Danger on Lake Superior, Ely, and Cass Lake. *Cheilospirura spinosa, Davainea progliottina, Brachylaemus fuscatus* also found in some of the grouse.

Ibid. 4(4):154. Microfilariae, *Leucocytozoon bonasae,* and *Trypansosoma* sp. from Ruffed Grouse.

Erickson, A. B., P. R. Highby, and C. E. Carlson. 1949. Ruffed Grouse populations in Minnesota in relation to blood and intestinal parasitism. Jour. Wildlife Mgt. 13:188-194. Examinations were made of 231 Ruffed Grouse for intestinal parasites; 163 of this number were also examined for blood parasites. The area from which the birds were taken was north and east of Lake Superior, north and west of Cass Lake, and the region between.

Roundworms:

Ascaridia bonasae — small intestine
Cheilospirura spinosa — lining of gizzard
Heterakis gallinae — caeca
Microfilariae — blood
Oxyspirura petrowi — eye

Flukes:

Brachylaemus fuscatus — caeca
Echinoparyphium aconiatum — small intestine
Lyperosomum monenteron — liver

Tapeworms:

Choanotaenia infundibulum — small intestine
Davainea proglottina — small intestine
Hymenolepis sp. — small intestine
Raillietina tetragona — small intestine

Protozoa:

Eimeria angusta — intestine
Eimeria bonasae — intestine
Leucocytozoon bonasae — blood
Trypanosoma sp. — blood

Essex, H. E. 1932. A new larval cestode, probably *Hymenolepis cuneata*, a tapeworm of wild duck. Jour. Parasit. 18:291-293. Procercoids were found in the body cavity of copepods in Long Lake, Ely, representing a stage in the life history of the cestode.

Green, R. G. and J. E. Shillinger. 1933. Minnesota Wildlife Disease Investigation, Vol. 1, July, 1933 - Dec. 1934. Reported roundworms, tapeworms, ticks, fleas, and mites from a number of Minnesota vertebrates, including grouse and pheasants, but the parasites were not identified as to genus and species.

Hawkins, B. L. 1932. A study of the genus *Diplostomum* von Nordmann of the trematode family Alariidae. Master's Thesis, Univ. of Minn. *Diplostomum confusum* from the White Pelican (*Pelicanus erythrorhynchus*), Grant and Lac qui Parle counties; *Diplostomum trilobum* from the Double-crested Cormorant (*Phalacrocorax auritus*), Ottertail county.

Howard, C. W. 1918. A preliminary report on the Trombidiidae of Minnesota. 17th Ann. Rep. State Ent. of Minn., pp. 111-144. Undetermined larvae or "chiggers" were found in large numbers on the skin around the neck and anus and under the wings of prairie chickens, quail, and pheasants at Lake Minnetonka.

Ishii, N. 1942. New parasite records from the Ruffed Grouse. Jour. Parasit. 28:9. *Lyperosomum monenteron* from the liver of the Ruffed Grouse (*Bonasa umbellus*) and the Kingbird (*Tyrannus*), from Itasca State Park. *Echinoparyphium aconiatum* from the intestine of *Bonasa umbellus*, Itasca State Park.

Kagan, I. G. 1951. Aspects in the life history of *Neoleucochloridium problematicum* (Magath, 1920) new comb. and *Leucochloridium cynanocittae* McIntosh, 1932 (Trematoda:Brachylaemidae). Trans. Amer. Micr. Soc. 70:281-318. From the cloaca of the Sora Rail (*Porzana carolina*), the coot (*Fulica americana*), Virginia Rail (*Rallus limicola*), and the Florida Gallinule (*Gallulina chloropsis*), from Minnesota.

Macy, R. W. 1934. Studies on the taxonomy, morphology, and biology of *Prosthogonimus macrorchis* Macy, a common oviduct fluke of domestic fowls in North America. Univ. Minn. Agric. Exp. Sta., Tech. Bull. 98:1-71. Natural host: bursa Fabricii of English Sparrows, Detroit Lakes (Riley, unpublished). Experimental hosts: Crow, English Sparrow, Mallard Duck. *Prosthogonimus rudolphi* from the tame mallard, Little Pelican Lake (Riley, unpublished).

McIntosh, A. 1927. Notes on the genus *Leucochloridium carus* (Trematoda). Parasit. 19:353-364. *L. certhiae* from the cloaca of the Brown Creeper (*Certhia familiaris americana*); *L. mniotiltae* from the large intestine of the Black and White Warbler (*Mniotilta varia*); *L. icteri* from the rectum of the Baltimore Oriole (*Icterus galbula*); *L. vireonis* from the large intestine of the White-eyed Vireo (*Vireo griseus*); *L. sorae* from the intestine of the Sora Rail (*Porzana carolina*).

Olsen, O. W. 1937. A new species of cestode, *Dendrouterina nycticoracis* (Dilepidiidae) from the Black-crowned Night Heron (*Nycticorax nycticorax hoactli*) (Gmelin). Proc. Helm. Soc. Wash. 4:30-32. From the duodenum of the Night Heron, St. Paul. Coil (1950) has assigned the genus *Dendrouterina* to the genus *Ophilovalipora.*

1938. A new species of trematode, *Diasia podilybae* (Opisthorchiidae) from the Pied-billed Grebe, *Podilymbus podiceps* (Linn) Jour. Parasit. 24:215-218. From the mesenteries.

1940. *Diplogynia americana,* a new species of cestode (Hymenolepidiidae) from the eastern Little Green Heron (*Butorides virescens* Linn.) Trans. Amer. Micr. Soc. 49:183-186. From Osseo, Minn.

1940. Two new species of trematodes (*Apharyngeostrigea bilobata* (Strigeidae) and *Cathaemasia nyticoracis* (Echinostomidae) from herons with a note on the occurrence *Clinostomum campanulatum* (Rud.) Zoologica 25:323-328. *A. bilobata* and *C. nycticoracis* from the small intestine of the Black-crowned Night Heron and the Great Blue Heron, Owatonna. *Clinostomum campanulatum* from the Black-crowned Night Heron in Ramsey and Steele Counties, from the Great Blue Heron in Rice county, and from Double-crested Cormorants (*Phalacrocorax*) from Minnesota.

Penner, L. R. 1939. *Tamerlania melospizae* n. sp. (Trematoda:Eucotylidae) with notes on the genus. Jour. Parasit. 25:421-424. From the urinary tract of a Lincoln Sparrow (*Melospiza lincolni*), Minneapolis.

Popichal, L. B. and W. H. Marshall. 1954. A field study of Sora-rail and Virginia Rail in central Minnesota. Flicker 26:1-32. The following parasites have been taken from the Sora Rail and the Virginia Rail in the area of Lake Peltier, Anoka county:

Sora-rail:

Echinuria horrida — wall of proventriculus
Tetrameres sp. — wall of proventriculus
Hystrichis sp. — proventriculus
Ligula gallinula — small intestine
Hymenolepis sp. — small intestine
Echinostoma revolutum — large intestine
Levinseniella sp. — small intestine
Cyclocoelium mutabile — air sac
Psilostomum reflexae — small intestine
Notocotylus porzanae — large intestine
Corynosoma constrictum — small intestine
Spiruridae — small intestine
Strigeid metacercariae — fascia and muscles of breast

Virginia rail:

Tetremeres sp.
Ligula gallinula
Hymenolepis sp.
Echinostoma revolutum
Echinostoma sp.
Levinseniella sp.
Psilostomum reflexae
Notocotylus porzanae
Strigeid metacercariae
Spiruridae

Riley, W. A. 1931. *Collyriculum faba* as a parasite of poultry. Poultry Science 10:204-207. Found infected English Sparrows in various parts of Minnesota and an infected Bronze Grackle (*Quisculus quisculus aeneus*) from Waconia, Minn.

1931. *Sarcocystis*, a parasite that dines on duck flesh. Fins, Feathers, and Fur, No. 93:22. From a Mallard Duck, Gray Cloud Island in the Mississippi River; in Hartland and in Russell, Minnesota.

1931. Sarcosporidosis in ducks. Parasit. 23:282-285. *Sarcocystis rileyi* from a Mallard Duck in Minnesota.

and H. C. H. Kernkamp. 1924. Flukes of the genus *Collyriclum* as parasites of turkeys and chickens. Jour. Amer. Vet. Med. Assn. 64:591-599. Found in a robin (*Turdus migratorius*), St. Paul.

Swanson, G. A. 1932 Studies on the holostomes of Minnesota (Trematoda:Strigeodea). Master's Thesis, Univ. of Minn. *Strigea accipeteria* described as new from Cooper's Hawk (*Accipiter cooperi*), Fertile, Minnesota. (*Crassiphiala megastoma* described as new from the Belted Kingfisher (*Megaceryle alcyon*), Minneapolis. *Neodiplostomum pseudospathula* from the Marsh Hawk (*Circus cyanea*).

1937. Studies on the trematodes of the superfamily Strigeoidea with especial reference to the species from hawks and owls. Ph. D. Thesis, Univ. of Minn. *Neodiplostomum minnesotensis* described as new. Metacercariae from the muscles of *Rana pipiens* fed to a Marsh Hawk was followed by the recovery of adult *N. minnesotensis* from the intestinal tract of the avian host. Naturally infected Marsh Hawks reported from Fertile, Minnesota.
diplostomulum of *Alaria minnesotensis* described as new; reported from the skeletal muscles of Marsh Hawk and Sparrow Hawk which had been fed mesocerceriae from the muscles of *Rana pipiens*. The cycle is completed by feeding infected hawk muscle to mink and red fox.
Crassiphiala megastoma from the Belted Kingfisher, Minneapolis; *Strigea accipteria* from Cooper's Hawk, Fertile; *Neodiplostomum cochleare* from a Great Horned Owl which had been fed infected frog muscle; *Cotylurus flabelliformis* from the Lesser Scaup Duck, Madison, Minnesota; *Diplostomum confusum* from the White Pelican, Grant county and Madison, Minnesota; *Diplostomum indistincta* from a Ring-billed Gull (?), Maple Lake, Polk county; *Diplostomum gavium* from a loon and a Pied-billed Grebe, Polk county; *Diplostomum trilobum* from a Double-crested Cormorant, Ten Mile Lake, Ottertail county.

Swinyard, C. A. 1931. On *Heterakis hyperborea*, n. sp., from the Lesser Snow Goose, *Chen hyperborea hyperborea* (*Pall.*). Trans. Amer. Micr. Soc. 50: 366-371. From Owatonna.

Van Cleave, H. J. 1945. The status of the acanthocephalan genus *Arhythmorhynchus*, with particular reference to the validity of *A. brevis*. Trans. Amer. Micr. Soc. 64:133-137. From the Great Blue Heron (*Ardea herodias*) from northern Minnesota.

Wehr, E. E. 1940. A new intestinal roundworm from the Ruffed Grouse (*Bonasa umbellus*) in the United States. Jour. Parasit. 26:373-376. *Ascaridia bonasae* from the intestine of the Ruffed Grouse in Minnesota.

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Minnesota Nesting Season — 1953

by

Josephine D. Herz

The Minnesota 1953 nesting record shows extensive field work and an increasing interest in observation during the nesting season by M.O.U. members. Thirty-four observers reported on 141 species, the largest number listed to date. Last year 122 species were observed.

The greatest number of reports, from Houston and Winona Counties, were sent in by Brother Theodore. Mr. and Mrs. Whitney Eastman of Minneapolis and Dr. P. B. Hofslund of Duluth also contributed a great many nesting records. Other observers, many of whom sent in numerous reports, are: Dr. Olga Lakela, Mary I. Elwell, Vera Sparkes, John T. Pratt, A. C. Rosenwinkel, Brother Pius, Robert Hanlon, A. D. BuBois, Dana Struthers, Colleen Helgeson, O. A. Rustad, O. A. Finseth, Roland E. Cole, Tilford Moore, William Marshall, the Gordon Butlers, Mrs. William Davidson, Charles E. Wiberg, E. F. Harms, J. K. Bronoel, Arthur Boe, Lewis L. Barrett, Mr. Hofmaster, Elizabeth Jerabec, Harriet Miller, Robert Galati, the Minneapolis Bird Club, the Duluth Bird Club, and the Avifaunal Club of Minneapolis. The assistance of Mr. A. D. DuBois in the compiling and editing of this material is gratefully acknowledged.

One of the most interesting reports was for the Evening Grosbeak, a bird for which no actual nesting is recorded for the state. One adult male, two adult females, and five "fully-grown immature" birds were observed August 17, on County Road No. 40, north of Duluth, by Roland E. Cole. These birds were in the top of two tamarack trees in a spruce-tamarack swamp. Mr. Cole also observed one adult male, one adult female, and an immature Arctic Three-toed Woodpecker July 22, feeding in dead trees in a jack pine area northwest of Birch Lake Dam, near Ely in northern St. Louis County.

Bell's Vireo again nested in Winona County. At least 14 nesting pairs were reported by Brother Theodore who last year found six nests, the first nesting records for the state for this species since 1922 when Dr. Thomas S. Roberts discovered one nest. A colony of 18 American Egrets, adults apparently with young, observed June 15 at Kellogg, in Wabasha County, by Brother Theodore is also of interest.

The following species were reported parasitized by cowbirds: Eastern Pheobe, Catbird, Veery, Bell's Vireo, Red-Eyed Vireo, Yellow Warbler, Myrtle Warbler, Blackburnian Warbler, Pine Warbler, Northern Yellow-Throat, Western Meadowlark, Red-Winged Blackbird, Brewer's Blackbird, Indigo Bunting, Red-eyed Towhee, Henslow's Sparrow, Vesper Sparrow, Chipping Sparrow and Song Sparrow.

Because of the great number of nesting records received this year, abbreviation was found necessary. The following key of abbreviation has been employed:

n — nest or nests
e — egg or eggs
y — young
pr — pair
i — adult in nest
cb — cowbird
ce — cowbird egg

Only those records for which county location and exact dates were given are included in the report which follows:

COMMON LOON — Ramsey Co., June 6, adult with y; Rosenwinkel.

HOLBOELL'S GREBE — Douglas Co., July 11, n4e, 3n vacated (hatched); July 12, 6y; Eastman. St. Louis Co., July 16, 3y with female; Cole. Becker Co., 3y with adult; Struthers.

PIED-BILLED GREBE — Rice Co., April 19, n building; Rustad. Hennepin Co., June 12, 2 broods 4; Rosenwinkel. June 13, ni; 2y & 3y out of n; July 3, 2 females with y; Eastman. Houston Co., June 19, pr & 4y; Theodore. Ottertail Co., July 24, pr with 8y; Struthers.

DOUBLE-CRESTED CORMORANT — Waseca Co., June 22 to 30, 20n; Struthers. Winona Co., June 18, 2 broods 3 & 5y; Houston Co, June 18, 2y; Theodore.

GREAT BLUE HERON — Rice Co., Apr. 27, adults i, others feeding y; July 4, large fledglings in n; Rustad. Winona Co., June 18, pr with 2y; Theodore.

GREEN HERON — Rice Co., Apr. 27, adults i, others feeding y; July 4, large fledglings in n; Rustad. Winona Co., June 18, pr with 2y; Theodore.

GREEN HERON — Winona Co., June 18, pr with 4y; June 21, 3pr & 8y; Theodore. LeSueur Co., June 25, n4y; Hanlon.

BLACK-CROWNED NIGHT HERON — Waseca Co., June 22 to 30, Colony 30 n; Struthers.

AMERICAN BITTERN — Winona Co., June 12, pr nesting; Theodore.

LEAST BITTERN — Winona Co., June 5, n3e; June 8, n8e; June 18, n5e; Theodore. Rice Co., June 30, n4e; Struthers.

MALLARD — Hennepin Co., Apr. 28, 11e & 1 pheasant e; Avifaunal Club. 34 ducklings, May 23 to June 13; Eastman, Mpls. Bird Club. St. Louis Co., May 3, n4e; May 4, n6e; May 23, n9e; n10e; n8e; Hofslund. June 28, 9e; Duluth Bird Club. Ramsey Co., June 10, 10e; Pius. Houston Co., June 16, 18y; Theodore. Becker Co., July 23, 7y; Struthers.

BLACK DUCK — St. Louis Co., May 7, n9e; May 19, n8e; Hofslund. Lake Co., Aug. 1, 2y; Lakela, Elwell.

PINTAIL — Douglas Co., July 22, 10y with adult; Becker Co., July 23, 7y with adult; Struthers.

BLUE-WINGED TEAL — Watonwan Co., June 24, n12y; Struthers. St. Louis Co., June 29, n1e; n9e, n10e; Duluth Bird Club. Winona Co., June 8 to 20, 3 broods (24y); Houston Co., June 19, 6y; Theodore.

WOOD DUCK — Winona Co., June 13, 8y; Houston Co., June 21, 9y; Theodore. Ramsey Co., June 21, 10y; Pius. Hennepin Co., July 21, 6y; Struthers. Aug. 15, 5y; Aug. 23, 7y; Sept. 12, 5y; Eastman. Polk Co., Aug. 19, 4y; Struthers.

REDHEAD — Becker Co., July 23, 4y with female; Struthers. Clearwater Co., Aug. 8, female with 9y; Galati.

CANVAS-BACK — Becker Co., July 23, 3y; 6y; 5y; 7y; Struthers.

RUDDY DUCK — Ottertail Co., July 24, 3y; Struthers. Hennepin Co., Aug. 8, 8y; Sparkes; Aug. 22, 12y; 5y, 8y; Eastman. Aug. 25, 4y (diving); Cole.

HOODED MERGANSER — Houston Co., June 15 to 24, 8y, 9y; 3y; Theodore. Goodhue Co., July 5, 15y; Struthers.

AMERICAN MERGANSER — Cook Co., Aug. 12, 5y; Sparkes.

RED-BREASTED MERGANSER — Houston Co., June 21, 11y; 8y; Theodore. Lake Co., July 20, 5y; Rosenwinkel. St. Louis Co., July 25, 6y; Eastman.

BALDPATE — Clearwater Co., Aug. 8, female with 7y; Galati.

RING-NECKED DUCK — Becker Co., Aug. 8, female with 8y; Galati.

SHARP-SHINNED HAWK — Winona Co., June 26, 2y; Theodore.

RED-TAILED HAWK — Winona Co., June 30, pr with 3y; Theodore. St. Louis Co., July 25, ny; Finseth.

RED - SHOULDERED HAWK — Winona Co., June 29, 1 pr & several immature; Theodore.

BROAD-WINGED HAWK — Hennepin Co., May 23, building; Eastman.

BALD EAGLE — Clearwater Co., 2y exercising in n (about 40 ft. up in white pine); Hofslund.

DUCK HAWK — Wabasha Co., July 1, 1y; Struthers. (Brother Theodore reported 1 pr nesting in Winona Co., 1 pr in Houston Co. during latter part of June.)

SPARROW HAWK — Ramsey Co., May 1, n in woodpecker hole; Avifaunal Club. May 1, y being fed in n; Boe. July 16, 2y out of n; Pius.

CANADA SPRUCE GROUSE—Lake Co., Aug. 2, 2y nearly full grown; Lakela, Elwell.

RUFFED GROUSE — Winona Co., June 26, 13y; July 1, 9y; Theodore. Clearwater Co., June 27, 6y; Hofslund.

BOB-WHITE — Winona Co., June 10, 8y; Theodore.

HUNGARIAN PARTRIDGE — Big Stone Co., Aug. 29, 2y; Eastman.

RING-NECKED PHEASANT — Blue Earth Co., May 6, n20e; Hanlon. Hennepin Co., July 9, 4y; July 17; 1y; July 30, 5y; Aug. 1, 6y; 4y; Harms.

FLORIDA GALLINULE — Hennepin Co., July 5, 4e & 5y; Avifaunal Club. Aug. 8, 3y, 5y; Sparkes.

COOT — LeSueur Co., June 3, n10e; Hanlon. Hennepin Co., June 13, 4ni; July 4, 1y; Aug. 22, 2y; Eastman. Houston Co., June 22, 5y; Theodore. Meeker Co., June 23, 7y. Scott Co., June 24, 8y; Struthers.

KILLDEER — Ramsey Co., Apr. 24, n2e; Rosenwinkel. May 26, 3y; Moore. St. Louis Co., May 14, n4e; Hofslund; June 29, n2e; n3e; Duluth Bird Club.

WILSON'S SNIPE — Winona Co., June 13, 2y with adult; Theodore.

UPLAND PLOVER — Watonwan Co., July 8, 2y with adults; Struthers.

SPOTTED SANDPIPER — St. Louis Co., June 7, n1e; n4e; n4e; Finseth. June 29, n4e; n1e; Duluth Bird Club. July 23, 1y out of n; Hofslund.

COMMON TERN — St. Louis Co. (Harbor Is. Colony), June 29; 50n 3e, 17n 2e; 9nle; 2n empty; 4n1y; 4n2y; 1n3y; total 87n; Duluth Bird Club. Aug. 15, 2y being fed; Sparkes.

BLACK TERN — Hennepin Co., June 13, 6ni; Eastman. June 14, n1e; n2e; Avifaunal Club. Watonwan Co., June 24, n3e; July 9, n1e; Struthers.

MOURNING DOVE — Hennepin Co., May 14, n1ei; July 10; ni (built on top of robin n used earlier this season); DuBois. Aug. 15, n2y; Avifaunal Club. Nicollet Co., May 24, n2e; Rice Co., May 28, n2y; LeSueur Co., June 2, n2e; June 10, 2e (in old robin n); Hanlon.

YELLOW-BILLED CUCKOO — Winona Co., June 10, 3y; 2y; June 14, 4y; June 18, n3e; Thedore.

BLACK-BILLED CUCKOO — Winona Co., June 22, 3y; Theodore.

GREAT HORNED OWL — Hennepin Co., May 9, n1y & 2y out of n in trees; DuBois.

WHIP-POOR-WILL — Winona Co., June 6, pr nesting; June 13, pr nesting; June 29, 2 pr nesting; Theodore.

NIGHTHAWK — Ramsey Co., June 21, n2e; Pius.

CHIMNEY SWIFT — Winona Co., June 6, 3 pr nesting; June 20, 12 pr nesting; Theodore.

RUBY-THROATED HUMMINGBIRD — Carlton Co., July 3, ni; Helgeson.

BELTED KINGFISHER — Winona Co., June 8, n4e; June 16, n3y; June 22, 2y out of n; June 29, 3y out of n; Theodore.

FLICKER — Hennepin Co., May 9, n being excavated ; DuBois. June 13, y out of n; Eastman.

PILEATED WOODPECKER — Nicollet Co., May 23, n (adult flushed); Rosenwinkel. Ramsey Co., June 6, n (female flushed); Hall, Rosenwinkel.

Winona Co., June 12, 2y being fed; Theodore. Hennepin Co., y in n being fed by female; Eastman.

RED-BELLIED WOODPECKER — Rice Co., June 1, y in n being fed by adult; Rustad. Winona Co., June 8, 2 pr with 6y out of n; June 20, n4y; Theodore.

RED-HEADED WOODPECKER — Hennepin Co., June 20, y being fed in n; Eastman. Aug. 29, 2y, 2 adults; Sparkes.

YELLOW-BELLIED SAPSUCKER— Houston Co., June 15, ny; Theodore. Clearwater Co., June 27, ny; June 30, ny; July 1, ny; Hofslund. Lake Co. Aug. 16, y out of n; Sparkes.

HAIRY WOODPECKER — St. Louis Co., May 17, y in n being fed; Bronoel, Duluth Bird Club. Rice Co., May 21, nesting; Rustad. Winona Co., June 8, y in n being fed; Theodore. Hennepin Co., July 3, parents feeding full-grown y; Eastman.

DOWNY WOODPECKER — Ramsey Co., June 18, ny; Rosenwinkel. Hennepin Co., June 27, y out of n; Harms.

ARCTIC THREE-TOED WOODPECKER — St. Louis Co., July 22, adults & 1y feeding in jack pine area; Cole.

EASTERN KINGBIRD — Anoka Co., May 25, building; Ramsey Co., June 24, n4y; Avifaunal Club. Carleton Co., July 6, n2y (about 12 ft. above water); Helgeson. St. Louis Co., July 23, ny; Hofslund. Lake Co., Aug. 22, 3y out of n; Pine Co., Aug. 23, adults with 1y; Sparkes.

ARKANSAS KINGBIRD — Hennepin Co., July 10, pr feeding 2y; Avifaunal Club, Hennepin Co.

EASTERN PHOEBE — 14 n reported by 6 observers. Earliest e Apr. 30 (n3e). Rosenwinkel — Latest e July 14 (n5e) Clearwater Co., Hofslund.

ALDER FLYCATCHER — Winona Co., June 12, pr & 4y; June 16, pr & 4y; pr & 3y; Theodore.

LEAST FLYCATCHER — Goodhue Co., May 24, 2n building (both n by same bird); Eastman. Winona Co., June 12, pr & 4y; June 16, pr & 3y; June 16, pr & 5y; Theodore. Carlton Co., June 18, ni; July 7, ny; Helgeson. June 19, ny; Hofslund.

WOOD PEWEE — Clearwater Co., June 29, n3y; July 9, n3y; Hofslund.

OLIVE-SIDED FLYCATCHER — Lake Co., Aug. 16, 2 families of 4; Sparkes.

HORNED LARK — Rice Co., Feb. 28, building; Rustad. Hennepin Co., Apr. 4, n4e; Sparkes. Winona Co., June 21, 4y; June 23; 3y out of n; June 23, 2y; Theodore.

TREE SWALLOW — St. Louis Co., May 5, 5n building; Hofslund. Hennepin Co., May 23, building; July 4, 2 broods 4y & 5y; Eastman. Winona Co., June 16, y being fed in n; Theodore.

BANK SWALLOW — Dakota Co., May 24, several pr digging n holes; June 13, about 100 pr feeding y; Eastman. St. Louis Co., June 12, 36 occupied n; Finseth. Winona Co., June 14, 20n with e and y; June 15, adults feeding y in 10n; Theodore. Hennepin Co., July 3, about 200 adults & y on wires; Eastman.

ROUGH-WINGED SWALLOW — Clearwater Co., May 30, building; Eastman. July 5, 3n in 4 ft. bank; Hofslund. Pine Co., June 6, 1n; Mpls. Bird Club. Hennepin Co., June 13, 2n in bank; Eastman. Winona Co., June 13, 2ny; June 24, 2n, 3y out, others in n; June 25, 3n, y being fed; Theodore. Carlton Co., July 14, n3y (chimney hole of old fireplace); Helgeson.

BARN SWALLOW — Hennepin Co., May 29, 7n (girders under bridge) 2 n empty; 1n4e; 1n5e; 3n6e; Pratt. Ramsey Co., June 10, 2n building; 3ne; 1n-4e1y; 1ny; Pius. Winona Co., June 14, 2n4y; 1ny; 1n4y; 1n5y; Theodore. Lake Co., Aug. 16, 3y on wires; Sparkes.

CLIFF SWALLOW — St. Louis Co., May 29, 91 occupied n; Lakela. June 2,

2 colonies, 25 n building; 175n completed; Jerabec, Miller. Hennepin Co., July 3, 8 occupied n; Eastman. Winona Co., June 21, 75 pr feeding y; Theodore.

PURPLE MARTIN — Clearwater Co., May 30, ny in woodpeckers' hole; Eastman. Winona Co., June 12, 16 pr feeding y; Theodore. Hennepin Co., June 13, 2n; St. Louis Co., July 25, 4n; Eastman.

CANADA JAY — Clearwater Co., May 30, y out of n; Cook Co., July 26, y out of n; Eastman.

BLUE JAY — Goodhue Co., May 17, n5y; Hennepin Co., May 19, ni; Aug. 2, 3y out of n; Eastman. Nicollet Co., May 24, ni; Hanlon. Winona Co., June 16, pr 3y; June 24, pr 4y; Theodore. Cook Co., July 26, 5y being fed out of n; Eastman.

CROW — Clearwater Co., June 16, n3y; Hofslund. Winona Co., June 17, 2y out of n; Theodore.

BLACK-CAPPED CHICKADEE — Nicollet Co., May 10, nesting; Hanlon. St. Louis Co., May 23, 2y out of n; Lakela. Clearwater Co., June 19, ny being fed; Hofslund. Winona Co., June 17, 6y out of n; 4y out of n; June 22, 5y out of n; Theodore. Cook Co , July 25. y out of n; Eastman.

TUFTED TITMOUSE — Winona Co., June 21, 4y out of n; June 23, y with adults; Theodore.

WHITE-BREASTED NUTHATCH — Rice Co., May 28, nesting; Hanlon. Hennepin Co., June 12, 2y out of n; Harms. Winona Co., June 17, ny; June 18, 3y out of n; Theodore.

RED-BREASTED NUTHATCH — Clearwater Co., May 30, excavating nesthole; Cook Co., July 26, y out of n; Eastman.

HOUSE WREN — Winona Co., June 12, n6y; 4y; 5y; Theodore. Hennepin Co., June 20, ny being fed; Eastman. June 23, y being fed; Harms. Clearwater Co., June 28, y being fed; Hofslund.

LONG-BILLED MARSH WREN — Nicollet Co., May 23, building; Rosenwinkel. Winona Co., June 20, building; June 23, 5y; Theodore.

SHORT-BILLED MARSH WREN — Winona Co., June 23, y being fed; June 26, 3 pr adults feeding y; Theodore.

CATBIRD — Goodhue Co., May 16, n4e; Pratt. May 17, n1e & 2ce; Eastman. Rice Co., May 28, n1e; Hanlon. Hennepin Co., May 28, n1e; n3e; DuBois. June 13, n4e; Eastman. Pine Co., June 6, completed n; Mpls. Bird Club. Winona Co., June 12, n4y; n3e; June 13, n4y; Theodore. Ramsey Co., June 13, 5y; Pius. St. Louis Co., June 21, n4e; female with 1y in nest; Galati. June 29, n2e; n4y; Duluth Bird Club. Carlton Co., July 9, n3y; Helgeson.

BROWN THRASHER — Blue Earth Co., May 20, n4e; Hanlon. St. Louis Co., May 23, n4e; Hofslund; June 13, female leading 1 y from nest; Gallati. June 29, 3y; Duluth Bird Club. Nicollet Co., May 24, n3e; Hanlon. Hennepin Co., June 2, building; DuBois. July 1, 2y out of n; Harms. Winona Co., June 13, 4y; June 18, n3e; 4y; Theodore.

ROBIN — Ramsey Co., Apr. 11, building; Rosenwinkel. May 29, 2y being fed; Stearns Co., Jnue 3, n3y; n2y; Moore. Hennepin Co., Apr. 26, n3e; Sparkes. May 3, ni; May 30, n3e; June 3, n3e; Pratt. LeSueur Co., May 5, n4e (hatched May 15); June 2, ny; Nicollet Co., May 19, n3e; May 23, ny; Blue Earth Co., May 22, n4e; Hanlon. Pine Co., June 6, ni; Mpls. Bird Club. St. Louis Co., July 24, 2y out of n; Hofslund.

WOOD THRUSH — Winona Co., June 13, pr nesting; June 23, 3y out of n; June 26, 2 pr feeding 7y; Theodore.

HERMIT THRUSH — Clearwater Co., June 17, 2y out of n; Hofslund.

VEERY — Lake Co., June 4, n3e & 2ce; Lakela, Elwell.

BLUEBIRD — Hennepin Co., June 13, building; Eastman. Aug. 29, 5y

out of n; Sparkes. Winona Co., June 14, 10y out of n; 4y; June 26, 3y; Theodore. Ramsey Co., July 7, n3e; Avifaunal Club. Lake Co., Aug. 16, 3y out of n; Sparkes.

BLUE-GRAY GNATCATCHER — Goodhue Co., May 16, building; Pratt. Houston Co., June 20, y being fed in n; June 21, n4y; Theodore.

CEDAR WAXWING — Winona Co., June 20, n3y; June 22, 4y out of n; June 24, n4e; Theodore. Carlton Co., July 3, ni; Helgeson. Hennepin Co., June 29, n5e; DuBois. Lake Co., Aug. 16, y out of n; Sparkes.

MIGRANT SHRIKE — Anoka Co., June 20, 1y out of n; Avifaunal Club.

STARLING — Hennepin Co., June 13, 3y out of n; y leaving n; Eastman.

BELL'S VIREO — Winona Co., June 8, 5 pr nesting (3n found - n3y; n3e; n2e & 1ce); June 10, n3e; 2 pr feeding y; June 12, pr feeding y; June 14, 3pr nesting (1n found - 1n3y); June 28, 2 pr nesting (1n found - 1n4y); July 6, 4n; July 24, n3y (newly hatched); Theodore.

YELLOW-THROATED VIREO — Winona Co., June 16, y being fed in n; Theodore.

BLUE-HEADED VIREO — Clearwater Co., July 9, n3e; Hofslund.

RED-EYED VIREO — Pine Co., June 6, building; Mpls. Bird Club. Winona Co., June 14, n3y; June 18, ny; June 23, n4y; June 26, 3y out of n; Theodore. Clearwater Co., June 28, ni; July 8, ni; Hofslund. Cook Co., July 26, 2y out of nest; Eastman.

WARBLING VIREO — Goodhue Co., May 17, building; Sparkes. Winona Co., June 10, ni (male singing on n); June 14, y being fed; June 16, 2 pr feeding y; Theodore.

PROTHONOTARY WARBLER — Houston Co., June 19, 2n with y; June 25, 3 pr feeding y; June 17, ny; Theodore.

BLUE-WINGED WARBLER — Winona Co., July 16, 3 pr feeding y; June 18, 4 pr feeding y; June 23, 3 pr feeding y; June 25, pr feeding y; Theodore.

PARULA WARBLER — Clearwater Co., July 14, 1y out of n; Hofslund.

YELLOW WARBLER — Anoka Co., May 25, building; Avifaunal Club. Nicollet Co., May 25, n1e; Rice Co., May 28, n2e; Hanlon. Hennepin Co., May 29, n4e; June 2, n5e; June 21, n3e; n1e; DuBois. June 13 n2y - icb; July 3, y out of n; Eastman. LeSueur Co., June 1, n5e; Hanlon. Pine Co, June 7, n completed; n4e; Mpls. Bird Club. Ramsey Co., June 18, n4y; Pius. Clearwater Co., June 23, n2e; Hofslund.

MYRTLE WARBLER — Clearwater Co., June 16, adult feeding cb out of n; July 10, adult feeding cb out of n; July 14, n3y; Hofslund. Cook Co., y being fed; Eastman.

BLACK - THROATED GREEN WARBLER — Clearwater Co., May 30; building; Eastman. July 5, y being fed; Hofslund.

CERULEAN WARBLER — Houston Co., June 20, building; pr feeding y; Winona Co., June 26, adults carrying food; Theodore.

BLACKBURNIAN WARBLER — Clearwater Co., June 23, adult feeding cb out of n; June 27, adult feeding cb of of n; 1y out of n; July 2, 2y being fed; July 15, n1cb (dead cb beneath n); Hofslund.

CHESTNUT-SIDED WARBLER — Clearwater Co., July 9, n3e; Hofslund. Lake Co., July 21, 2y out of n; Rosenwinkel. Aug. 22, 1y; Sparkes. Cook Co., July 26, y being fed; Eastman.

PINE WARBLER — Clearwater Co., July 10, adult feeding cb; Hofslund.

OVEN-BIRD — St. Louis Co., June 7, n4e; Lakela. July 19, n3y; Lakela, Elwell. Winona Co., June 16, 2 pr adults carrying food; June 23, 3y out of n; Theodore.

MOURNING WARBLER — Clearwater Co., July 16, 3y out of n; Hofslund. July 17, n3y; Hofslund, Marshall. St. Louis Co., July 23, adult feeding 1y out of n; Hofslund.

NORTHERN YELLOW-THROAT — LeSueur Co., June 5, n completed; July 10, n2e; Hanlon. Pine Co., June 6, n2e & 2ce; Mpls. Bird Club. Ramsey Co., June 13, n5e; Pius. Winona Co., June 12, 2 pr adults carrying food; June 13, 2 pr adults carrying food; June 23, 3y out of n; Theodore. Clearwater Co., July 7, 4y (banded); Hofslund. Lake Co., July 20, adult feeding cb; Rosenwinkel.

MEADOWLARK — Winona Co., June 6, 3 pr feeding 13y; pr with 3y; June 11, 18 pr feeding y; June 14, 2y; June 16, 5 pr feeding y; Theodore.

WESTERN MEADOWLARK — Rice Co., May 21, adult carrying food; Rustad. Nicollet Co., May 23, n2e (1 broken) & 1ce; Rosenwinkel.

YELLOW-BREASTED CHAT — Winona Co., July 10, n5e; Houston Co., July 21, pr carrying food; Theodore.

AMERICAN REDSTART — Lake Co., July 8, n1y & 2e; Elwell, Butler. July 21, 4y out of n; Rosenwinkel.

BOBOLINK — Winona Co., June 11, 3 pr carrying food; June 12, 2 pr carrying food; June 13, 3 pr carrying food; June 29, 6 pr carrying food; Theodore. Ramsey Co., June 13, 5y; Rosenwinkel.

YELLOW-HEADED BLACKBIRD— Hennepin Co., June 14, n2y & 1e; Avifaunal Club. July 3, 4y out of n being fed; Eastman. July 5, 1y out of n; Harms. Nicollet Co., June 19, 4y out of n; Hanlon.

RED-WINGED BLACKBIRD — Goodhue Co., May 16, n1e; Avifaunal Club. May 28, n3e; DuBois. May 29, 2n - 4e each; n4e & 1ce; n4y; Pratt. June 5, n3y; n4e; Eastman. June 14, n1e; Avifaunal Club. June 22, 1y out of n; Harms. July 19, building; Eastman. LeSueur Co., June 3 n4e; n4y; June 4, 2 empty n; n2e; n3e; 2n - 4y each; Hanlon. St. Louis Co., June 7, n2e; Lakela. June 29, 4n - 3e each; n5e; 2n - 4e each; n3y; nly - 2e; Duluth Bird Club. Douglas Co., July 11, n3e; building; n3e; Eastman. Pine Co., Aug. 23, flock of 30y & female; Sparkes.

ORCHARD ORIOLE — Washington Co., July 15, n3y; Davidson.

BALTIMORE ORIOLE — Goodhue Co., May 16, building; Pratt. May 17, building; Sparkes. LeSueur Co., June 11, building; Hofmaster, Hanlon. Ramsey Co., June 21, ny; Rosenwinkel. Crow Wing Co., June 30, n3y; Wiberg. Clearwater Co., July 5, 5y out of n; Hofslund. Hennepin Co., July 9, y out of n; Eastman. Aug. 29, 1y out of n; Sparkes.

RUSTY BLACKBIRD — Winona Co., June 16, 10 pr nesting; Theodore.

BREWER'S BLACKBIRD — St. Louis Co., May 23, n3e; n5e; May 24, n5e & 2ce; Hofslund. June 7, n5y, n2y; Finseth. Ramsey Co., June 10, y out of n; Pius. Winona Co., June 12, 10-12 pr nesting; June 16, 18-20 pr nesting; Theodore.

BRONZED GRACKLE — Ramsey Co., April 11, building; Rosenwinkel. Rice Co., April 21, building; Rustad. Blue Earth Co., May 20, n4e; June 1, n3y; Nicollet Co., May 25, n4y; Hanlon. Cook Co., July 25, y full grown; Eastman.

SCARLET TANAGER—Winona Co, June 6, 2n - adults feeding y; June 18, building; June 22, pr feeding y; June 29, 2 pr feeding y; Theodore.

CARDINAL — Ramsey Co., June 20, 3y (2nd brood) out of n; Rosenwinkel.

ROSE-BREASTED GROSBEAK — Winona Co., June 8, 2 pr with 8y; 4 pr feeding y; June 29, pr feeding y; Theodore. St. Louis Co., June 13, female with 3y in n; Galati. Clearwater Co., July 5, 1y out of n; Hofslund.

INDIGO BUNTING — Winona Co. June 8, pr feeding y; June 10, 2 pr feed-

ing y; June 14, n3e & 1ce; June 23, pr with 4y; Theodore.

DICKCISSEL — Winona Co., June 11, pr feeding y; June 12, 3 pr feeding y; June 15, 2 pr feeding y; Theodore.

EVENING GROSBEAK — St. Louis Co., Aug. 17, 1 male, 2 female & 5 immature; Cole.

PURPLE FINCH — Clearwater Co., May 30, n y being fed; Eastman. July 14, adult carrying food; Hofslund. Cook Co., July 26, y out of n; Eastman.

PINE SISKEN — Lake Co., Aug. 16, 1y out of n; Sparkes.

GOLDFINCH — Winona Co., June 15, n5e; Theodore. St. Louis Co., July 23, n completed; Hofslund. Stevens Co., Aug. 30, 3y out of n; Eastman. Washington Co., Sept. 7, 3y out of n; Sparkes.

TOWHEE — Winona Co., June 10, n3e; June 18, pr feeding y; June 24, pr feeding y; 3 pr feeding y out of n; Theodore.

HENSLOW'S SPARROW — Winona Co., June 14, n4e; n5e; June 20, 4y out of n; July 6, n5e; Theodore.

VESPER SPARROW — Anoka Co., May 3, n5e (1e out of n); Washington Co., June 19, n4e; Sherbourne Co., July 4, n3e (1e out of n) & 2ce; Avifaunal Club. Clearwater Co., Aug. 8, female with 2 y in n; Galati.

LARK SPARROW — Winona Co., June 8, 3 pr with 7 y; pr with 3y out of n; June 12, n4y; June 16, pr nesting; July 6, 1 pr with y; Theodore.

SLATE-COLORED JUNCO — St. Louis Co., July 23, 4y out of n; Cole. Cook Co., July 26, y out of n; Eastman.

CHIPPING SPARROW — Rice Co., May 19, y being fed; Rustad. Ramsey Co., June 3, ni; Moore. St. Louis Co., June 8, n5e; Lakela. Clearwater Co., May 31, n2e; Eastman. June 19, n1e & 2y; June 25, n3y; n2y; June 26, n3y; June 27, n3y; July 10, adults feeding cb out of n; July 17, n2y; Hofslund. Lake Co., Aug. 16, 2y; Sparkes.

FIELD SPARROW — Hennepin Co., June 13, n4y; Eastman.

WHITE-THROATED SPARROW — Clearwater Co., June 19, 1y out of n; June 28, n4e; July 9, n5y; July 18, n2e & 2y; Hofslund. St. Louis Co., July 25, 2y being fed out of n; Lakela.

SWAMP SPARROW — Hennepin Co., July 3, 3 adults carrying food; Eastman.

SONG SPARROW — Goodhue Co., May 16, n5e; Barrett, Hofslund. Hennepin Co., May 20, n5e; Avifaunal Club. July 3, y out of n; Eastman. LeSueur Co., June 2, y leaivng n; Hanlon. Ramsey Co., June 2, n4e & 1ce; Rosenwinkel. Pine Co., June 6, n4y & 1e; Mpls. Bird Club. Rice Co., July 4, adult carrying food; Rustad. Carlton Co., July 13, n4e; Helgeson. St. Louis Co., July 24, adult feeding cb out of n; Hofslund. — *Excelsior, Minn.*

Seasonal Report

by

Mary Lupient

Except for one snow storm accompanied by very strong winds, the mild weather of the winter continued on into March. The storm occurred in all sections of the state being heaviest in the north. Warm weather succeeded it. Boats traveled upriver to St. Paul, March 16, breaking the record by three days. During the last few days of March and all of April the temperature fluctuated sharply. Shallow standing water opened the middle of March. There were successive freezes and thaws for the next three weeks. Ducks were concentrated in such small areas of open water that they appeared to be one mass. Fortunately, the periods of hard freezes were not too long and the birds were able to spread out during the thaws so that they got enough food to last until the next severe cold spell. A record cold of 8° above in the Twin Cities and 8° below at International Falls occurred April 2 which was followed April 6 by a high of 77° in the Twin Cities. April 13 the temperature soared to 85° in the Twin Cities breaking an all time record for that date. A cold spell of length and intensity accompanied by ice and snow spread over the state the first week in May causing high mortality among Tree Swallows, Myrtle Warblers, Hermit Thrushes, White-throated Sparrows and other migrants. Deep snow covered the earth and the temperature dropped to below freezing during several successive nights. In the southern half of the state the birds concentrated on the ground around open water where there were living insects and a higher temperature. The wind was very strong and confused migrating birds were blown into buildings and other obstructions. Mrs. George Bantle of St. Paul said that a large flock of Slate-colored Juncos was blown against her buildings leaving the ground strewn with stunned and dead birds. In the north, many Hermit Thrushes, Tree Swallows and White-throated Sparrows died of exposure and starvation. The sleet and ice gathered on the wings of some of them so that they were unable to fly. In an hour's walk near Duluth, P. B. Hofslund found 21 dead Hermit Thrushes. V Gunvalsen of Bemidji reported White-throated Sparrows with their beaks frozen shut and robins with balls of ice on their feet. He said birds gathered along the edges of the highway and refused to fly in many instances and flew only for a short distance when they did get up. At Whitefish Lake George Ryan reported that large numbers of swallows, martins and warblers died. Residents in the area saved robins and other birds by shoveling clear spots in the snow and sattering food. Due to the warm weather in March the vanguard of the migration arrived earlier than usual and many of them must have perished. Margaret Burr brought a dead Parula Warbler to the Museum, April 13. Hermit Thrushes and Fox Sparrows arrived in the Twin Cities, April 7 and migrated through. They were not seen again in any number until after the storm in May when a few appeared. Myrtle Warblers appeared early in April and by the last week were migrating in large numbers. They were everywhere. The May storm grounded them and when the snow melted the earth around the lakes in southern Minnesota appeared to be a living carpet of warblers, blackbirds, swallows and other species. Early warblers, especially Myrtles, migrated with the later ones so that at times up to the last of May almost all

species could be seen in a single day.

The migration peak of cormorants, grebes, herons and loons was a little late probably because of the intermittant freezing of the water. An immature Red-throated Loon was discovered on Lake Harriet, April 28 by Ray Glassel.

An American Egret was reported at the bass ponds near Minneapolis, April 10. Later others appeared along the Minnesota River bottoms and adjacent territory. In a small slough beside a farmhouse near Frontenac, 21 egrets were observed May 16. Some of them wore plumes. At the time of this writing, May 28, American Egrets were present in marshes near Shakopee and in sloughs along the Minnesota River near Minneapolis.

Whistling Swans arrived in the Minnesota River lowlands April 7 and most of them left April 26. At one time nearly 300 were counted. According to P. B. Hofslund they arrived in Duluth Harbor, April 9. Several flocks were seen in western Minnesota, April 10-11. Flocks of pelicans were seen in the same area on that date.

Canada Geese appeared in eastern Minnesota March 22 and thousands were seen in western Minnesota March 30. Blue Geese and Snow Geese were reported from various points in the south half of the state the first week in April. They were still migrating through eastern sections the third week in May. About 24 White-Fronted Geese were seen at Salt Lake, Lac qui Parle County, April 24 by members of the Avifaunal Club.

The first ducks arrived in small numbers in waters adjacent to the Twin Cities by March 30, at Duluth they had arrived by April 9. A Cinnamon Teal, reported first by Mrs. P. D. Tryon in water near the Cedar Avenue bridge just south of Minneapolis was seen by several other observers. It remained about a week and was last seen April 24.

No large hawk migration was reported. There was a flight of Rough-legged Hawks at Duluth, April 10, reported by P. B. Hofslund. Two Red-shouldered Hawks arrived at P. D. Tryons, Christmas Lake, Excelsior, March 18 and remained. In past years Red-shouldered Hawks have nested there. A Broad-winged Hawk in complete melanistic phase was seen near Afton, April 9, by Paul Murphy and others. There were several records of Bald Eagles in eastern Minnesota this season, and a Golden Eagle was seen by the Avifaunal Club, April 3.

In their migration, Sandhill Cranes stopped at Fergus Falls affording observers on the M.O.U. field trip, April 10-11, an opportunity to see them. In flight they uttered their melodious trumpeting.

Large concentrations of Greater Yellowlegs and Pectoral Sandpipers were seen April 16. Later rain and melting snow caused the water level to rise so that observation of shore birds was hampered in eastern Minnesota for the rest of the season. An avocet was discovered at the Isaac Walton bass ponds and reported first by Mrs. William Davidson of St. Paul. The date was April 24. The bird stayed a few days and was seen by several observers. M.O.U. members attending the annual meeting at Duluth, May 22, had the privilege of seeing two Hudsonian Curlews at close range. They were on an island off Minnesota Point. About 25 Ruddy Turnstones and several Red-backed Sandpipers were on the Point besides Long-billed Dowitchers, Semi-palmated Plovers and other species. A Hudsonian Godwit was observed at the bass ponds, April 25, by the class in Ornithology from the Museaum of Natural History and five were seen by Mrs. P. D. Tryon near Chaska. Lewis Barrett observed three flocks of Golden Plovers in a field south of Farmington. The flocks contained 210, 75 and 48 individuals. With them were four Black-bellied Plovers.

Ring-billed and Herring Gulls were present in force on the rivers, April 6. Joel Bronoel stated that about 1500 Herring Gulls spent the winter on Lake Superior. Franklin's Gulls were reported by Mrs. M. E. Herz, May 7. They were following a farmer's plow at St. Bonifacius near Lake Minnetonka. Flocks of Franklin's Gulls were observed in western Minnesota, April 11. A flock of about 60 Bonaparte's Gulls rested on Mother Lake, Minneapolis, May 12, and about 100 were observed by M.O.U. members, May 22, over Duluth Harbor. They mingled with hundreds of Common Terns. Observers in Duluth said it was the largest concentration of Common Terns they had seen in the area. A few Caspian Terns were with them.

Only two records of cuckoos were received, one Black-bill in each record.

A Saw-whet Owl was reported by Ray Glassel at Glenwood Park, April 13. Two Long-eared Owls perched in a tree all day, April 7, near the Greeley School in Minneapolis. This report came from Stephen Tanner. Mrs. E. W. Joul reported one in Roberts Sanctuary, May 5. There were several reports of Snowy Owls as follows: South of Farmington, 1, March 6, Richard Dawson; south of Minneapolis, 1, March 6, Mr. and Mrs. Wallace Peterson; near Hastings, 2, April 4, Rev. and Mrs. Vance; near Owatonna, April 18, 1, Bruce Hayward; 6 killed, reported Dr. W. J. Breckenridge. At least a dozen were seen by observers in Minnesota and South Dakota on the Sand Lake trip, April 10-11. Joel Bronoel, Duluth, reported as follows, "Snow owls have been fairly numerous about the city particularly around the elevators. Several of them have died due, we believe, to eating poisoned rats and pigeons".

Red-breasted Nuthatches were scarce this season, none were seen on the North Shore trip and very few farther south. No White-breasted Nuthatches were seen on the North Shore trip. In Duluth, Black-capped Chickadees and Downy Woodpeckers were fewer in number than normal according to Joel Bronoel. In central and southern Minnesota the usual number were present.

Nighthawks, chimney swifts and swallows migrated as usual. The May storm was disastrous to the first arrivals.

Robins arrived in Minneapolis March 21, in Duluth April 6. As usual there were a few very early arrivals. The first reported bluebird was seen by M. E. Herz, March 18.

The Blue-grey Gnatcatcher is nesting again at Frontenac. One was seen at Northfield, May 1, by Lewis Barrett.

A Townsend's Solitaire came to the yard at the home of Walter J. Wilwerding in south Minneapolis, February 20. It reappeared several times, the last reported date being April 26.

Many records of large flocks of Cedar Waxwings were received especially in the Twin Cities and surrounding area. A flock numbering thousands filled the trees along the West River Road in Minneapolis, April 4, reported by Walter Jiracek. At various times in April several small flocks of Bohemian Waxwings were seen in Minneapolis by R. E. Cole. They were in Duluth in March according to Joel Bronoel.

A very heavy wave of Myrtle Warblers passed up the Mississippi Valley, April 28. Those that went on to the north probably perished in the May 1 storm. Many remained and with the next large waves of Myrtles they piled up to exceptionally large numbers. May 15, there was a wave of late warblers, and observers at Frontenac were favored. They saw nearly all species and many individuals of each of the rare ones. Warblers were beginning to arrive in the Duluth area by May 22.

Birds of the blackbird family migrated as usual, except the Red-winged. Some of them arrived very early. On February 24 hundreds of them streamed past a given point for 10 minutes. Very few of this species was seen here in the

winter so undoubtedly it was an early migration.

To date only a few dickcissels have been seen.

Evening Grosbeaks still came to feeders, May 22, at the Harvey Putnam and John Bero homes in Duluth.

White-throated Sparrows appeared in Minneapolis April 24, and were still passing through in small numbers, May 28. Slate-colored Juncos migrated in very large numbers, the peak in the first week in April. Migration of other species of sparrows was normal.

Lapland Longspurs were present in large flocks in April. They were reported from all sections of the state.

A very early record for the American Pipit was received from William Peiper. He saw six in the outskirts of South Minneapolis, April 24. — *Minneapolis, Minn.*

The Book Page

Summer Birds of Western Ontario — L. L. SNYDER. Transactions of the Royal Canadian Institute, Vol. 30, Part 1:47-95. 1 map. 1953.

This is one in a series of regional studies of summer bird-life in Ontario, prepared by the staff of the Royal Ontario Museum of Zoology and Palaeontology, Toronto. The present paper deals with an area transecting the District of Kenora along the Canadian Pacific and Canadian National Railways and extending along the former to Savanne in the western portion of the District of Thunder Bay. Museum parties carried out field work in the area during the summer months of 1937, 1947 and 1949. Their work was supplemented by the observation of several competent observers who had spent varying periods of time within the area.

A total of 170 species are listed in which 150 are considered extant summer residents. Specimens of 117 species were obtained. Definite breeding evidence was secured for 95 species. In addition to wide-ranging species, 15 percent are characteristic of austral rather than boreal regions and 10 percent were characteristically boreal. It is in this region that many species reach their most northern distribution in Ontario. Many of the species represented are primarily western in distribution or are represented by western races. Only the Black Duck and the Black-throated Warbler can be considered as eastern species extending their range westward.

This paper should be of special interest to ornithologists living in western Ontario as well as to those residing in Manitoba and Minnesota. The necessity of so markedly condensing the available material is to be regretted. One cannot understand the omission of material provided by A. G. Lawrence, particularly when it was readily available. No one has a greater knowledge of the birds of this region than the editor of "Chickadee Notes" which has appeared in the Winnipeg Free Press for the past 33 years. — *A. E. Allin.*

The Canadian Lakehead

Edited by
A. E. Allin

A physician has described boredom as the great American disease. There was no excuse for Lakehead naturalists to be bored during the winter of 1953-54. The Audubon Screen Tour Season concluded on March 1, with Allan Cruickshank's presentation of "Sea Cliffs of Santa Lucia." On February 20, the local naturalists, accompanied by a party from Dryden, 200 miles to the west, joined groups from Minnesota for their annual winter meeting at Pigeon River. After observing the birds between Fort William and Duluth during the day, 102 naturalists had dinner at Pigeon River Hotel and were shown pictures of the life histories of the woodcock and the Ring-necked Pheasant as well as "Survival Perilous", a picture dealing with the present status of the woodland caribou. The annual dinner-meeting of the Thunder Bay Field Naturalists' Club was held on March 11 with Gregory Clark, well-known Canadian newspaperman, fisherman, naturalist and philosopher as guest speaker. Mr. Clark described as "aesthetic shocks" those observations which we consider as the highlights of our trips.

We have never believed one can be a good ornithologist without also being a general naturalist. Mr. Clark again brought this matter to mind in the above address. At a recent gathering of naturalists in Southern Ontario he was dismayed to note that most of the members could recognize all the birds present, but that few could distinguish a pine from a spruce, or a poplar from a birch, and many were at a complete loss when it came to identifying the flowering plants and shrubs. It may not be amiss, therefore, to utilize space in what is primarily an ornithological journal to discuss recent changes in the status of certain mammals at the Canadian Lakehead. Undoubtedly there are inter-relations between these and the changing status of certain birds although such changes may not be immediately evident.

Two new animals have recently been recorded in Thunder Bay District, viz. the cougar and the coypu. Although the records are usually sight ones only, the cougar seems to have spread recently into areas where it was formerly unknown or where it has been absent for a prolonged period. For the past year or so, increasing numbers of sight records have been made of the cougar in the area west of Fort William. Some are undoubtedly erroneous, but it would appear that some are authentic. The presence of the coypu or nutria has been confirmed by the trapping of four specimens in the Whitefish River, 25 miles southwest of Fort William. The first was taken in May, 1953, near Hymers and the second eight miles further up the Whitefish River on November 29. At least two more were taken near Hymers in the early part of 1954.

Snowfalls in recent winters, with the exception of 1952-53, have been very heavy and the total for the winter of 1953-54 was double the normal. Not only has the fall been heavy but it remained for a long period of time, large amounts being present in the forest regions until late April. It is feared the effect will be disastrous for the deer population which has steadily declined in recent years after building up a high population in the forties. This animal only entered this region some 60 years ago and its further increase appears more dependent on the depth of snow than on any other factor. Many starve, particularly fawns and does.

Possibly fewer fawns are born to malnourished does and fewer of those born are raised by such mothers. The decline in population coincides with an apparent increase in numbers of timber wolves, and it is too easy to attribute this decline to predation alone rather than to natural causes.

The moose on the other hand is again increasing in numbers after a disastrous decline a few years ago. It is now necessary to have an open season since their numbers are exceeding the food available on their ranges. Formerly the woodland caribou was an abundant animal north of Lake Superior, but recently they have been scarce and this scribe has never seen one despite thousands of hours spent in the field. It now appears that the caribou may again be increasing in numbers. Seven were seen at Pays Plat, near Rossport, on February 13 and four at Longlac on February 25. On the islands of Lake Nipigon, 44 were seen during March.

Not only was the snowfall heavy during January (42 inches compared with an average of 16.2) but the mean temperature of 0.1° was 6.7° below normal. The only interesting record for the month was a Glaucous Gull seen at Port Arthur on January 21 by D. Beckett. Few Herring Gulls were present despite the hundreds occurring along the open lake above and below Grand Marais. February was particularly mild, the mean temperature of 19.9° being 11° above normal and approaching the all-time high of 21.6° for 1931. Few wintering finches were present, the first Common Redpolls being reported on February 12. The weather continued mild throughout March. A pair of American Mergansers were present on the open waters of Dorion fish-hatchery on March 7 and a Bald Eagle was reported on March 30. Herring Gulls and crows returned on March 14 and 18 respectively, and an early migration was anticipated. However, a 6.6 inch snowfall on March 26 and a low at the Lakehead of -27° on March 28 temporarily retarded it. Dead Saw-whet Owls were found on March 4 and March 22 and a dead Richardson's Owl on March 28. The latter is a rare species and it is difficult to explain the numbers found dead in early spring and late fall.

The weather throughout April was about average although snow was still present in the bush and inland lakes were still solid at the end of the month. This resulted in an unusual congregation of water-fowl in the local harbour. These consisted principally of Greater and Lesser Scaup, American Golden-eyes, Mallards, Blacks, and Pintails. Baldpates arrived early and in greater numbers than on any previous occasion and Redheads are quite common. The Canvasback is a rare spring visitor but was seen on April 20, and for the remainder of the month a considerable number were present. For the first time we heard their hoarse croak and believe it is much more distinctive than one would suspect from a study of literature. We expect to see a small flock of Whistling Swans in April and five appeared. Unfortunately one was shot. At Cloud Bay, 38 Whistling Swans were seen. Geese were more common than usual, possibly because the northern lakes and streams remained frozen. A flock of over 600 Canadas were reported on Kab Lake, northeast of the Lakehead, on April 25. Both Greater and Lesser Canadas were reported locally. C. E. Garton and R. Robb saw three White-fronted Geese on April 23, the third local record.

A Snowy Owl which had wintered at a local elevator, feeding on rats and mice, was still present at the end of April and others were seen during the month. This has been a Northern Shrike year and they were quite common in mid-April, one or more being seen on every trip. The Ring-billed Gull is an uncommon visitor, usually only two or three being seen in late April. This year they appeared on April 16 and remained

in considerable numbers until the end of the month. It is possible a violent west wind on April 17 which reached a peak at 3:10 p.m. of 45 miles per hour with gusts up ot 72 miles may have had some effect on migration.

The majority of April migrants arrived earlier than expected so that arrival dates were three days earlier than the 1938-1953 average. Record early arrival dates were recorded for the following species in addition to the Semipalmated Plover: Great Blue Heron, April 6; American Sparrow Hawk, April 8; Whistling Swan and Belted Kingfisher, April 10; Baldpate and Ring-billed Gull, April 16; Rusty Blackbird, Blue-winged Teal and Broad-winged Hawk, April 17. Most unusual was a Semipalmated Plover seen by C. E. Garton, R. Robb, and W. Addison on April 27. The previous early was May 18, 1952 and their average date of arrival has been May 24.

The Lakehead cities received a rainfall of three inches on April 30 and May 1 and the weather was relatively mild. The rain continued as a drizzle early on May 2. Palm Warblers returned, Greater and Lesser Yellowlegs were seen on every puddle, and phoebes occupied old nesting areas. Tree Swallows were feeding on unidentified material on the surface of sheets of foam floating on the flood waters of the Kaministiqua River below Kakebeka Falls. On the afternoon of May 2 it began to snow and 10 inches fell within the next 24 hours. The temperature fell to 16° on the early morning of May 4 and it continued cold for several days. By May 7 a total of 14 inches of snow had fallen. This unusual May storm apparently coincided with a mass migration of robins, Hermit Thrushes, Rusty Blackbirds, Slate-coloured Juncos and White-throated Sparrows as well as lesser numbers of other species. But the ground in fields and woods was now covered with snow. The only exposed areas were the highways and here the returning migrants congregated in great numbers. Possibly they were weakened by cold and hunger for they seemed unable to avoid speeding cars and thousands were killed. Keith Denis, returning from Duluth on May 3, estimated he saw 12 dead birds per mile between Duluth and Reservation River. These were principally robins and juncos with a few White-throated Sparrows, Rusty Blackbirds, and Hermit Thrushes. Six birds were removed from the grill of their car at Pigeon River. In the next few days other observers reported many birds killed by speeding cars or apparently from starvation or cold. More than 100 birds were brought to the principal by the children of one school alone. Dead birds ranged from a great Blue Heron to a Ruby-crowned Kinglet, but the majority were juncos, White-throated Sparrows and Hermit Thrushes.

The low paths in Vicker's Park, Fort William, filled with water by the recent heavy rains, froze solid and the grassy areas were deep in snow. Here we found Woodcock and Wilson's Snipe huddled in the snow beside the pathways. Hundreds of Rusty Blackbirds congregated in the trees. There was little or no food for any of these species.

The daily newspapers carried heavy-type front-page articles appraising the citizens of the disaster which threatened the returning migrants. The radio joined them in appealing to the citizens to feed as many as possible. Soon nearly every lawn had patches cleared of snow, and food of every type was made available. Mr. Widnall, park controller, dug up flower beds in Vicker's Park and stated the Wilson's Snipe congregated on the exposed earth immediately. Lorne Ohlgren, owner of a sports store, contributed a supply of dew-worms (nightcrawlers) which he had in stock for the opening of trout fishing. Hundreds of pounds of weed seeds were spread out along the roadsides and about the elevators. Possibly the lives of few birds were saved but no other event has ever

made the citizens of the Lakehead as conservation-minded. What happened to the phoebes and Tree Swallows was undetermined but none was seen on a trip through suitable areas on May 9.

Migration during this early period was definitely retarded, although by May 8, the occasional Olive-backed, Grey-cheeked and Wilson's Thrush, White-crowned, Fox, and Chipping Sparrow had been reported. We heard our first Fox Sparrow in full song. Lapland Longspurs, Snow Buntings, Tree Sparrows and juncos were abundant. The majority of the juncos, of course, were Slate-coloured, but on May 2 and 3 many red-backed specimens were seen which we identified as Oregons. In recent years the Oregon Junco has occurred more and more frequently in southern Ontario, and Marion Smith brought us a dead bird in October, 1950. Most unusual, however, was a European Widgeon which S. Robb and I spotted in the Fort William Harbour on May 1. The following day it was seen and studied by several of us at close range. It was still present on May 8. The only previous Lakehead record for this species was one we saw in the Port Arthur Harbour on May 12, 1950. — *Regional Laboratory, Ontario Department of Health, Fort William, Ontario.*

MINNESOTA ORNITHOLOGISTS' UNION ANNUAL MEETING

The first annual business and paper session of the Minnesota Ornithologists' Union will be held Saturday, December 4, 1954 in the Museum of Natural History, University of Minnesota.

M.O.U. FIELD TRIPS

The M.O.U. field trip committee has announced the following field trips:

North Shore Trip. Date has not been set, but will be either on the Lincoln or Washington Day week end.

Frontenac. May 14 and 15, 1955.

Itasca Park. This will be the first campout meeting. It will take the place of the spring meeting and will be devoted to field trips and evening entertainment. It will be held on the Memorial Day week end.

Hawk Count. As usual this will be held on the lookouts of Duluth on the second and third week ends of September.

Notes of Interest

MOTHER LAKE — RICH IN BIRDING OPPORTUNITIES — For many years Mother Lake, an extensive swamp in southern Minneapolis, has been a favorite and productive breeding area for water birds and other species which frequent habitats as found in swampy, boggy terrain. The value of this area as a place for the observation, enjoyment, and study of bird life has long been recognized by those interested in nature, or in birds, in particular. The nearness of this great swamp to dense population centers and its easy accessibility (one can make many observations from the car window) makes it a much frequented spot. On any visit during May, June, or July, you will find observers peering at the abundant bird life from car windows through binoculars, and you can see others trudging along wet, grassy margins and into bushy spots to hunt out the more elusive species of the feathered tribe. The following summary gleaned from field notes about Mother Lake, gathered during a period of about 10 years, may indicate to some extent the abundance and unusual variety of bird life in this one area.

In early spring, you can always see the Common Loon, and often the Horned Grebe. The rarer Holboell's Grebe has been recorded several times. Cormorants arrive early and remain until the end of May or longer. Regular nesters are the Great Blue, the Little Green, and the Black-Crowned Night Herons, as also the Sora and Virginia Rails, the American Bittern and the rather seclusive Florida Gallinule. The Thunder-Pumper (American Bittern) produces its primitive music in the midst of reedy thickets, while its tiny cousin, the Least Bittern, shows itself only occasionally, and lucky you are if you happen to be in the "line of sight" when it appears out of the dense cover of reeds. During periods of low water, when extensive mud-flats appear, you will find an abundance of waders, such as Killdeer, Wilson's Snipe, Lesser Yellowlegs, Greater Yellowlegs, and Solitary, Spotted, Least, Pectoral, and Semi-Palmated Sandpipers. The following species have been seen less frequently: Semi-Palmated and Black-Bellied Plovers, Long-Billed Dowitcher, Red-Backed Sandpiper, Ruddy Turnstone, Wilson's and Northern Phalaropes, American Knot (once), Sanderling (once), and Stilt Sandpiper (once).

If you wish to see broods and broods of ducklings of all sizes led about on the water by their mothers, by all means make several visits to Mother Lake during July. During this month, you will see the coot and Pied-Billed Grebe mothers caring for their tiny, fluffy young. You will enjoy seeing a little midget of a young grebe ride piggie-back on "Mama", or to see how adept these babies are at diving. On one of those productive July visits at Mother Lake, I found broods as follows: Mallard — 13 broods, Blue-Winged Teal — 6 broods, Ruddy Duck — 2 broods, Pied-Billed Grebes — 8 broods, and coot — 15 broods. During July, too, you will find Black Terns and Forster's Terns nesting here. You can see some of the Black Terns' nests not far from Cedar Avenue thoroughfare, which provides the easiest access to the birds. You may see eggs on some nests and newly-hatched young on others, and you will see many adults busily carrying food to their young. For this trip you had better wear a hat, as the Black Tern becomes quite noisy, ferocious, and daring in the protection of its nests and babies.

If you want a "skeptic" to see what "birding" is like, take him along on such a July visit to Mother Lake. You may find him surprised and even thrilled at seeing such an abundance of water-birds and perhaps touched by the daintiness of those tiny but agile and ever-hungry balls of fluff as they surround their mothers, eager

for the hand-out of delicious morsels brought up from the deep. He will enjoy the comic spectacle of an adult Ruddy Duck performing its characteristic twitch of head and bill and imitated to a "T" by a line of five youngsters following as in tow. The hoarse "crowing" of the Yellow-Headed Blackbird may amuse him because it sounds a bit like the initial efforts of a young rooster. Sometimes a trip like this opens the eyes of the uninterested, to the fact that nature study *can* be interesting.

Many species of northern ducks can be seen here during the early spring migration. Caspian Terns, too, are regular spring visitors. Various observers have found the Franklin's Gull at Mother Lake during fall or spring migration. American Egrets have been observed occasionally. Mr. and Mrs. Rice of the St. Paul Audubon Club in May, 1951, reported a flock of 25 to 30 Least Terns over Mother Lake. The writer saw a part of this flock a few days later. This same species was reported in mid-June by another observer. Coming to other birds nesting, or at least foraging, in this area, we should mention the pert Marsh Wrens, Long-Billed and Short-Billed, the Yellow-Headed and the Red-Winged Blackbirds, the Marsh Hawk, the Sparrow Hawk, the Ring-Necked Pheasant, the kingfisher, the kingbird, the Least Flycatcher, the five species of swallows commonly found in Minnesota (Tree, Barn, Rough-Winged, Bank Swallows, and Martins). During the spring migration, one can find some of the northern warblers in the alders and willows of the slough margin. Blackbirds, flickers, catbirds, thrashers, grosbeaks, cuckoos, robins, pewees, Cedar Waxwings, Red-Eyed Vireos, Yellow-throated Vireos, Yellow Warblers, Northern Yellowthroats, Bronzed Grackles, cowbirds, Song Sparrows, and goldfinches, are usually found along the tree-fringes and fields during spring, summer and fall.

In late fall, Lapland Longspurs and Snow Buntings have been seen on the exposed shore-flats and adjacent, level lowlands. Here, too, in season, you are likely to find a fair number of meadowlarks and occasionally a cheery, sputtering, bobolink hovering near its mate and nest hidden somewhere in the field grasses.

Mother Lake with its bushy and grassy fringes has long been a training ground for beginning ornithologists and a fruitful field for observations for the more advanced students. Let us hope that the recent rumors of the planned destruction of Mother Lake are unfounded, and that this and other similar locations within our metropolitan area can and will be preserved. Such localities, though eventually surrounded by densely-settled residential areas and by commercial and industrial establishments, will represent a bit of nature unchanged, which will be conveniently available to old and young for their enjoyment, relaxation and for the pursuit of a clean, educative, health-promoting, and ennobling hobby.

A. C. Rosenwinkel, St. Paul

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TOWNSEND'S SOLITAIRE IN MINNEAPOLIS AREA. There have been few recorded observations of Townsend's Solitaire in Minnesota. It is quite possible that it is not an uncommon visitor and that people have seen it and have not recognized it.

On the morning of February 20th, 1954, I looked out of my east studio window in Edina to see a gray bird in the mountain ash tree. My first thought was that it was a catbird, but I knew no catbird would or should be in Minnesota at that time of the year. Then I saw some white edgings on its tail feathers. I thought at once that here was my first solitaire, but before I could get the glasses and study it carefully it was gone. Twenty minutes later it was back. This time I had the glasses and saw that it had the white eye ring and short slender bill of the solitaire.

I could also see the wing markings and the white on the tail feathers as it moved about to eat the mountain ash berries that still hung thickly on the branches.

That day it came seven times and I took several kodachrome pictures of it through the window. I also called Dr. W. J. Breckenridge, who came at 3 o'clock to try for motion pictures of it, but it failed to return that day.

I left the city the next day and was gone for a week. Mrs. Wilwerding saw it once on March 3rd and again on March 4th. On March 5th I saw it come to the tree at twenty minutes to 7 A.M. and again at 7 o'clock. Mrs. Wilwerding saw it later that day when it came twice in the afternoon.

We were too busy to keep watching for the bird to appear and did not see it again until March 21, when I took more kodachromes of it. This time it flew to the ground where it sat for some time preening its feathers and I had an excellent opportunity to study it. There was no question about its identity. On the 22nd it came early, at about 6:30 A.M. and again at about 10 A.M.

The last record I have of it at this writing, is on March 26 when it again sat on the ground preening its feathers and picking at mountain ash berries that had fallen to the ground. It flew back and forth from one spruce tree to another and then flew away to the east and did not return that day. We noticed that when it flew to the west to the woods near the creek, it would return again and again, often at twenty minute intervals. When it flew east it did not come back again that day. Perhaps other mountain ash trees to the east may have attracted it. Our tree, heavy with berries that lasted through the winter, apparently attracted it in the first place. Cedar Waxwings have been in that tree much of the winter and spring. It was while looking for the waxwings that I first saw the solitaire.

My kodachrome pictures have since been developed and have been sent to Dr. Breckenridge who agreed with the identification. *Walter J. Wilwerding, Edina*

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A WESTERN MINNESOTA FIELD TRIP

EDITOR'S NOTE: The following account, contained in a recent letter to me from William Pieper, is a report of a field trip in 1954 by members of the Avifaunal Club. It contained sufficient interesting information as to be suitable for publication in the FLICKER, with almost no editing. — WJB

We arrived in Wheaton at dawn on May 29. We saw two Western Grebes and — of all things — a Whistling Swan. Several species of shorebirds were there, but nothing unusual. We drove up into Wilkin Co. along the Minn.-No. Dak. border looking for some of the more western species, but it was not until we got north of Doran that we were successful in locating the first of several interesting birds. We took a gravel road north out of Doran instead of the highway into Breckenridge. This road is not shown on most maps, but it runs north for a couple of miles, angles west for a ways, then turns north again and crosses the Ottertail River. Just before we turned north to cross the river we sighted a Burrowing Owl standing close to the road in a pasture between the river and the road. There was a hole nearby which was probably the owl's, but the fellows jumped out of the car and frightened the owl away before we could make sure. We saw a Hudsonian Godwit near Foxholm. From there we drove west out of Rothsay to Highway 82, then north on 82 to Barnesville. Just before we entered Clay Co. on the east side of the highway we spotted several Chestnut-Collared Longspurs. We worked the field they were in and turned up a Baird's Sparrow and found a Savannah Sparrow's nest. In the afternoon we reached Buffalo State Park and found a Ferruginous Rough-leg soaring over the area. It remained in view for almost all the two or three hours we were there. It had a habit of hovering like a Sparrow Hawk or an

American Rough-leg. Its head was white all over and was in every respect a typical, normal-phase bird. We saw two Swainson's Hawks, one in the melanistic phase. We also found both Baird's and Leconte's Sparrow at Buffalo State Park. We saw or heard nothing of Sprague's Pipits anywhere on the entire trip although we had a good day for them (lots of Horned Larks singing), and we followed the glacial beaches and prairie areas all the way into Kittson Co. We saw a Richardson's Ground Squirrel in Wilkin Co. and a Franklin's Ground Squirrel in Clay Co. within a few minutes of one another near Barnesville, which gave us fair grounds for comparison of the two species. After spending the night at Crookston, we drove north to Warren and east to Mud Lake where we saw another Whistling Swan, Holboell's Grebes, another Hudsonian Godwit, Northern Phalaropes, and a deer. At Twin Lakes in Kittson Co. we saw still another Whistling Swan, one Snow Goose, and two Philadelphia Vireos, but no Nelson's Sparrows or Yellow Rails, although I feel certain we were in the same meadow where they were found by Drs. Roberts and Breckenridge in 1928. The water was about 4 to 8 inches deep and was grown up in grasses about knee deep. We flushed a Marsh Hawk from its nest in this meadow. In the afternoon we continued on to the Red Lake Game Refuge just north of camp. When we reached the camp we took off six abreast into the spruce bog north of the road. We spaced ourselves about a half block apart and plowed in. Norrie Jones was about two blocks west of me when he found a Spruce Grouse. He kept calling as we plunged towards him through the swamp. We probably looked funny jumping from hummock to hummock while getting over to where Norrie was standing, but we all got to see the bird.

Later, near dusk, George Fisher and I were walking along an old logging trail west of Norris Camp when we came across another Spruce Grouse which was whirring up into first one tree, then hopping down to the ground, then whirring up into another tree, then down again and so forth. I'm not sure whether this was a courtship performance, or if it was looking for a roosting place. (*Ed. note.* This, undoubtedly, was courtship). We drove to Baudette for the night. The 31st found us driving south towards Red Lake on Highway 72 where we saw a Red Fox and a Wilson's Snipe. We saw nothing unusual during the last day (May 31) until we reached Sand Dunes State Forest near Zimmerman. There we found Orchard Orioles, a Towhee nest with four cowbird eggs and two Towhee eggs, and a Black-billed Cuckoo. The cuckoo was my 250th species of the year in Minnesota.

Editor's Note: This list together with 2 additional species seen later near Winona, brought Pieper's list to 252 species, not including sub-species, seen in Minnesota in five months. This is a remarkable record for other field workers to shoot at.

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SUSTAINED RUN OF A SNOWSHOE RABBIT. On a sunny, warm (40°) day during the 1953 deer season, Dr. Risbrudt and I were posted on a muddy back woods road near Pike Lake out of Grand Marais, Minn. I was sitting in the center of a 700 yard straight stretch with a slow 350 yard rise to the east and west. At the limit of my easterly vision the road took a north bend, and 150 yards beyond this in a place out of danger from my rifle was posted my partner. As an aid to estimating trajectory the road had been paced, and was marked with sticks, stones, etc.

Only an occasional Whiskey Jack was seen, and things were so dull and monotonus that Dr. Risbrudt was interested in seeing from his easterly limit of vision (100 yds.) a Snowshoe Rabbit coming down the center of the road at a slow but steadily paced run. The animal passed the hunter who, of course, sat quietly, and went on around the bend toward me. I picked up the white creature immediately, and, until I put my 4 power rifle scope on it, assumed it was a weasel. Without any

change in speed a very mud be-spattered rabbit soon ran past me and continued westerly to the 350 yard marker where he suddenly popped into the brush. This rabbit unpursued by anything, so far as we could see, covered 950 yards without a pause or change of pace. *V. L. Whipple, St. Paul, Minn.*

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THE POCKET MOUSE AND THE RED-BACKED MOUSE FROM DAKOTA COUNTY, MINNESOTA. The recent review of the status of mammals in Minnesota (Gunderson and Beer, *The Mammals of Minnesota,* University of Minnesota Press. pp 1-190, 1953) indicates that there are many gaps in our knowledge of their distribution. Recent trapping at Rosemount, Dakota County has provided specimens of the Pocket Mouse (*Perognathus Flavescens*) and the Red-backed Mouse (*Clethrionomys Gapperi*) which extends the known range of these species in Minnesota.

The pocket mouse is generally considered to be a rare mammal in Minnesota and is known from but a few localities. Previously, it had not been taken east of Watonwan County south of the Minnesota River. North of this river it has been taken as far east as Anoka County. The present record adds to its known distribution in a southeasterly direction. In all four, specimens have been trapped, but only one of these was in a condition suitable for making into a study skin.

The Red-backed Mouse is generally associated with our northern forested areas but may also be found in some of the woodlands south of the original conifer belt. The present specimen represents an extension in its known range in Minnesota. The nearest localities where this species had been recorded are Nicollet County to the southwest and Anoka County to the north.

The specimens are deposited in the collection of the University of Minnesota Natural History Museum. *James R. Beer and Charles F. MacLeod, University of Minnesota, St. Paul.*

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HAIRY WOODPECKER NOTES. This year the Hairy Woodpeckers nested in a large box elder tree across the alley. They had not been especially faithful to the suet stick, but during the last ten days of May were noted making frequent trips with pieces of suet to the nesting tree. About the first of June these visits seemed to have stopped, but on June 15 the birds were quite noisy in the neighborhood. This was believed to be an indication that the young were out.

The next morning the male and a young female (?) came to the suet about 6 a.m. The male fed the young one repeatedly while she hopped about to various places, including the window screen, but made no move to feed herself. Half an hour later a young male (?) came and helped himself generously to suet. He paid no attention to movements in the house, quite in contrast to the old birds which are decidedly wary. He was seen again later in the day.

The young male was seen at the suet again later in the day, but no further visits were observed until June 21 when the male was again feeding the young female. The latter was much more active than before and spent considerable time working on dead limbs, but made no attempt to visit the suet. *O. A. Stevens, Fargo N. D.*

❋ ❋ ❋

MOURNING DOVE NEST ON THE GROUND. On August 1, 1954, I found a Mourning Dove's nest with young about a week old within a few feet of the Great Northern Railway tracks near Sabin, Clay County, Minn. The nest was placed at the foot of a clump of goldenrod in completely open country. *O. A. Stevens, Fargo, N. D.*

Call Notes

William Pieper, whose account of the Avifaunal Club's northwestern Minnesota trip last spring appears in this issue of the *Flicker*, has recently accepted a business position in Omaha, Nebraska (Apt. 4, 618 south 32nd Street). Bill has been one of Minnesota's most ardent field observers and we are sorry to have him leave the state. He hopes to eventually return, but in the meantime he is laying plans to organize another Avifaunal Club in Omaha. Good luck to you, Bill.

* * *

Correction: The article on Minnesota bird banders in the December, 1953 issue, page 155, incorrectly gave Mrs. Melvin Jacobson's address as Jackson, Minnesota. This should read Owatonna, Minnesota.

* * *

We are short many of the latest officer lists of the affiliated clubs. Please have your secretary send them in as soon as they have been elected.

* * *

It's old news, but Dr. and Mrs. Pettingill, Jr., have returned from the Falkland Islands. Dr. Pettingill is in Maine revising his ornithology manual.

* * *

I think that it is appropriate at this time to express the debt of gratitude that the M.O.U. owes the Printing Office at the State Reformatory at St. Cloud. If it had not been for their willingness to take on the printing of *The Flicker* at a time when the publication funds were at low ebb, there probably would have been no publication. Our thanks go to the prison officials for making the last few years possible.

* * *

Several members of the M.O.U. attended the annual meeting of the American Ornithologists' Union at Madison, Wisconsin, September 8-12. Among Minnesotans attending the convention were: Dr. James Beer, Dr. Walter Breckenridge, Patsy DeBell, Beth Doeringsfeld, Dr. and Mrs. P. B. Hofslund, Mrs. H. A. Northrop, and Dr. Dwain Warner.

* * *

J. S. Findley is the new editor of the *South Dakota Bird Notes*. Mr. Findley is well known to many M.O.U. members as he has accompanied them on several trips. This fall he and Mrs. Findley took part in the September 20 hawk count at Duluth.

* * *

John Pavek of Hopkins and 17 members of the Minneapolis Bird Club spent the Memorial week end camping in Flandreau State Park at New Ulm. They counted 93 species of birds, a red fox, and 'millions' of frogs.

* * *

Photo credit for the Canada Jay on page 135 of the December, 1953 issue of *The Flicker* should have been given to Harvey Gunderson, assistant scientist at the Museum of Natural History.

* * *

Correction: The title of Miss Palmer's and Miss Lieske's article on page 139 of the December, 1953 issue should read, "Bird Watching on a Trip to Churchill, *Manitoba*", not *Minnesota*.

* * *

More than likely this issue will not have reached you before the first winter paper session. It is hoped that this will be an annual part of the M.O.U. program. The separate meeting combining the paper session and the annual business meeting will free the Spring meeting for field events. An arrangement

of this nature has been successful in the Michigan and Wisconsin ornithological societies. Our spring meeting will be held for the first time in Itasca State Park over the Memorial day week end. This will be strictly a field meeting with planned excursions and evening entertainment. There will be no formal business session or paper sessions to interrupt the field events. Full details on this and other planned field trips will appear in later issues. *P.B.H.*

Minnesota Ornithologists' Union

Affiliated Societies

ALBERT LEA AUDUBON SOCIETY

President, Helen Johnsrud; Vice-president, Iva M. Loy; Treasurer, Loes P. Scott; Recording Secretary, Esther Jorgenson; Corresponding Secretary, Mrs. C. Flugum.

Meets the second Tuesday, September through May.

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President, J. K. Bronoel; Vice-president, John Hale; Secretary, Doris Bronoel; Treasurer, Harvey Putnam; M.O.U. Representative, Evelyn Putnam.

Meets at the University of Minnesota, Duluth Branch Science Building, the second Thursday of each month, September through May.

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President, John Neihart; Vice-president, John A. Hall, Sr.; Recording Secretary, Miss Katherine F. Jensen; Corresponding Secretary, Miss Berghild Berntsen.

Meets at the St. Paul Library.

The Flicker

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THE FLICKER

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THE COVER

Marsh Harrier — (Photo by Stanley Stein)

THE PRESIDENT'S PAGE

Thoughts While Sitting In A Duck Blind

Probably many of us have read a newspaper column that had the familiar title "Thoughts While Shaving". To a naturalist it is just as apropos to entitle a column "Thoughts While Sitting In A Duck Blind". Often the ducks do not fly to the decoys or over the pass so this allows time for meditation.

Some people contend that the died-in-the-wool duck hunter is a peculiar breed of *Homo sapiens.* Perhaps they are partially justified in their belief, inasmuch as the nimrod must arise in the early hours of the morning, exert himself physically with boat and decoys, and sit motionless for hours in his blind in all kinds of inclement weather. Sometimes he never fires his shotgun, and needless to say frequently he does not bag any game.

Why, then, does the duck hunter hunt the web-footed clan? Have you ever been thrilled by some unusual birding experience? Some people especially enjoy observing warblers, owls, shorebirds, hawks or some other kind of wildlife. The duck hunter enjoys the sight of lots of ducks. Have you seen the sunrise on a duck marsh? Have you watched Canvasbacks skirt a point just outside of the decoys, or Redheads and Ringnecks trading back and forth over a pass, or Mallards gliding into the decoys with wings set and feet outstretched? Have you heard the clamor of wild geese overhead while circling your blind, or listened to the whistling wings of Bluebills as they came zooming into the decoys like a squadron of jet planes? The sight of a Whistling Swan alighting in our decoys within 30 yards of our duck blind, provided me with a thrill that I will never forget. Needless to say the duck hunter, while in the out-of-doors, has experiences that are enjoyable and which he can relive after his hunting trips.

A hunting trip offers opportunities to enjoy some of Minnesota's 10,000 lakes, the brilliant colors of autumn foliage, the fall bird migrants, and it presents a chance to use a camera to take a few shots of natural history subjects.

Many duck hunters and some bird watchers are asking the question, "What happened to the ducks in Minnesota this fall?" The opening day and early season duck hunting was a marked disappointment to many sportsmen as some of the better duck lakes had very few local ducks and the early migrants failed to put in an appearance. In some localities geese were reported as being fairly common while ducks were extremly scarce. Normally the reverse is true. Is our duck population diminishing rapidly? Are the ducks changing their migration routes and passing east of Minnesota, or west of our state through the Dakotas?

In-as-much as I was in the East this past summer I did not do the usual amount of field work in studying breeding waterfowl. However, on trips into southwestern and northwestern Minnesota in late August and early September it was my impression that there were very few ducks on the marshes and lakes with the exception of Mud lake in Marshall county in northwestern Minnesota. Some rather pertinent questions about our ducks come to mind. Is the breeding duck population of Minnesota at a low point? Has the drainage ditch and habitat destruction done irreparable damage? Is much of the good duck habitat of the state unoccupied by breeding waterfowl? Are we harvesting too much of the brood stock? It seems highly desirable for bird watchers, ornithologists, and duck hunters to ask the biologists of the State Conservation Department and of the U. S. Fish and Wildlife Service for the answers to these questions. If it is necessary to take drastic steps to rebuild our nesting duck population in Minnesota then such action should be forthcoming in the immediate future. — *Lewis L. Barrett, President*

Hawk Banding at Cedar Grove, Wisconsin

by

Daniel O. Berger

Twenty years ago several men from the Milwaukee Public Museum became aware of an interesting hawk migration pattern along the west shore of Lake Michigan near Cedar Grove, Wisconsin. They began to observe some rather unusual flights of migrant hawks — unusual in the sense that this particular portion of the flyway seemed to be an unexplained bottleneck for the migrating birds and, therefore, produced flights that were unduplicated further south along the lake. It was decided that if sufficient numbers of these hawks could be live-trapped an interesting banding program might be initiated. This was presently accomplished with the aid of such federal projects as the WPA and the CCC.

A small shack was built as a blind and later an addition which provided rather crude living quarters. For the most part only two battery-operated traps — called bow nets — were used. This same trap, only manually operated, was used several hundred years ago as the method of catching Passage Falcons to be sold to Falconers all over Europe. The banding station was practically abandoned during World War II and continued to be inoperative following the war due to a lack of appropriations. In order to keep the area available for future research and hawk banding it was made a state wildlife refuge in 1949. In 1950 the station was again opened on a part time basis by Helmut C. Mueller and the writer. Since that time the Bahr Creek Biological Station, as it is now known, has been in operation annually during the fall migrations. I might add that in 1953 spring migrants were also trapped during the months of March and April. Since funds are still lacking, the aforesaid along with Kenneth H. Kuhn are presently sharing the expenses connected with the project.

Since the state acquired the area, however, there has been a great increase in the number of ornithologists and visitors who come to the refuge to observe the migration and the banding operations. This is most unfortunate since these birds are very wary and show little or no interest in our lures when people are seen in or near the trapping area. To counteract this, the Conservation Department graciously authorized us to post the experimental area, requesting all visitors to watch the migration from nearby observation points and not to enter the trapping grounds without permission. Since that time we have received splendid cooperation from most ornithologists and our work has gone on unhindered.

Considerable expansion of trapping facilities has taken place since we reopened the station four years ago. At that time we simply operated two bow nets with comparatively poor success. A bow net consists of two semi-circular metal frames hinged together to form a complete circle. This framework is covered with a piece of fish net and is powered at the hinges by two coil springs. The bow net is mounted on the ground and one bow is folded back upon the other to set the trap. When released it springs over and envelops the bird. As stated before, these traps are released electrically by pushing a button in the blind. At the present time we are using five of the bow nets and eight "dhogazzas". A "dhogazza" is a fine, rectangular piece of net which is suspended vertically between two poles and is practically invisible when

more than 10 feet away. When a hawk, passing it at any of our five live lure-birds — two pigeons and three English Sparrows, hits a dhogazza the net collapses to the ground and the bird is hopelessly entangled. Sometimes the lure-bird itself is struck by the hawk, in which case it is caught in bow net.

The fall migration begins towards the end of August with the passing of a few Marsh Hawks — also known as Harriers — and an occasional Sharp-shin. The Sharp-shins, or Sharpies as we call them, are the first hawks to show up in any real numbers. The high point of their migration seems to be about the middle of September, although lesser numbers may be seen way through until the end of October. These later birds are mostly adults. It seems to be fairly well establishied with all species of hawks that we observe that the "birds of the year" (known as passage birds) go first and the adults follow. Both in 1952 and in 1953 the peak day for the Sharpie migration was the 15th of September. On that date in 1952 we observed as many as 1219 birds of this species.

The Red-tailed Hawks start in the beginning of September and gradually increase throughout the season with occasionally a spectacular migration of hundreds in a single day during November.

Broad-wings are almost always "Number 1" on the list of "hawks observed", but lowest on the list of "percentage caught and banded." They migrate in large milling flocks during the second half of September. Often several hundred may be seen in one flock high in the sky, and we have seen as many as 7462 go by in one day. That day, September 20, 1952, proved to be conducive to good Broad-wing movements throughout the Great Lakes region and the New England states. At Northampton, Mass., 1700 were counted; also 485 more at New Paltz, N. Y.; 4359 along the Kittatiny Ridge in New Jersey; and the amazing figure of 24,683 in Elgin county, Ontario.

The Cooper's Hawk, not too common a migrant in fall, makes its appearance during the second week in September and is seen until the end of October. This bird is far more numerous during the spring migration. A brief study of the table submitted at the end of this report will corroborate this.

The Red-shouldered Hawk is normally very uncommon during migration, although one of the most common breeders in southeastern Wisconsin.

American Kestrels, also known as Sparrow Hawks, start coming through during the second week in September and abruptly finish near the end of September. We seldom see more than 15 or 20 in one day. This species is an important component of the spring migration and headed the list of number of birds caught in the spring of 1953. It is interesting to note that of the 29 Kestrels we banded that season, 22 were females.

The beautiful Peregrine Falcon usually migrates between the middle of September and the middle of October. Probably about 50 of these large falcons fly over our banding station every fall with seldom more than six or seven in a single day. A good westerly wind at about 20 miles per hour is very conducive to an excellent hawk flight. While most hawks simply are not in evidence during a bad day, the Peregrines show much less tendency to cease flying during unfavorable migrating weather. Because of this we always keep a steadfast watch even through the most unpromising days.

The smaller American Merlin, or Pigeon Hawk, appears during the second week of September; reaches its peak shortly after the middle of that month; and tapers off after mid-October. These small falcons are very swift and require skilled operation of the traps.

The last species to migrate is the

Rough-leg — first appearing around the middle of October. This bird often is seen on the move well into the month of December, however, we normally terminate trapping a few weeks after this bird begins. They seldom show any interest in our traps. To date we have only caught one Rough-leg.

The Harrier oddly enough is often the first migrant to be seen and yet, is still migrating in good numbers late in November. In regard to Harriers, there is a strong indication that the immatures of this species are the first to leave. Secondly, the adult females go and lastly, the adult males. Early in March, three months after the last adult males have left, they are seen moving north once more through Cedar Grove, thus marking the beginning of another spring migration. Slightly behind the males are the adult females — just reversing the order of the fall migration.

Ospreys are, for the most part, early migrants with only an occasional bird being seen after the first of October. Among the rarer birds to be seen are the Bald Eagle, the Goshawk, the Swainson's Hawk, the Turkey Vulture, and the Short-eared Owl. The most interesting of these is the Swainson's Hawk — a species common in the western states, but most unusual this far east. In the past three years we have trapped and banded more of these birds than had previously been recorded in Wisconsin ornithological history. On September 16, 1951 we trapped our first Swainson's. Two years later four more Swainson's were seen in two days — the 2nd and 3rd of September. Three of these were banded. Only one or two each of the other species mentioned above are normally seen each fall.

Due to constant refinement of our traps and trapping techniques and to the increased number of traps, definite progress is being made in the number of hawks we are catching. Typical of this progress is the fact that we caught almost one out of every five Sharpies this past season, whereas in 1952 we caught only one of every 16 birds. Another example is the increase from 4.4% for Merlins in 1952 to almost 21% in 1953. In Peregrines we improved from 15.2% in 1952 to 22.5% this year. It might also be mentioned here that the overall percentage of birds trapped has risen from 1.4% last year to 7.5% this year. This last figure is somewhat misleading though, since an unusually high or an unusually low broad wing count can make it fluctuate considerably from one year to the next.

In addition to studying migratory habits, bird longevity, etc, through banding we are also recording weights, wing and tail measurements, analysis of crop contents (in some cases), notations on eye color, unusual plumage, and the order of feather replacement in molting birds. This data will be the source of future research on sexual dimorphism; age determination; and the order of feather replacement during molting. Weather conditions are also noted several times each day.

Since our list of returns for the past two seasons is still far from complete the writer will not attempt a discussion of returns at the present time. However, one particular return regarding an adult female Cooper's Hawk banded last spring is of interest. This bird, though caught in spring, was going south at the time it was caught. This was nothing unusual for 28% of all hawks seen last spring were traveling south. The hawk was banded at Cedar Grove on April 20. Twenty-four days later it was trapped in Antrim county, Michigan. According to the return this was apparently the bird's nesting area. It seems most peculiar that the hawk was found migrating along the west shore of Lake Michigan when the ultimate destination proved to be across the lake in the state of Michigan. Since it is most unlikely that the bird would attempt to cross a body of water as large as Lake Michigan, it might be assumed that the bird

followed along the west and north edges of the lake and then crossed southward over or near the Straits of Makinac and traveled back down into Antrim county approximately 60 miles to the south. Another less plausible theory is that the bird back-tracked and rounded the southern end of the lake.

As for the future, the writer intends spending all of March and April each spring, and September and October each fall at the refuge. This will insure a complete recording of the migration pattern for comparison from year to year. Since improvements are still being made in our trapping apparatus, it is expected that our banding potential will continue to rise for the next two years at least. We anticipate banding not less than 420 hawks during 1954 and approximately 500 per year by 1955 when Mr. Mueller's expected return from the service will bring our staff back to normal.

Following is a list of the number of birds of prey seen and trapped at the Bahr Creek Biological Station during the past two years:

	Fall 1952		*Spring 1953*		*Fall 1953*	
Species	*No. Seen*	*No. Trapped*	*No. Seen*	*No. Trapped*	*No. Seen*	*No. Trapped*
Broad-wing	9018	1	3	—	1908	1
Sharp-shin	2268	130	37	1	933	168
Harrier	196	2	230	16	298	30
Merlin	229	10	21	2	91	19
Red-tail	105	15	64	4	243	28
Kestrel	38	1	188	29	41	5
Cooper's	34	3	116	18	48	10
Peregrine	33	5	1	—	40	9
Osprey	18	—	6	—	38	—
Rough-leg	5	—	14	—	10	1
Swainson's	4	3	—	—	—	—
Red-shoulder	4	1	33	3	7	1
Goshawk	2	1	—	—	1	1
Turkey Vulture	2	—	—	—	2	—
Saw-whet Owl	—	—	—	—	1	1
Screech Owl	1	1	—	—	2	2
Short-eared Owl	—	—	1	—	1	—
Bald Eagle	—	—	2	—	1	—
Unidentified	10	—	10	—	24	—
Total	11,966	173	728	73	3686	276

Milwaukee, Wisc.

Duluth Club Participates in Hawk Conservation

by

Joel K. Bronoel

According to local authorities, hawk-shooting on Davidson's Hill or Hawk Hill as we now know it, goes back many years and was a favorite sport of hunters during the heavy migration in September and October. Blinds were erected and mounted crows used as decoys. Hundreds of hawks, including protected Marsh, Red-tailed and Broad-winged Hawks were destroyed for sport each year.

Through the efforts of the National Audubon Society and state conservationists, the State Legislature was finally prevailed upon to pass measures protecting the so-called beneficial hawks during the session of 1945. Of this law, Dr. W. J. Breckenridge made the following observation, "Some people are of the opinion that there is not sufficient local support of the hawk protection bill to allow them to get any convictions on arrests made and that game wardens would lose a great deal of local support among sportsmen if they attempted to enforce the law. It is imperative that persons be apprised of the true facts regarding our hawk population if this hawk slaughtering, which is being reported from other points also, is to be put to an end."

The wanton slaughter of hawks on the Duluth flyway reached such proportions in the fall of 1946 that a concerted effort on the part of the Duluth Bird Club to reduce and possibly eliminate the shooting of hawks within the city limits was initiated.

An interesting article entitled "Hawk Trouble" was written and published by Clarence N. Anderson on October 20, 1946 in the Duluth-News Tribune. The article outlined the slaughter taking place, pictured the beneficial hawks, and pointed out the good results obtained from these hawks in the destruction of rodents. In the spring of 1947 the Duluth Bird Club petitioned the Duluth City Council for permission to erect appropriate signs throughout the park system calling the attention of the public to the fact that our city parks are bird sanctuaries and of the penalties involved under the city ordinances for violations.

The following are exerpts from City Attorney Harry E. Weinberg's letter of June 6, 1947 to the City Council of the City of Duluth:

"In a letter addressed to Mayor George W. Johnson and the Council of the City of Duluth, written May 28, 1947 by J. K. Bronoel, President of the Duluth Bird Club, the City Council is asked to grant the Bird Club permission to erect signs in the Kenwood district, outside of the park system, containing the warning, in effect, that the Kenwood district is a bird sanctuary, and that hunting in such area is prohibited under penalty of fine or imprisonment."

"Destruction of birds any place within the corporate limits of the City of Duluth is forbidden by ordinances which were on the books since 1885."

"It would seem, therefore, that the City Council has legal authority to accept the offer of the Duluth Bird Club to erect the type of sign indicated in the Club's letter to the Council."

With this authority to proceed with the erecting of signs, the Duluth Bird Club, through the co-operation of Guy

Atherton of St. Paul, purchased 100 signs of two types reading as follows:

BIRD SANCTUARY
NO HUNTING PERMITTED
Misdemeanor punishable by fine not to exceed $100.00 or 85 days imprisonment.

WILDLIFE
SANCTUARY
NO SHOOTING

These signs were received and erected throughout the Duluth park system and in the Kenwood area during the month of September, 1947 by members of the Duluth Bird Club. Immediate results were obtained, particularly in the Kenwood area, when it was found a week later that in that district all of our signs had been shot down or carried away. They were replaced and again disappeared. However, they did have the effect of notifying the violators that a campaign was under way to stop the unlawful shooting. Newspaper publicity was obtained and the police made an effort to apprehend the culprits. Very few were caught due to the fact that sentinels were posted and the violators were a block away before the police arrived on the scene. Blinds were pulled down and erected the next day. We were advised by many that we would never stop the shooting. However, no shooting was attempted when members of the Club were present, and the area was patrolled as regularly as possible by various members working in shifts. Some progress was made in the fall of 1947, enough to pledge anew our efforts in the fall of 1948.

In the fall of 1948 we again posted the Kenwood area with "*Wildlife Refuge — No Shooting*" signs and also stenciled the words on the rocks. The signs were again destroyed and the stenciled signs defaced to read "*Wildlife Shooting*". Again we enlisted the support of the newspaper and police, and our members patrolled the area. This year fewer hawks were shot and our campaign was gaining ground.

In the fall of 1949 we again patrolled the area, but the shooting had been reduced to a minimum. Thus through perseverence, publicity, education and enforcement, we have succeeded in correcting one of the most deplorable conditions we have known to exist in the State of Minnesota. At the present time several members of the club are deputized as special policemen in the park department with authority to enforce the city ordinances relative to carrying fire arms within the city limits. We cannot let down our guard and must continue to watch the situation when the hawks begin to arrive from out of the north.

Duluth Bird Club

The Hawk Pass at Duluth

by

Pershing B. Hofslund

It wasn't until 1946 that Duluth birders realized that there was a hawk flight in the area, although falconers and hunters had known it for some time. As usual, the mass slaughter that characterizes good hawk flights focused attention on the migration. Between 1946 and 1951 the efforts of the Duluth Bird Club were bent toward stopping this indiscriminate killing and little time was spent in actually studying the flight. In 1951 the club was asked by the Fish and Wildlife Service to participate in a survey of hawk migration, and because of this request, a count of the migrating hawks was made during the second and third week ends of September. The results were startling even to those who had seen the considerable numbers of hawks slain by the hunters. The four day count yielded a total of 8977 hawks of 14 different species. In 1952, we again undertook a similar census, and again got results that indicated a major hawk flyway. The total number of hawks counted during September 12, 14 and 20, 21, 1952 was 13,123. The second and third week ends of September, 1953 gave us a count of 7,220. Thus over a period of approximately 120 hours we have seen from lookouts in Duluth at least 29,300 hawks. It is easy enough to see that the flight is of considerable magnitude.

We have identified 18 different kinds of hawks in these three counts. In round figures the distribution has been:

Broad-winged Hawk	13,500
Sharp-shinned Hawk	3,400
Marsh Hawk	695
Cooper's Hawk	570
Red-tailed Hawk	360
Sparrow Hawk	250
Pigeon Hawk	70
Osprey	70
Turkey Vulture	70
American Rough-legged Hawk	60
Goshawk	30
Duck Hawk	20
Bald Eagle	15
Golden Eagle	10
Red-shouldered Hawk	5
Harlan's Hawk	1
Krider's Red-tailed Hawk	1
Gyrfalcon	1
Unidentified (beyond Buteos, Accipiters and Falcons)	11,000

In brief this is just about the extent of our knowledge concerning this particular hawk pass. The rest of this paper I would like to devote to certain questions that have arisen in our minds since we have started watching the pass, and the possibilities for research that have been laid open by the discovery of the flyway .

1. *What is the source of our flight?* Surely Canada is the reservoir of much of our hawks, but from how far west and from how far east? Harlan's Hawk according to the 1931 A.O.U. Check-list, "breeds in northwestern British Columbia, southwestern Yukon and adjoining parts of Alaska south at least to southern Alberta." Do the Harlans we see in migration come from as far west as the Yukon? Dana Struthers, who has been studying the Peregrine Falcon for a number of years believed that a specimen he trapped in the fall of 1953 near Duluth breeds only in the Arctic. The studying of other plumages might well gives us a partial answer to this puzzling problem of where our hawks come from.

2. *Where does the flight begin its*

convergence on Duluth? We have felt that the flight comes down along Lake Superior, possibly using air currents generated in the Sawtooth Range, but if that is so, why don't our Canadian ornithologists pick up large flights along the Pigeon river. In 1952, they failed to see any large flights at all, although in 1953 a small flight was discovered near Fort William and Port Arthur. Large concentrations have been seen in Two Harbors.

3. *Why does this flight converge on Duluth?* There seems to be little doubt that favorable air currents along the shore of Lake Superior have something to do with creating our flyway. One has only to watch a flight when it hits a thermal to realize what these updrafts of air mean to the migrating hawk. Entering a thermal the hawks rise spirally with scarcely a movement of their wings until, apparently reaching the top, they peel off like planes from formation and glide for great distances until hitting another thermal when they again rise effortlessly and then again coast. Literally, if a series of these thermals can be encountered along the coast of Lake Superior, they could slide downhill all the way from Canada. Another point that seems worthy of consideration is the size of the lake itself. Undoubtedly it serves as something of a barrier, shunting the birds along its coast line. The two factors, the Sawtooth Range and the west shore of Lake Superior, end at Duluth, apparently serving as a funnel spout to bring these birds directly over the city. That is our theory, but there needs to be much work done to prove our point.

4. *What happens to the flight after it leaves Duluth?* We have no reports of large numbers of hawks south of Duluth. Minneapolis birders counted less than a hundred when we were seeing them in the thousands. Is there a divergence after they leave the effects of Lake Superior and the hills along its shores? Or do the hawks swing in another direction, possibly following the south shore of the lake? At the lookout, our observations do not indicate that the flight is headed in that direction.

5. *How consistent is the flight?* So far we have only been able to devote 12 full days to counting, and these days have been limited to the second and third week ends of September. We have been able to spend brief periods scattered throughout the months of August, September and October. These brief periods of observation indicate that this flight is unusually consistent. We have had, as yet, no "no hawk" days. For instance, counts were made for periods seldom exceeding 1½ hours at a time on September 5, 6, 7, 10, 11, 21, 22, 23, 24, 25, 26, 27, and 30, and on October 1, 4, 11, and 12 during 1953. Hawks were seen during every observation period.

6. *What is the period of the hawk migration, and when does it reach its peak?* Hawks have been seen migrating as early as the third week of August and as late as the last week in November. The peak apparently occurs between the second and third week of September, although our data are too few to state this as a fact. On the target days our high counts have occurred on September 16, 1951 (4,393), September 20, 1952 (5,646) and on September 20, 1953 (1,912).

7. *What effect does the wind have on the flights?* The large flights at Hawk Mountain apparently come when the wind is in a northerly direction. (Broun, Hawks and the Weather, *Atlantic Nat'l.*, Jan.-Feb., 1951.) So far we have not found such a correlation. When northerly has been the prevailing direction we have recorded 6583 hawks; when it has been southerly, 7391 hawks. Apparently neither northerly or southerly winds have much effect on our flights. When the winds have been in a westerly direction, however, we have counted 17,475 hawks as compared to 1523 when the wind was easterly. Our lowest counts have come when the wind was directly from the east. There have

been some indications that the flight height varies with the direction and force of the wind, but we are unprepared to make any definite statements about this.

8. *At what heights do the hawks fly when migrating?* There are times when only with the aid of binoculars are we able to pick out the flying hawks, and even with binoculars they sometimes are hardly more than specks. At other times they are scarcely 10 feet above our heads as they pass over. It is quite a thrill to look down on the backs of Bald Eagles as they pass down the valley below the lookout. Buteos ordinarily travel at greater heights than do the Accipiters and Falcons.

9. *Is there any segregation into age groups, sexes and species?* Definitely there is an age segregation. Generally the first birds to appear are the immatures. The Goshawks that we have seen in September have all been immatures, in October 90% adults. Where adults are easily told from immatures we have found this to be true. Sex differentiation is quite difficult in most hawks, at least when they are flying, but we have seen large and small sharpshins during the same period of observation, and this may be an indication that there is no separation into sexes in this group, but we need many more observations to be certain about it. Each species has its own peak. The Sparrow Hawk flight is largely over by the second week of September. The Broadwings come in vast numbers during the third week of September, but are few the week before and the weeks afterwards. The Sharpshin is seen from late August well into October, but it probably reaches peak numbers around the middle of September. The adult Red-tails, American Rough-legs and Goshawks are seldom seen in large numbers until October. The Buteos are generally in flocks during migration, the Accipiters and Falcons usually move alone. When the thermals are especially effective Buteos, Falcons, and Accipiters are sometimes in mixed company. It can be said, however, that there usually is a segregation into species during a hawk migration.

10. *Is there any relationship between the hawk flights and those of other migratory birds?* The flight path taken by the hawks is not confined to them. Thousands of other birds follow generally the same line of flight. Ravens, for example, are often seen flying right along with the migrating Buteos. Most interesting is to speculate on the possible relationship between the flights of small birds such as Blue Jays and Flickers with the flights of the bird hawks. Almost without fail, if a flock of Blue Jays passes by our lookout it will be followed in a short space of time by a migrating Sharpshin or Cooper's Hawk. Are these hawks following their food supply?

11. *Just what plumage changes do occur in those hawks whose plumages puzzle us?* We see Red-tailed Hawks that are almost white and Red-tailed Hawks that are almost black, and seemingly all gradations in between. There has been some controversy for years as to whether Krider's Red-tails and Harlan's Red-tails are full species or just color variants. If we could keep some of these hawks in live cages for a year or two, we might be able to have some definite answers to plumage variants and changes that occur in the Raptores.

12. *Will there be any value beyond academic knowledge to a study of the flyway?* There is little doubt that the publicity we have given the flight has had its effect in Duluth. We have been able to put a dent in the meaningless and fallacious classification of living things into harmful and beneficial. There have been several organizations who were interested enough to allow us to expound on the theory that each plot of ground has its own carrying capacity, and that predation crops only a surplus that would be levelled in a different way, hence shooting all the hawks will not

raise the number of Ruffed Grouse or Red-eyed Vireos to any appreciable degree. We have not eliminated the shooting entirely, but it has been reduced to a negligible amount. Most important of all, the youngsters of the city are tremendously interested — some of them spend hours at the lookout faithfully recording every hawk they see. The Duluth Chamber of Commerce has become interested in the flight, especially when it was pointed out that over 400 people visited the lookout on one week end, and that these visitors included representatives from seven different states and Canada, some of whom spent a week in Duluth just to watch the flight. If the flight could eventually attract the number of visitors that annually visit Hawk Mountain (1050 in a day, 12,000 in a season), conservation of avian predators would receive its biggest shot in the arm in our region. What is more interesting and stimulating to the general populace toward the preservation of a species than the fact that this preservation means money in the bank?

Here are a dozen questions that have arisen in our minds since we started watching the Duluth Hawk Pass. They hardly scratch the surface of the possibilities for research in this area, not only of hawks but of other animals too. Here is a tremendous hawk flight, that ornithologically at least, was unknown until three years ago. Ask any Minnesota ornithologist to describe the distribution of the birds, say in St. Louis county. Beyond vague generalities he cannot answer you. The largest freshwater lake in the world touches Minnesota, yet very little study has been made of it by Minnesota scientists. This paper is given with two purposes in mind. First to bring before the readers of *The Flicker* the fact that such a flight does exist within its sphere of activities, and secondly to point out that we know little about the natural history of our state and that reasearch possibilities are exceedingly great. — *Biol. Dept. U. of Minn., Duluth Branch.*

The Book Page

New Edition of Conservation Bibliography Available

The second edition of the popular "*Bibliography of Free and Inexpensive Materials for Teaching Conservation and Resource-use*" by Muriel Beuschlein has been published by the Conservation Project of the National Association of Biology Teachers. Copies are available at ten cents with 20% discount on orders of 100 or more, from the Project Leader, Dr. Richard L. Weaver, P. O. Box 2073, Ann Arbor, Mich.

The revised bibliography will be Chapter XII in the "*Handbook on Teaching Conservation and Resource-use*" which was prepared by the Conservation Project Committee and which will be released early in 1955. The handbook contains descriptions of over one hundred school projects or programs in conservation and resource-use from thirty states. It will assist teachers in planning for classroom and club programs; school ground and community projects; for elementary and secondary children. Advance orders can be placed with the project leader. It will cost $4.00 per copy, with a 20% discount to teachers and schools. Proceeds from the sale of the handbook will be used to locate additional descriptions for use in later editions of the handbook.

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Tracks usually pique the curiosity of anyone who spends time out-of-doors. Often it is impossible to identify the maker of the tracks, or to interpret the story told because most track books are very incomplete. For this reason, a new book, *A Field Guide To Animal Tracks* by Olaus Murie, can be highly recommended. It is a very complete book on tracks, well written and well illustrated, by a man who can do both. As an outstanding field biologist, he has a wealth of material on which to base these skills. There are over a thousand illustrations nearly all done by Murie.

Many natural history observations, besides the story of tracks, make this book more useful, while many sketches, in addition to those of tracks, add to the book's attractiveness.

The book is number 9 in the Peterson Field Guide Series, and follows the pattern set by the other field guides (published by Houghton Mifflin, Cambridge, Massachusetts, $3.75).

Anyone who buys the book will find that it will increase the enjoyment of his outdoor hours. — *Harvey L. Gunderson*

Christmas Count, 1953

by

Elizabeth Jerabek

What can be learned by comparing the 1953 winter bird count with those of the past decade? This year has produced by far the largest individual count, 16,486, more than double that of 1952. Although 104 species have been counted during the ten years, no previous year produced 67 species. These increases may be due to more areas reporting (11 as compared to 8 in 1952) and to more observers in the field (129 as compared to 72 in 1952). Perhaps more open water played a part. Seven of the 11 areas reported some open water in 1953. Only three areas reported open water in 1952.

In the past ten censuses (1944-1953) 20 birds have appeared only once. These unusual records were added over many years: 1944, Baldpate, Ring-necked Duck, Long-eared Owl, Saw-whet Owl; 1946, Pied-billed Grebe, Great Grey Owl, Cowbird; 1947, Holboell's Grebe, Spotted Towhee; 1948, Vesper Sparrow; 1949, Common Loon, Short-eared Owl; 1952, Great Blue Heron. This year seven species were added: Canada Goose, Ruddy Duck, Red-shouldered Hawk, Killdeer, Winter Wren, Western Meadowlark, and the strange western stray, the Varied Thrush.

In 1953 several species were reported in surprisingly large numbers. This year 2475 Tree Sparrows were counted. The previous peak was 391 in 1945 (based on winter counts published in *The Flicker* 1945-1952). Juncos and Goldfinches were over three times as numerous as during any of the past ten years. These reports of large flocks of seed-eating, ground-feeding birds came from the southern half of the state where snow was extremely light.

Three species, which usually appear in the count by one's or two's, made sudden leaps this year; 29 Wilson's Snipe, 83 Mourning Doves, and 18 Tufted Titmice. Titmice were reported in every area except Cedar Creek Forest, Duluth, and Grand Marais. This is added evidence of the northward movement of some southern birds.

Several visitors from coniferous forests and tundra reached southern Minnesota. Pine Siskins, Redpolls, Evening Grosbeaks, Northern Shrikes, and Snowy Owls were reported near the Twin Cities.

A census records the common birds as well as the more unusual species. The list below compares the percentage of each species seen this winter with the average percentage over the decade (1944-1953).

These percentages depend largely on the areas which are censused. They are not a general representation of Minnesota winter bird life because, (1) the census areas include a large percentage of town suburbs, and (2) census areas are concentrated in the eastern part of the state.

Comparison of reports from this year and previous years is very frustrating when some detail has been left out (for example, the amount of snow or open water). Although some of the counts are not as valuable as they could have been, they still record in numbers the winter birds in definite Minnesota areas. As long as these areas are censused by the same method each year so that various years can be compared, winter censusers are making a contribution to ornithology. — *Avifaunal Club.*

Table 1

Species	*1953 %*	*Ave. %*
English Sparrow	33.8	27.7
Herring Gull	5.5	10.0
Golden-eye	5.3	9.0
Starling	6.4	7.6
Tree Sparrow	14.7	5.4
Black-capped Chickadee	3.6	5.2
Slate-colored Junco	6.1	3.1
Common Redpoll	1.1	2.7
Blue Jay	1.4	2.1
Ring-necked Pheasant	1.6	2.1
Goldfinch	4.4	2.0
Snow Bunting	.3	2.0
Mallard	1.3	1.9
Evening Grosbeak	1.7	1.7
Downy Woodpecker	1.3	1.6
White-breasted Nuthatch	1.5	1.4

GRAND MARAIS Dec. 29; Overcast. Seven observers. Participants: Bill Luwe, Orwin Rustad, George Palmer, Huns Nelson, Mike Naylon, Bob Hanlon.

DULUTH BIRD CLUB (Fond du Lac to Encampment Forest along St. Louis River and Lake Superior including Minnesota Point; town suburbs 20%, deciduous city parks and highways 70%, sand dunes 10%). Jan. 3; 7:30 a.m. to 4:30 p.m. Partly cloudy; temp. 0° to 17°; wind NE, 5 m.p.h.; ground covered with 8 to 12 inches of snow; all fresh water frozen except Lake Superior. Twenty-seven observers in 11 parties. Total party-hours, 48 (26 on foot, 22 by car), total party-miles, 254 (29 on foot, 225 by car). Participants: Hulda Adams, Joe Antonio, Mr. and Mrs. J. K. Bronoel, Margaret Brown, Robert Cohen, Raymond F. Dasmann, Mary L. Elwell, Mrs. Hazel Fields, Mary V. Fulton, O. A. Finseth, Henry Gilbert, Richard Green, Lloyd Hackl, Mr. and Mrs. John Hale, P. B. Hofslund, M. M. Keith, Olga Lakela, Catherine Lieske, Susan H. Lovald, Evelyn Palmer, Mr. and Mrs. Harvey Putnam, Joan Shoberg, Robert Ulvang, Wm. Ulvang.

ST. CLOUD BIRD CLUB (St. Cloud along Mississippi River to Sartell. Campus of the College of St. Benedict. Campus of St. John's University). Dec. 26; Clear; temp. 20°; wind N, 6 m.p.h. Eleven observers. Participants: Harry Goehring, Mr. and Mrs. George Lehrke, Mrs. Alys Misho, Mrs. Alma Stageberg, Ida Oren, Loretta Rosenberger, Agnes Brohaugh, Monica Misho, two Sisters of St. Benedict.

MINNESOTA BIRD CLUB (Cedar Creek Forest, 7½-mile radius from Corniea's Cabin; about ½ forested deciduous and pine, about 25 acres of meadow, hills, valleys and marshes). Dec. 27; 9:00 a.m. to 4:00 p.m. except one hour at noon, Party cloudy; temp. 36° at noon; wind SE, 8 to 12 m.p.h.; no snow. Two parties on foot, 20 miles by car.

MINNEAPOLIS BIRD CLUB (7½-mile radius from Camden Park to Anoka on both sides of Mississippi River; open farmland 60%, town suburbs 20%, deciduous farm woodlots 15%, deciduous river banks and valleys 2%, marshes and sloughs 2%, sand dunes 1%). Jan. 2; 8 a.m. to 5 p.m. Cloudy; temp. 15° to 20°; wind WNW, 10 to 12 m.p.h.; 2 inches of snow; practically all creeks had open water, Mississippi River open in spots below Coon Creek dam. Twenty-three observers in 8 parties. Total party-hours, 47½ (26 on foot, 21½ by car), total party-miles, 240 (36 on foot, 204 by car). Participants: Lewis Barrett, Delwin Cahoon, Amy Chambers, Roland Cole, Mr. and Mrs. Whitney Eastman, Mr. and Mrs. Edward Harms, Severena Holmberg, Elizabeth Jerabek, Mr. and Mrs. Boyd Lien, John Marx, Phyllis McRae, John Pavek, Mr. and Mrs. Malcolm Renfrew, H. G. Scott, John Scott, Vera Sparkes, David Thurston, Mrs. E. A. Vinton, Charles Wiberg.

AVIFAUNAL CLUB (7½-mile radius centering on Minneapolis Golf Course and extending to the junction of highways 55 and 101, Robbinsdale, Edina, Hopkins, and including Theodore Wirth Park and Roberts Bird Sanctuary; town suburbs 45%, open farmland 25%, deciduous woodlots 17%; lakes, marshes, and creeks 8%, city park and golf course 5%). Dec. 26; 8 a.m. to 4:30 p.m. Partly cloudy; temp. 26° to 33°; wind W, 15 m.p.h.; ground covered with less than 1 inch of crusted snow; small acres of open water in 3 creeks. Ten observers in 4 parties. Total party-hours, 30 (11 on foot, 19 by car), total party-miles, 308 (22 on foot, 186 by car). Participants: Jeremy Berman, Geo. Fisher, John Futcher, Burton Guttman, Mr. and Mrs. Henry Jerabek, Elizabeth Jerabek, Norrie Jones, Wm. Nelson, Wm. Pieper.

EXCELSIOR (7½-mile radius centering in Chanhassen, and including areas about Grays bay of Lake Minnetonka, Glen lake, Lake Lucy, Lake Ann, Minnesota river bottom, Christmas lake; pasture and open fields, 40%, deciduous woodland and planted evergreens 31%, open water 1%; river, creeks, ravines, marshland 28%, town suburbs 30%). Dec. 26; 8 a.m. to 3:30 p.m. Partly cloudy; temp. 26° to 33°; wind WNW, 12 to 16 m.p.h.; light covering of old snow; all water frozen except creeks and few small spots in river. Twenty-one observers in 8 parties. Total party-hours, 25½ (10½ on foot, 15 by car), total party-miles, 169 (16 on foot, 153 by car). Participants: Lester R. Badger, Angus Clarke, A. Dawes Du Bois, Mr. and Mrs. Whitney H. Eastman, Mr. and Mrs. Ray Fuller, Colleen Helgeson, Mr. and Mrs. Malvin Herz, Michael Herz,, Robert H. Landre, Grady Mann, Dr. and Mrs. Kenneth A. Phelps, Dr. H. G. Scott, John Scott, Mr. and Mrs. Philip D. Tryon, James W. Willkie.

ST. PAUL AUDUBON SOCIETY. Two counts. No. 1 (Vadnais, Sucker lake and Mounds Park; farm woodlots 10%, pine forest 30%, tamarac 5%, open fields 15%, deciduous woodland 15%, spruce and cedar thickets 5%, marsh 20%). Dec. 26; 7:30 a.m. to 4:30 p.m. Mostly fair; temp. 26° to 32°; wind gusty, 5 to 15 m.p.h.; 2½ inches of snow in woodlands; lakes icebound, river open, open water in boggy cress. Eighteen observers in parties of 5 to 6. Total party-hours, 44 (20 on foot, 24 by car), total party-miles, 100 (28 on foot, 72 by car). Participants: A. C. Rosenwinkel, Oscar Enstrom, O. G. Enstrom Sr., Dorothy Faber, John A. Hall, Caroline Larson, John Mara, David Merry, Mrs. Walter Olin, Kermit Piper, Mrs. J. M. Rice, David Thurston, Vernon Whipple, Larry McEvoy, Brother Pius, Brother Paul, Tom Meyer, Thomas Huntley.

No. 2 (South St. Paul to Pine Bend, Newport to Pig's Eye lake and Mississippi river from Madison to Montreal Streets in St. Paul; open fields 15%, frozen marsh land 5%, open river and springs 25%, deciduous and coniferous 10%, deciduous woodland 40%). Jan. 3; 7:30 a.m. to 4:30 p.m. Overcast; temp. 21° to 28°; wind SSW, 9 to 15 m.p.h.; snow 3 to 5 inches in woods; river open. Nine observers in 5 parties. Total party-hours, 23 (20 on foot, 3 by car), total party-miles, 87 (10 on foot, 77 by car). Participants: David Thurston, John A. Hall, Kermit Piper, Mrs. Marjorie Allie, Caroline Larson, R. A. Kortmann, James Cummings, William Cummings, David Blais.

NORTHFIELD (Rice County). Dec. 31 (Two Red-tailed Hawks observed Jan. 1). Orwin A. Rustad.

WINONA (Prairie island and lower end of Gilmore valley; open fields 60%, marsh 25%, jack pine 2%, deciduous woods 13%. Dec. 28; Overcast; temp. 18° to 25°; marsh frozen except for some open water from warm springs. One observer on foot covering 12 miles. Brother I. Vincent, F. S. C.

	Grand Marais	*Duluth*	*St. Cloud*	*Minnesota*	*Minneapolis*	*Avifaunal*	*Excelsior*	*St. Paul 1*	*St. Paul 2*	*Northfield*	*Winona*	*Total*
Canada Goose								75				75
Mallard		10	1		71	17	6		111		11	227
Black Duck		1			3		90		12			106
Pintail											2	2
Shoveller							1					1
American Golden-eye	30	199	30		500			23	114			896
Old-squaw	25											25
Ruddy Duck											1	1
American Merganser		7	10		17							34
Sharp-shinned Hawk					1							1
Red-tailed Hawk				1			2	2	1		1	7
Red-shouldered Hawk										3		3
American Rough-legged	1			1	1		4			3		10
Marsh Hawk				1								1
Sparrow Hawk					2		1			1		4
Ruffed Grouse	1	1		24				3				29
Ring-necked Pheasant		2			147	91	7	7	7	14		275
Killdeer											5	5
Wilson's Snipe											29	29
Glaucous Gull	1	4										5
Herring Gull	300	631										931
Mourning Dove					16	42	6			19		83
Great Horned Owl		3				3		2	1	1		10
Snowy Owl	1	1			1							3
Barred Owl						2	1	2	1	1		7
Belted Kingfisher						1				1		2
Piliated Woodpecker				3		1	1	2		1	1	9
Red-bellied Woodpecker				1	1		5	2		2	5	16
Red-headed Woodpecker							1					1
Hairy Woodpecker	3	5	1	1	11	8	16	14	6	2	1	68
Downy Woodpecker	3	53	3	2	30	53	24	15	12	10	9	214
Canada Jay	10	1										11
Blue Jay	2	20	14	11	32	51	45	23	25	10	6	239

	Grand Marais	*Duluth*	*St. Cloud*	*Minnesota*	*Minneapolis*	*Avifaunal*	*Excelsior*	*St. Paul 1*	*St. Paul 2*	*Northfield*	*Winona*	*Total*
Raven	5	7										12
Crow				4	133	15	12	5	3	5		177
Black-capped Chickadee	25	69	38	37	59	99	85	110	23	30	24	599
Tufted Titmouse			3		2	2	1	4	2	2	2	18
White-breasted Nuthatch			13	3	37	60	66	26	11	24	6	246
Red-breasted Nuthatch		1	1					8			1	11
Brown Creeper			1	1	3	3	8	4		4	2	26
Winter Wren					1							1
Robin						1					23	24
Eastern Bluebird										1		1
Golden-crowned Kinglet			6	1	2			28		2	1	40
Cedar Waxwing						18	5	10		20		53
Northern Shrike		1		1	1		1	1	1	1		7
Starling		159	56	2	199	424	63	60	60	20	33	1076
English Sparrow		1052	40	2	1138	1707	987	90	265	10	400	5691
Western Meadowlark					1	11				10		22
Red-wing						1	100				8	109
Rusty Blackbird							2		1		2	5
Brewer's Blackbird								1				1
Bronzed Grackle							2					2
Cardinal			3		6	15	30	6	9	10	26	105
Evening Grosbeak		267					13	1				281
Purple Finch					2	19	19	12	9	1		62
Pine Grosbeak		48										48
Common Redpoll		33	57	50		22		25		1		188
Pine Siskin		58		9			25	2	7			101
Goldfinch				12	452	68	59	65	4	75	3	738
Slate-colored Junco			55	6	327	238	161	115	101	10	19	1032
Oregon Junco					2		1					3
Tree Sparrow				22	291	428	1000	160	234	50	290	2475
Lapland Longspur				250				3				253
Snow Bunting		40					2					42
Varied Thrush		1										1
Eagle sp. (?)				1								1
Totals-Individuals	405	2675	343	446	3489	3400	3850	903	1080	344	911	16846
Species	13	27	17	24	31	27	36	33	24	31	26	67

Heron Rookery D

Harvey L.

A WIND AND HAIL STORM struck the heron colony at Rice Lake, Ramsey county, Minnesota, on June 26, 1952 . . .

. . . destroying nests with young . . .

amaged by Storm

Gunderson

. . . leaving some birds, yet unable to care for themselves, without parents to feed them . . .

. . . and others severely injured, such as this Great Blue Heron, with a broken left wing.

Fall Flight, Duluth

by

Dana Struthers

Almost any group of people interested in birds will be found out with their binoculars in May. People want to be outside after the long winter. Then too, in the spring the vast majority of the migrants come through between March 25 and May 25, a period of only two months. Besides seeing a concentration of birds in the spring the ornithologist sees birds all dressed up in their Easter plumages.

The fall migration is of longer duration; from August through December. The number of birds going south greatly outnumbers those going north. Many birds which go south fall victim to either the natural or human elements. The fall migration is more of a challenge to the bird student since many birds no longer have their brilliant and distinctive plumages.

For sheer numbers of warblers, other song birds, and birds of prey there is no place in the state to compare with Duluth in the fall. Birds are intrinsically lazy, they tend to do what is easiest. Since the longitudinal distance from Duluth to the northern portion of Lake Superior is over three hundred miles, and since the majority of the birds that meet the shore follow it down, Duluth becomes a bird student's paradise during the heavy migrations from August 15 to October 15.

During the last two weeks of August and the month of September the woods along the shore are filled with warblers in their nondescript plumages. Below the city, on Park Point, shore birds such as Golden Plovers are to be seen and if the weather is conducive the hawks fly.

Hawks generally may be seen flying on any day in the autumn, but warm days with a gentle wind or just before a storm are the best time to see hawks. Bad rainy weather will stop the majority of the hawks. When the weather clears, the birds, impatient from the delay, hurry southward. Such was the case on September 10, 1940, when after more than a week of rain and no sun, the weather broke. Since the weather around Lake Superior was local, the birds had migrated under blue skies until they had met up with the rain and fog of Lake Superior when they were forced to stop. Then the weather cleared and the birds funneled past.

On September 22 and 23, 1941 the biggest hawk flight I have seen went through. There were young birds and old birds. There were small hawks and there were the large hawks. September 23 brought adult birds and even Goshawks which weren't due to arrive for several weeks.

Generally speaking the young birds precede the adults on their way south. The smaller hawks start migrating through in the latter half of August. The large hawks with the exception of the Marsh Hawks, don't start coming through in appreciable numbers until the third week in September.

One of the best locations to observe the flight is on the bluff overlooking the lake at 45th Avenue East behind Duluth. Up the shore some birds, Ospreys and Falcons, follow the water's edge. The Buteos, Eagles, Accipiters, and Marsh Hawks usually keep to the ridges. However, at the 45th Avenue bluff the birds converge. Some places birds are to be seen only if the wind is from a certain direction, but you will see some at this hill if they are flying.

Here you will see hawks above you, level with you, and below you. Each year the composition of the flight varies somewhat from other years. American Rough-legged Hawks were coming through in numbers in September 1952. It was not until November 1953 that they were winging their way south in their customary numbers.

Unless you have seen a good hawk flight in Duluth you still haven't seen one of the more impressive ornithological sights of Minnesota.

Minneapolis, Minnesota

Lake Superior North Shore Field Trip

February 19 and 20, 1955

Aims: 1) To see winter bird residents and visitors as Snow Owl, Old Squaw Ducks, Mergansers, Bald Eagle, Shrike, Pine and Evening Grosbeaks, Siskins, Redpolls, Nuthatches, Woodpeckers, Canada Jays and Ravens.

2) To have dinner and a program with our Canadian friends at the new Shoreline Hotel.

Reservations:

1) Make dinner reservations with Mrs. Harvey Putnam, 1407 Woodland Ave., Duluth 3, Minn. Price $2.00; time 3 p.m. (4 p.m. Canadian time).

2) Make reservations with friends at the Arrowhead Hotel for Friday evening in Duluth.

3) Make room reservation at the Shoreline Hotel or East Bay Hotel for Saturday evening early for that is the skiing season also.

Itinerary:

Meet 8 a.m. Saturday morning in front of Bronoel's home at 2010 E. First Street, Main stopping points are at:

John Bero's, 3645 E. 4th Street

Lester bridge area

French River

Two Harbors lighthouse bay

Encampment Forest

Beaver bay; lunch about 11 a.m.

Temperance river, and along the way wherever one sees birds.

Seasonal Report

by
Mary Lupient

Because your reporter spent six weeks in New England, two of them at the Audubon camp on an island in Muscongus bay, the report on Minnesota will be somewhat curtailed. It was an exceptionally delightful and profitable two weeks. The sun shone every day and cool ocean breezes flowed over the camp when most parts of the nation were sweltering. The camp offered for study Ornithology, Nature Activities, Botany, Insects and Marine Life. These courses are presented by a competent staff of instructors to about 55 campers most of whom are teachers. These teachers obtain a goodly amount of material to present to their classes.

Muscongus bay is dotted by many lovely islands, some of which we visited. A few are almost bare of vegetation and are inhabited by sea birds and seals, others are forested and make a haven for nesting song birds. The songs of the Parula Warbler, Black-throated Green Warbler, Olive-backed Thrush, Blue-headed Vireo and other nesting birds can be heard anywhere on the island where the camp is situated. Paths lead through the silent forest of towering spruces, silent except for the songs of birds, the cry of a nesting Osprey and other sounds of wildlife. Sunlight drifts gently down through the canopy of tree tops marking all the beauty of nature and bringing a realization of the blessings from its creator. This is another world; no telephone, no radio or newspaper here. The only unhappy thought springs from the knowledge that soon the session will be over.

One of the most interesting birds that nests on the rocky islands is the Black Guillemot, a member of the Auk family. It has a pigeon-like head and white wing patches that are visible when it flies. It catches little red rock eels to feed its nestlings that are down in rock crevices, out of sight. Hundreds of Eider Ducks swim around islands near the mouth of the bay where ocean swells rock the boat and one can see far, far out. The young Eiders climb on the mother's back as she swims hurriedly away from apparent danger. Campers may see Eider nests, lined with down on some of the islands. American Scoters, Surf Scoters and White-winged Scoters all in one flock are sometimes seen, and Great Black-backed Gulls, Laughing Gulls and Herring Gulls are common.

The study of marine life is most interesting. Tide pools, beaches, shallow and deep ocean waters are studied. Dredges bring up strange creatures from the bottom of the sea which are placed in aquariums in the laboratory for closer study. Plankton, strange and weird microscopic creatures, are magnified and thrown on a screen in one of the classes. Fresh-water pools and mainland lakes and streams also are visited.

It is impossible to do justice to this subject without writing a book: there are glorious sunrises and sunsets, picnics and lobster dinners on the beaches and above all the courteous kindness of the staff members that make up the Audubon family at the Maine camp. This area is fortunate that an Audubon camp is being established in Wisconsin to serve educators, camp directors and nature lovers and through them bring to our youth knowledge that will be a great aid to conservation.

In Minnesota, five American Egrets lived in swamps along the Minnesota river near Shakopee from June to date

of this writing, September 30. No nesting was reported.

The hawk census was taken in the Minnesota river valley from Ft. Snelling to Shakopee, September 11 and no hawks appeared. At Duluth, September 19, there was a heavy fog and it was impossible to take a census. The weather cleared on the 20th and hundreds of hawks passed above and below the Lookout, Ospreys, Bald Eagles, Peregrine Falcons, Pigeon Hawks, Sparrow Hawks, Goshawks, Red-tailed Hawks, Sharp-shinned Hawks, Marsh Hawks, Broad-winged Hawks and Turkey Vultures. In a two hours drive along the North Shore, observers counted 108 Pigeon Hawks.

The shore bird migration began the first week in August and reached a peak about August 15. A greater number of Wilson's Phalaropes migrated through eastern Minnesota than has been reported in recent years. Mrs. M. E. Herz saw a concentration of about 60 near St. Bonifacius, August 3. At Duluth P. B. Hofslund saw returning shore birds August 15, among them Golden Plovers, Black-bellied Plovers, Stilt Sandpipers, numerous Small Peeps including the Baird's Sandpiper. A. C. Rosenwinkel reported a King Rail in a slough on the outskirts of St. Paul, August 21. On the same date he saw more than 100 Herring Gulls, 10 Ring-billed Gulls and 5 Caspian Terns at Goose lake near White Bear. A Northern Phalarope was observed near Shakopee, September 5 by Raymond Glassel.

The following interesting observation was sent by Dorothy Smith. "Several evenings before and after the 15th of June we observed a pair of Saw-whet Owls and three young in an oak tree in the park area south of Lake Nokomis. We discovered them by following the fighting, scolding antics of several robins."

The peak of the Night-hawk migration was August 23 to 25. Large flocks were observed.

An interesting observation was afforded this writer June 13, when Mrs. W. F. Davidson invited me to her country home near Afton to observe some Orchard Orioles. There were three, an adult male, an immature male and a female that was being courted by both males. For several hours the fickle female favored one then the other. The adult male was a beauty and for some time it looked as if he would win. Suddenly the immature male flew away and the female followed him everywhere in a very unladylike manner. The loser quietly stayed around until the happy pair chased him away time and again and he finally left. The pair became very devoted, perching close together wherever they were. She even sang a snatch of a warble for him. I was just a few feet from them when this happened. Mrs. Davidson stated that they nested and were seen feeding young, July 2. Orchard Orioles have nested in her yard for the past three years.

A Mourning Dove built a nest about 30 feet up on an outer branch of an oak tree in my yard, August 28. It was built in one forenoon and the material was brought on an average of once a minute. Leaves partially obstructed the view of the nest but the incubating bird could be seen. September 30 very unsteady young were out of the nest being fed by the parents. Two days later all four birds had left.

Single individuals of early warblers leisurely migrated the latter part of August. It was hot and almost no rain fell in August and early September. After a hard rain a heavy migration of Warblers, Ruby-crowned Kinglets, Vireos, Flycatchers, White-throated Sparrows and Juncos occurred, September 27 in Minneapolis. A Prothonotary Warbler's nest was observed by Raymond Glassel on the banks of the St. Croix river during the nesting season.

Dickcissels abounded in fields and pastures in the southern half of the state.

John Hall, St. Paul, has a bird feeder

which he operates the year around. This summer the bird's fare consisted of Crisco, ham fat, suet, corn-on-cob, boiled potatoes, peanut butter, apples, oranges, raisins, bread crumbs, baked beans, cottage cheese and seeds of various kinds. Aristocratic food!

Minneapolis, Minn.

The Canadian Lakehead

Edited by
A. E. Allin

In the last issue of *The Flicker* we referred to the disastrous storm of May 2, and its effect on the migrating birds of that period. Subsequently we have learned that a much greater area was involved than we had previously suspected. In addition to the heavy mortality on the Duluth-Lakehead road, two observers reported 500 casualties on the highway from Fort William to Dryden. Others reported many birds killed northeast of the Lakehead. Recently we have learned that the storm continued at least to Sault Ste. Marie where countless birds were killed. The chief sufferers appeared to be White-throated Sparrows, Hermit Thrushes, Robins, Juncos and Rusty Blackbirds, but the storm may have been equally disastrous for Tree Swallows and Phoebes, few of which have been observed locally since early May. Considering the vast area involved, millions of birds may have been casualties of this one storm.

The weather during the remainder of May was not unusual but the inland lakes were not free of ice until the latter half of the month. This dammed back the migration of ducks. All the common diving ducks and pond ducks were represented with Lesser Scaup being most abundant. Spot counts on several occasions revealed that 70 per cent of the Lesser Scaup were males. Ordinarily, Shovellers are rare visitors, but several pair were present throughout the month.

Harris's Sparrow has been considered a rare spring migrant. From 1938 to 1948 it was recorded locally on only four occasions but from 1949 to 1954 we failed to find it only during 1951. This season we saw it on May 18 and there were other reports of its occurrence. We believe it is definitely increasing during spring migration at the Canadian Lakehead. A Baltimore Oriole was present in Port Arthur from May 28 to May 30. This is one of the few local records for this species. The Scarlet Tanager is usually reported on one or two occasions each spring. There was apparently a major migration on the night of May 29-30 for we received nine records of Tanagers seen on May 30 in the area between Silver islet and Whitefish lake.

May 24 was cold and windy and a cold front grounded migrating small birds. Great numbers of warblers were reported present over the area and we identified 17 species including great numbers of Black-throated Blues and a few Parulas. The former is uncommon at the Lakehead, and in the past 16 years the parula had been reported on three occasions. The same day, D. Beckett added the Arkansas Kingbird to the local list when he carefully observed one at Squaw bay, southwest of Fort William. C. E. Garton recorded White-rumped Sandpipers at Port Arthur, the second local record for that winter. The previous day he had identified a Caspian Tern, another new local record.

May 29 and 30 brought a great wave of migrating shore birds. The usual common species were all recorded. In addition, both Golden and Black-bellied Plovers were present as well as two Dowitchers and two Baird's Sandpipers, a species which had been added to the local fauna in September, 1953.

The precipitation during June was below normal but the temperature was slightly above normal. The 84° registered on June 9 was the warmest ever

recorded on that date as was the 90.2° on June 24 when Fort William was the warmest place in Canada. The minimum temperature was 35.9° on June 2. The mean for the month was 58.6°. July was also a hot dry month with a limited precipitation during the last week. Consequently the crop of wild fruits did not meet the expectations of the early frost-free blossoming period.

No outstanding observations were reported during these months. A colony of Bobolinks returned to their favorite field, but once more we failed to find them breeding. An occasional Catbird, Brown Thrasher and Upland Plover were reported, and on June 14, we heard a Crested Flycatcher in the area where they were first recorded locally on June 7, 1953. Several Scarlet Tanagers were seen during the month, and a single Indigo Bunting was observed near Whitefish lake where we found a pair breeding in 1938. Two American Rough-legged Hawks at Rossport on June 5 were unexpected although there are previous summer records for the species in that area. Suitable nesting sites are present and they may yet be found breeding. On June 6, a Canada Goose was seen at Ronge lake near Rossport and no less than ten were seen by V. Bruce on Black Bay, Lake Superior, on June 21. A pair of Shovellers was still present on July 5.

The season of 1954 was particularly uninteresting to those studying the breeding birds. Relatively few nests were found and these were chiefly those of common species. An exception was the nest of a Saw-whet Owl found at Shebandowan on May 24 by Dr. H. Quackenbush. The site was a cavity in a decayed stub, eight feet from the ground. Several years ago a pair of Flickers had excavated and nested in this cavity. We examined the site on June 13 and were convinced young were present in the nest, but we could not actually see them. In mid-July the stub blew down and Dr. Quackenbush reported the presence of three eggs in the remains of the nest.

We holidayed in Kenora from July 5 to July 17. Two male Evening Grosbeaks were flushed almost daily from one small area of gravelled road and at least one female was also present. A Scarlet Tanager sang daily near the town. We were unable to establish a breeding record for either species. On July 20, a visit to the Wildlife Institute, at Delta, on the south end of Lake Manitoba, produced the first returning shorebirds and numbers of Greater and Lesser Yellowlegs and Pectoral Sandpipers were seen. Ruddy Drakes were still in full breeding plumage and Al Hochbaum reported many ducks of several species were incubating second or possibly third clutches of eggs. This was subsequently confirmed by B. W. Cartwright of Ducks Unlimited (Canada). It will require a long, open fall to permit these late-hatched ducklings to mature in time to escape the freeze-up.

Although we found a Cedar Waxwing's nest containing three young on August 4, there were already indications that the breeding season was drawing to a close and that some summer residents were once more on the move. Nashville Warblers had been seen in city shade trees on July 27. By August 8, numbers of Red-eyed Vireos and warblers, chiefly Black-throated Greens, were noted moving along the lake front. A week later Eastern Kingbirds were unusually common along the roadsides and unexpected numbers of Pigeon Hawks were seen. Mrs. Knowles observed two migrating flocks totalling almost 200 Nighthawks on August 19. Starlings were unusually abundant, great flocks being noted on several occasions at widely separated points.

Shore birds were first noted on August 15 in some numbers. These included Greater and Lesser Yellow-legs and Solitary and Least Sandpipers. C. E. Garton reported the presence of two Baird's Sandpipers and eight Stilts, species which had been added to our

local list in the falls of 1953 and 1952 respectively. On August 21 we observed a Dowitcher, the first fall record at the Lakehead, as well as a White-rumped Sandpiper, the third occasion this species has been reported locally in recent years. It is difficult to determine how much of our success in finding waders in recent years has been due to our becoming more familiar with their haunts and how much has been due to an actual increase in their numbers. On August 15, we saw numbers of Pintails which we assumed to be birds of the year hatched in the local region. This may have been a false assumption since Garton noted Green-winged Teal on August 17 which undoubtedly were migrants. — *Regional Laboratory, Ontario Department of Health, Fort William, Ontario.*

Notes of Interest

MAMMAL NOTES — To supplement the material collected by Gunderson and Beer in "Mammals of Minnesota", a two-year study of small mammals found in the Mankato area was developed by high school biology students directed by Robert W. Hanlon. Specimens are obtained mostly by student trapping. Although our records are not from a long period of study they do show 11 species not reported by Gunderson and Beer from Blue Earth and Nicollet counties.

Scalopus aquaticus, Common Mole — 178-28-20 — 69.1 gms. Collected November 11, 1953 by J. Engelen in Blue Earth county.

Sorex cinereus, Cinereus Shrew — 94-35-11 — 22 gms. Collected October 7, 1953 by C. Bunde in Blue Earth county.

Blarina brevicauda, Short-tailed Shrew — 145-25-17 — 28.1 gms. Collected in Nicollet county by G. Larson on November 18, 1953; 119-25-16-4 — 23.45 gms. Collected in Blue Earth county by M. Larson on September 21, 1953.

Eptesicus fuscus, Big Brown Bat — 112-34-10-12 — 18.2 gms. Collected by K. Appel in Blue Earth county on October 10, 1951.

Microtus pennsylvanicus, Pennsylvania Meadow Mouse — Collected in Nicollet county by N. Meyer on October 10, 1953; Specimens collected in Blue Earth county on October 23, 1953 by P. Samuelson.

Mus musculus, House Mouse — Specimens collected on November 12, 1952 in Nicollet county by G. Lamb; 147-74-17-13 — 13.5 gms. Collected in Blue Earth county by C. Bunde on October 5, 1953.

Mustela erminea, Short-tailed Weasel — 277-50-30-5 — Collected on October 16, 1953 by G. Bernardson in Blue Earth county.

Mustela frenata, Long-tailed Weasel — 342-92-46-21 — 161.8 gms. Collected by J. Probart in Blue Earth county on December 12, 1953.

Urocyon cinereoargenteus, Grey Fox — 1000-366-143-69 — Collected December 8, 1953 in Blue Earth county by B. Bell.

Rattus norvegicus, Norway Rat — Collected by D. Kolling in North Mankato, Nicollet county on November 10, 1952.

Taxidea taxus, Badger — Collected by F. Ahrndt on January 20, 1954 in Blue Earth county. — *David B. Youel, Mankato Senior High School*

* * *

THE STARLING IN THE QUETICO-SUPERIOR ROADLESS AREA — Between June 26 and July 4 of 1953, a pair of starlings were observed carrying food to a large red pine on an island in Hoist bay of Basswood lake, Lake county, Minnesota. We were unable to locate the nest, but the calls indicated the presence of young birds. Between June 18 and July 1 of 1954, the starlings were again seen carrying food to this same tree. On July 8, 1954, a pair of starlings was observed feeding fledglings in the marsh along the stream that connects Pine lake with Hoist bay. During the same period a pair was found nesting in an old flicker nest high in a dead aspen on one of the small islands at the extreme north end of Back bay on Basswood lake.

The distribution and spread of the starling has generally been associated with the presence of cities and agriculture. This area, however, has no agriculture and only an occasional cabin or resort used by fishermen and vacationists. The first nesting site is near such a resort while the one in Back bay is far from human habitation. In both cases the starlings must depend upon the natural foods of the area. — *James R. Beer and Louis D. Frenzel, University of Minnesota, St. Paul*

A SUMMARY OF WINTER BIRD OBSERVATIONS IN THE MANKATO AREA FEBRUARY 1952 TO FEBRUARY 1954

	DECEMBER		JANUARY		FEBRUARY		
SPECIES	1952	1953	1953	1954	1952	1953	1954
Common Mallard	X	X					
Lesser Scaup	X						
Ruddy Duck		X					
Red-tailed Hawk	X			X		X	X
Red-shouldered Hawk				X			
Broad-winged Hawk					X	X	
Rough-legged Hawk						X	
Marsh Hawk				X			
Sparrow Hawk					X		
European Partridge	X		X				
Bob White			X				
Ring-necked Pheasant	X	X	X	X	X	X	X
Mourning Dove		X		X			X
Screech Owl				X		X	
Great Horned Owl				X		X	
Snowy Owl			X	X			
Barred Owl				X			
Short-eared Owl				X			
Flicker		X	X	X		X	X
Pileated Woodpecker	X	X	X	X			
Red-bellied Woodpecker				X			X
Hairy Woodpecker	X	X	X	X	X	X	X
Downy Woodpecker	X	X	X	X	X	X	X
Horned Lark			X	X	X	X	X
Blue Jay	X	X	X	X	X	X	X
Crow	X	X		X	X	X	X
Black-capped Chickadee	X	X	X	X	X	X	X
White-breasted Nuthatch	X	X	X	X	X	X	X
Red-breasted Nuthatch					X		
Brown Creeper		X			X		X
Robin		X	X			X	X
Golden-crowned Kinglet		X					
Bohemian Waxwing					X		
Northern Shrike				X			
Starling	X	X		X	X	X	X
English Sparrow	X	X	X	X	X	X	X
Western Meadowlark		X	X	X		X	X
Red-winged Blackbird			X	X			
Brewer's Blackbird	X						
Bronzed Grackle	X	X					

Cardinal	X	X		X	X	X	X
Redpoll				X			
Pine Siskin				X		X	
Goldfinch						X	
Slate-colored Junco	X	X	X	X		X	X
Tree Sparrow		X	X	X	X	X	X
Field Sparrow	X						
Song Sparrow		X		X		X	
Snow Bunting	X	X		X		X	X

These records have been compiled from the field observations that have been made in the Mankato area by Robert W. Hanlon and various student assistants whose observations have been used only when they were accompanied by their instructor.

The data was collected on field trips made with the following frequencies:

December 1952 — 3 field trips
December 1953 — 2 field trips
January 1953 — 3 field trips
January 1954 — 12 field trips
February 1952 — 4 field trips
February 1953 — 6 field trips
February 1954 — 3 field trips

Robert W. Hanlon
Biology Department
Mankato Senior High School

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CENSUS OF HARBOR ISLAND IN ST. LOUIS BAY - 1954 — A census of Harbor Island in St. Louis bay at Duluth was taken on Saturday, June 26, 1954 by Mr. and Mrs. Harvey Putnam, Mrs. Flora Evans, J. K. Bronoel, Robert Cohen, Mrs. Arthur Roberts and Henry Gilbert. Temperature 75°, clear, northwest wind 20 to 25 M.P.H.

Common Tern	52	Spotted Sandpiper	1
Brown Thrasher	2	Catbird	1
Red-winged Blackbird	1	Black-billed Cuckoo	1
Blue Winged Teal	1		

A breakdown of nests was as follows:
Common Tern: 13 - 1 Egg; 13 - 2 eggs; 26 - 3 Eggs
Brown Thrasher: 1 - 4 Eggs; 1 - 3 Eggs
Red-winged Blackbird: 1 - 4 Eggs
Blue Winged Teal: 1 - 12 Eggs
Spotted Sandpiper: 1 - 4 Eggs
Catbird: 1 - 3 Yg - 1 Egg
Black-billed Cuckoo: 1 - 2 Eggs

No Piping Plovers seen or heard. It was noted that very few Common Tern nests were found on the sand dunes in the center of the island. Most of them were concentrated on the beach or the southwest end of the island. This may be due to heavy cover on the dunes.

A further check of the island by O. A. Finseth on July 3 indicated a great reduction in nests on the beach, with 20 tern eggs in one pile, which may have been gathered by children, or possibly by high water, wind and waves. Mr. Finseth found one tern nest on the mainland which suggests that the island is not the ideal nesting ground it has been for several years. — *J. K. Bronoel, Duluth Bird Club*

SUMMARY OF THE CHRISTMAS BIRD COUNT TAKEN IN THE NORTHFIELD, RICE COUNTY, MINNESOTA AREA DURING THE THREE YEAR PERIOD: 1951, 1952 AND 1953

	Dec. 29 1951	*Dec. 21 1952*	*Dec. 31 1953*	
Cooper's Hawk	1			
Red-tailed hawk			2	(Jan. 1, 1954)
Red-shouldered Hawk			3	
Rough-legged Hawk			3	
Sparrow Hawk			1	
Ring-necked Pheasant	2	5	14	
Killdeer		2		
Mourning Dove			19	
Great Horned Owl	2		1	
Barred Owl		1	1	
Belted Kingfisher		1	1	
Pileated Woodpecker		1	1	
Red-bellied Woodpecker	2	1	2	
Hairy Woodpecker	2	1	2	
Downy Woodpecker	3	10	10	
Horned Lark	2	2		
Blue Jay	10	7	10	
Common Crow	2	10	5	
Black-capped Chickadee	8	10	30	
Tufted Titmouse		1	2	
White-breasted Nuthatch	10	10	24	
Brown Creeper	6	1	4	
Eastern Bluebird			1	(male)
Golden-crowned Kinglet		12	2	
Cedar Waxwing			20	
Northern Shrike			1	
Starling	17	1000	20	
English Sparrow	200	6	10	
Western Meadowlark	1		10	
Rusty Blackbird		2		
Cardinal	5	7	10	
Purple Finch			1	
Common Redpoll			1	
Common Goldfinch			75	
Slate-colored Junco	10	20	10	
American Tree Sparrow			50	
Song Sparrow		1		

Orwin A. Rustad, St. Paul

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MID-SUMMER BIRDING ALONG THE SUPERIOR "NORTH SHORE" — Along the North Shore I found the week of July 26 through August 1 to be a part of the "out of the nest" feeding season among the birds. Most of my observations were made in the area from Castle Danger to Little Marais, with a brief stop-over at Duluth harbor's sandy shores, on the "inside" of Minnesota Point.

Red-breasted Mergansers — three broods, 4 young half-grown, in the bay at Split Rock river; 5 downy young, few weeks old, near Castle Haven resort; 14

downy young, perhaps only a week old, the largest brood I have ever seen of this species — Danielson's resort.

A covey of Ruffed Grouse, 5 young, almost adult size, seen without mother.

Two broods of downy young Spotted Sandpipers, a few days old, near Split Rock river.

Where the rocky shores were fairly flat I found a number of Lesser Yellowlegs, Spotted Sandpipers, Solitary Sandpipers, and a few Pectorals.

At Duluth bay along the sandy inner side of Park Point, we saw the following Common Terns' nests: a) 2 eggs (one in process of hatching) b) 2 eggs, both in process of hatching, c) one egg and one young, just hatched, d) one egg only, adult was flushed from nest, e) 2 eggs, one had first little cracks, ready to hatch.

At Gooseberry park along the river we found two full-grown, fluffy-feathered Ruby-throated Humming Birds. Bills were still of less than normal length. The young uttered an occasional long, very high-pitched and thin "seeeeep". Twice we saw an adult flit by, but no feeding was observed.

Mourning Doves were strangely scarce. On our jaunts we saw only three birds during seven days.

Alder Flycatchers were numerous. One individual indulged in two calls: the usual "wee-be-o" and the shorter, but very emphatic "breerr."

I found four colonies of Cliff Swallows, (Silver Cliff Bluff — to Split Rock Light House).

Two ravens soared and croaked about the Gooseberry river valley near the upper falls. I watched them for 10 minutes, after which they drifted northward and disappeared.

I heard the song of the Veery Thrush often, the "Hermit" on several occasions, and the "Olive-backed" twice. Saw a number of Thrushes in thickets, but could not identify them.

Cedar Waxwings were much in evidence, busy with nesting activities, as: nest-building — one pair, feeding young in the nest — two cases. A number of adults were observed carrying food.

The absence of English Sparrows and Starlings almost everywhere outside of cities was a pleasing experience.

I found many Warblers feeding their young out of the nest:

a) Magnolia — 1 young, 2 young.

b) Myrtle — 1 young, 2 young, 2 young.

c) Black-throated Green — 2 young, 2 young, 2 young.

d) Mourning Warbler — carrying food in 2 cases, feeding one young.

e) Northern Yellowthroat — 2 young, 1 young.

f) Chestnut-sided — 2 young, 3 young.

g) Redstart — 2 young, 3 young, 2 young.

h) I found two adult Connecticut Warblers. (Gooseberry park) (Baptism river) White eye-rings, and gray breast, sharply contrasted with yellow under-parts.

i) Golden-crowned Kinglet — adults found feeding young out of nest in two cases. Also, one family slowly traveling through trees looking for food.

Again found the Leconte's Sparrow in a low, damp meadow near Castle Haven resort. Appearances of adult tallied with description in Roberts and Peterson. Song was that described by Breckenridge in Robert's volumes. I made the same observation last year in July.

Several families of Brewer's Blackbirds were about a low, fairly extensive meadow.

In this same meadow I found, on the first visit, a Bobolink family, female, male, (the latter, still in rather beautiful plumage), and five immatures fully grown. On the second visit, the adult male pair showed great nervousness and anxiety at our approach. Finally I flushed a tiny, short-tailed, weakly-flying youngster out of the tall grasses. He flapped into a thicket of shrubs. We remained for about 15 minutes watching father and mother loudly scolding us with characteristic twitching of tails and sometimes also wings. At last, while the mother anxiously hovered near the youngster, the father flew off over the meadow and was there joined by the 5 grown young. The tiny young bird must have been the only survivor of an ill-fated second brood. (This was on July 31.)

Junco adults feeding three young out of nest on Palisade Head. Another set of two young. — *A. C. Rosenwinkel, St. Paul.*

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THE LEAST WEASEL IN MARSHALL COUNTY, MINNESOTA — During November of 1952, Oscar Guttrud of Holt, Minnesota, while running his mink traps near the south boundary of the Mud Lake Waterfowl Refuge, picked up a Least Weasel (*Mustela rixosa*), which had apparently been killed by grass fire. The specimen consists of a cased skin without the skull and is specimen number 548 in my collection. This represents the first specimen of this species from Marshall county. The Least Weasel has previously been reported from Roseau, Lake of the Woods, Pine, Goodhue, Winona and Pipestone counties. — *James R. Beer, University of Minnesota, St. Paul.*

Call Notes

The first annual winter paper session was held in the Museum of Natural History, University of Minnesota, on December 4. This very successful meeting will mean that it will become an annual event. A full report on the session plus the important items of business will appear in the December issue.

* * *

Correction: Paragraph 5, page 67, reading Green Heron . . . should be deleted. The correct nesting dates for the Green Heron are shown in paragraph 6.

* * *

The following report is of the North Shore trip made last February:

The Minneapolis and St. Paul Bird clubs joined the Duluth Bird club at their monthly meeting in the U.M.D. science building at 8:30 p.m. on February 19, 1954. Dr. William H. Marshall presented a movie on the Woodcock and slides on Itasca State Park facilities of the University.

The group left Duluth at 9:00 a.m. February 20 after visiting John Bero's feeding station to observe the Evening Grosbeaks. Luncheon was served at Beaver Bay, and after registering at Grand Marais the group travelled to Pigeon River to meet the Canadian delegation. A dinner was served at 6:00 p.m. eastern standard time followed by an interesting program of speeches and movies The assembly of over 100 people was welcomed by Keith Dennis, president of the Thunder Bay Field Naturalists' club, and remarks were made by Dr. Allin, O. A. Finseth and Dr. P. B. Hofslund. Movies on Woodcock, Pheasant and Woodland Caribou were shown. The meeting adjourned at 10:00 p.m. It was agreed by all present that the meeting in 1955 should be on the American side of the boundary, perhaps at Grand Marais or Lutsen with the M. O. U. as host club.

Most of the party were up at 7:00 a.m. Sunday morning, and after a hearty breakfast visited the bay shore and feeding stations in Grand Marais before leaving for home. The following species of birds were observed by the group: Mallard, American Merganser, Buffle Head, Old Squaw, White-winged Scoter, Greater Scaup, Golden-eye, Crows, Ravens, Blue Jays, Evening Grosbeak, Pine Grosbeak, Black-capped Chickadee, Claucous Gull, Herring Gull, Hairy Woodpecker, Downy Woodpecker, Ring-necked Pheasant, Ruffed Grouse, Canada Jay, American Rough-legged Hawk.

THE MINNESOTA ORNITHOLOGISTS' UNION

Are you interested in birds? If so, perhaps you would like to know more about the M.O.U.

Bird study is a fascinating avocation enjoyed by many individuals. Birding enthusiasts who join an ornithological club get mutual benefits by sharing their birding experiences with others who are like-minded. Bird watchers from all parts of Minnesota have banded together in a state-wide organization known as the Minnesota Ornithologists' Union.

Membership in the M.O.U. is open to any person who has a genuine interest in birds and who subscribes to the object of the organization as stated in the constitution and by-laws as follows: "The object of the Union shall be the promotion of a broad program of conservation primarily in the field of ornithology. To achieve this broad objective, the Union urges and promotes interest in field studies and observations of birds by individual members and affiliated bird clubs."

Members in good standing are entitled to vote and participate in all activities of the Union. At the annual meeting of the Union, members have the opportunity to present papers on the program and to participate in field trips. The official organ of the M.O.U. is *The Flicker*, which is published quarterly. Members are invited to publish articles and items on birdlife in this excellent magazine which is sent to the membership in March, June, September and December. The Union has been very active in the state in initiating and promoting legislation and activities pertinent to the conservation of wildlife. Annual dues for active members are $2.00 and they should be paid in advance to the treasurer.

If one subscribes to the purposes of this organization, even if he prefers to do his birding on an individual basis, there is a great need for his becoming an M.O.U. member. Active participation in the activities of the Union is not essential to membership in the society. Your support of the Union and its magazine are important in promoting ornithology in Minnesota. You are invited to join the Minnesota Ornithologists' Union.

Membership Application

Minnesota Ornithologists' Union

Name .....

Street Address .....

City and State .....

Are you a member of a Bird Club? .....

If so, name of Club? .....

Special fields of outdoor interest .....

Comments .....

Please enclose check for $2.00 with application and mail to Mrs. Mary Lupient, 212 Bedford St. S.E., Minneapolis 14, Minnesota.

Minnesota Ornithologists' Union

Affiliated Societies

ALBERT LEA AUDUBON SOCIETY

President, Helen Johnsrud; Vice-president, Iva M. Loy; Treasurer, Loes P. Scott; Recording Secretary, Esther Jorgenson; Corresponding Secretary, Mrs. C. Flugum.

Meets the second Tuesday, September through May.

AVIFAUNAL CLUB

President, Burton Guttman; Vice-president, Betsy Jerabek; Secretary-treasurer, Jeremy Berman.

DULUTH BIRD CLUB

President, J. K. Bronoel; Vice-president, John Hale; Secretary, Doris Bronoel; Treasurer, Harvey Putnam; M.O.U. Representative, Evelyn Putnam.

Meets at the University of Minnesota, Duluth Branch Science Building, the second Thursday of each month, September through May.

H. J. JAGER AUDUBON SOCIETY

President, Dr. H. A. Northrop; Vice-president, Lawrence M. Lee; Secretary, Mrs. H. A. Northrop; Treasurer, Mrs. John P. Zimmerman; M.O.U. Representative, Mrs. H. A. Northrop.

Meets at Owatonna Library every fourth Monday.

MANKATO AUDUBON SOCIETY

President, William R. Luwe; Vice-president, R. W. Sheley; Secretary, Mrs. Ada Polchow; Treasurer, Esther Klassen.

MINNEAPOLIS AUDUBON SOCIETY

President, Mrs. George O. Ludcke; Vice-president, Mrs. Whitney Eastman; Treasurer, Mrs. Malcolm Renfrew; Recording Secretary, Miss Thora Iverson; Corresponding Secretary, Mrs. Myrtle Mahoney; Field Secretary, Mrs. J. A. Thompson; Auditor, Mrs. E. D. Swedenborg; M.O.U. Representative, Mrs. I. S. Lindquist.

Meets at the Walker Branch Library the first Friday, October through June.

MINNEAPOLIS BIRD CLUB

President, Rene Hurtubise; Vice-president, Merna Quam; Secretary, Sophia Harms; Treasurer, Amy Chambers; Membership Chairman, Marie Vind; Field-trip Chairman, Boyd Lien; Editor, Vera Sparkes; M.O.U. Representative, Helen Lien.

Meets at the Minneapolis Public Library twice monthly.

MINNESOTA BIRD CLUB

President, Robert Hanlon; Vice-president, Orwin Rustad; Secretary, Theodora Melone; Treasurer, Irma Swanson; M.O.U. Representative, W. J. Breckenridge.

Meets at the Museum of Natural History.

ST. PAUL AUDUBON SOCIETY

President, John Neihart; Vice-president, John A. Hall, Sr.; Recording Secretary, Miss Katherine F. Jensen; Corresponding Secretary, Miss Berghild Berntsen.

Meets at the St. Paul Library.

The Flicker

VOLUME 26 DECEMBER 1954 NUMBER 4

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UNIVERSITY OF MINNESOTA
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THE FLICKER

Organ of the *Minnesota Ornithologists' Union.* Published quarterly in March, June, September and December. *The Flicker* is sent to all members not in arrears for dues. Dues for members: Active, $2.00; Sustaining, $5.00; Life, $50.00; Patron, $100 or more. All articles and communications for publications and exchanges should be addressed to the editor. Subscriptions, memberships, and requests for back numbers should be sent to the treasurer.

THE COVER

Snowy Owl — (Photo by Harvey Gunderson)

THE PRESIDENT'S PAGE

The change in policy in the production of the FLICKER calls for the more liberal use of photographs. These photos fall in three categories. First, illustrations for articles; second, the cover illustration in which there will be a different photograph on each issue; and third, the photo essay or picture story, possibly one in each issue.

The requirements for photographs to illustrate articles are specific in subject matter, but when you do write an article, think of possible illustrations. These could be your own photographs, or you may know of someone else who has suitable ones. Submit several possibilities with your manuscript.

Illustrations for the cover need not necessarily be of birds, but other subjects can be used. A good flower or mammal picture might occasionally be used. Good photographs of well-known birding areas might also be possibilities. I think everyone would appreciate a well-composed picture of Frontenac. The size of the illustration on the cover is 5x5 inches, so it would be well to submit your photographs in either a 5x7 or 8x10 enlargement.

The photo essay is the other new departure in the FLICKER. If we can use the center panel of the magazine, four to six pictures with short concise captions would be desirable. The possibilities this feature creates are innumerable. Certainly there is no limit to the subject matter. It also gives those who do not have the time nor inclination to write a longer article, a chance to contribute.

Still another possibility is the exploitation of the photo essay as a bird club project. A subject such as the nesting of a bird could be chosen in the spring. Individuals could pick the species which interests them. The object of this competition could be a completed essay by each of the members interested. Or a project could be assigned in which individual pictures are chosen to illustrate a club story. Suppose the maintenance of a feeder or feeding station were the project of a bird club, the club could outline the story to be told and individuals could compete for each picture. In this way, several individuals would contribute pictures for one story. The outline for such a story might be as follows: (1) general view of location of station, (2) closeup of feeds used, such as suet, sunflower seed or anything else, (3) pictures of birds and animals at the feeder, and (4) photographs of people taking care of feeder.

To maintain high standards, the following technical suggestions are made. Negative size preference is from the larger to the smaller: 4x5 first, 2¼x3¼ or 2¼x2¼ next, and 35 mm. last. In most cases 35 mm. film developed commercially does not yield crisp, sharp negatives, and what is worse, they have scratches, water marks and finger prints; these, when enlarged, detract from the appearance.

Black and white photographs submitted for publication should be 4x5 or larger (contact prints from 4x5 negatives, enlargements from smaller negatives) and on glossy paper. Please do not submit negatives. Put your name and address on the back of each picture. If you are a color slide fan, you can have 2¼x3¼ black and white negatives made from your slides and have 4x5 enlargements made from these. Please submit *completed* stories. Do not send negatives or small size prints.

These suggestions and standards serve only as a basis. Let's see your ideas. Help make the FLICKER an outstanding example of state bird club publications.

Harvey Gunderson, Associate Editor

Observations on the Effect of the May 1954 Storm on Birds in Northern Minnesota[1]

by

L. D. Frenzel and W. H. Marshall

Unseasonably cold weather with heavy snow occurring late in the spring has been reported as detrimental to bird life. Accounts of harm done to bird populations in Minnesota by several late storms have been reported in a general fashion by Roberts (1938) for April of 1928, '29, '35 and '37. A storm, which dramatically shifted conditions from an early spring aspect to that of mid-winter, occurred in northeastern Minneosta between April 30 and May 10, 1954. Notes concerning losses of small birds and some observations of behaviorisms of certain species involved are reported here.[2]

Chronology of Events

Hovde (1954) states that relatively mild conditions prevailed throughout the state the latter half of April, 1954. At International Falls, Babbitt, Bemidji, Grand Rapids and Duluth, daily maximum temperatures during the period April 15-April 30, ranged from 42-64° F. Although snow depths in this northern area were between 8 to 17 inches early in the month, this snow cover completely disappeared by April 15. Except for trace occurrences, the ground was snow-free between the 15th and the 30th of the month.

Many spring migrants, notably large numbers of Slate-colored Juncos, White-throated Sparrows, Song Sparrows, Red-winged Blackbirds and Robins arrived in northern portions of the state during this period of mild weather.

These birds, as well as other species in lesser numbers, were subjected to drastic weather changes throughout an eleven day period from April 30 to May 10. Minimum temperatures for the area represented by International Falls, Bemidji, Cloquet and Babbitt declined from 29-40° F. on April 29 to 19-22° F. on May 3 while maximum temperatures dropped from 48-62° F. to 27-34° F. By May 10, these temperatures had recovered to their April 29 reading. At the onset of the storm, precipitation was in the form of rain, but this turned to snow with the drop in temperature. Certain localities reported continual snowfall for eight days; however, the greatest amount had accumulated over the area by May 5.

Although this storm was recorded generally throughout the upper midwest, northeastern Minnesota reported the most severe conditions as can be demonstrated by describing snow accumulations in some areas affected by the storm (see fig. 1). Snow depths in areas on both sides of a line drawn from International Falls to Babbitt measured 12 to 13 inches. To the south and west, in an area extending to Baudette, Bemidji, Park Rapids, and east to Duluth, snow on the ground reached a depth of from 6 to 10 inches. One to 3 inches of snow covered the ground south to an arc through Alexandria, St. Cloud, and Minneapolis-St. Paul. The area east of a line drawn from Park Rapids to Baudette and north of a line drawn from Park Rapids to Duluth experienced the most severe aspects of the storm.

1. Paper No. 874, Miscellaneous Journal Series, Minnesota Agriculture Experiment Station, St. Paul 1, Minnesota.
2. Since preparation of this report, the notes on losses during this storm on pages 74 and 80 of THE FLICKER, vol. 26 (2), have come to our attention.

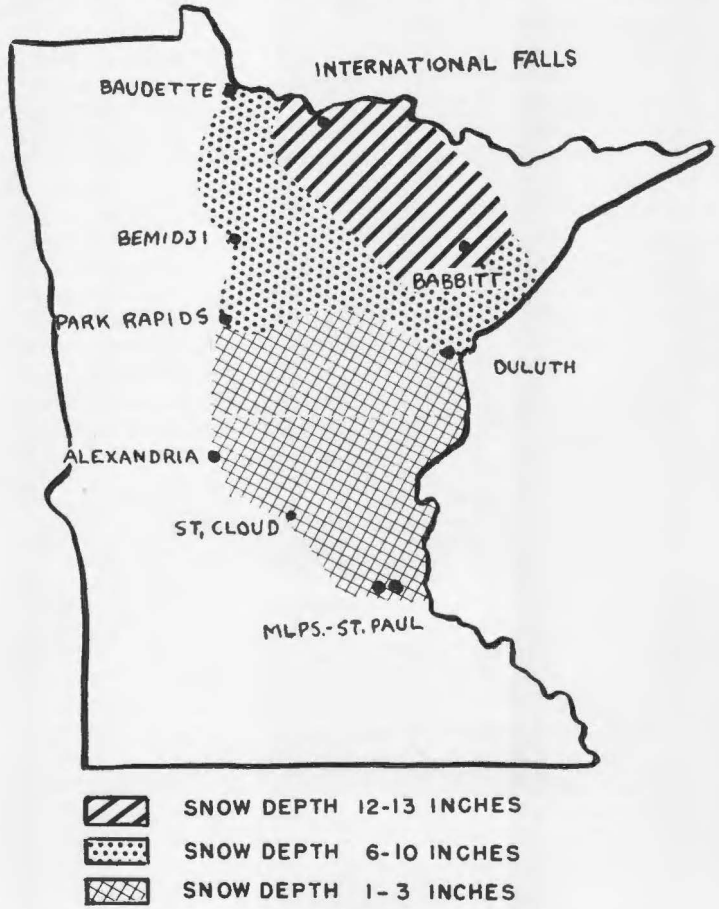
Reports of Field Conditions

Decimation of bird populations and other forms of wildlife by the storm is not well known but eye-witness accounts from several of the more seriously affected areas indicate hardships endured by individuals and the resultant changes in activities with some indications of mortality.

At the home of L. D. Frenzel in a wooded area a mile and a half south of Ely, Slate-colored Juncos and White-throated Sparrows were particularly numerous as the storm set in. Chipping Sparrows, Song Sparrows and Fox Sparrows also were present but in smaller numbers. As the storm increased in severity, these birds, along with wintering species, heavily utilized two feeding stations maintained in the yard.

At first there was evident demonstration of dominance between various species and peck order within a species. If a number of birds of one species was using a feeder, they would readily leave the station upon arrival of another more dominant species. Winter residents such as the Blue Jay, Red-breasted Nuthatch, Canada Jay and Chickadee held

SNOWFALL IN MINNESOTA – April 30 to May 10, 1954



priority over the transients while among the migrants a lone Fox Sparrow would chase off a dozen or more of another kind of sparrow. However, with an increase in storm intensity these typical behaviorisms were broken down entirely. It was not uncommon at the height of the storm to observe upwards to a hundred birds, varying in species, in close association at the feeders with many more in the general vicinity of the house.

It was not unusual at night to switch on the yard light and find as many birds still at the stations and in the immediate area of the house. While driving through the streets of Ely one night during the storm, large numbers of birds were seen using open front porches of houses for protection. One person related that an estimated 400 to 500 birds, juncos and sparrows by his description, took refuge in his opened garage and that similar incidents had occurred in his neighborhood.

Even with the conscientious effort of citizens to provide food for the hard pressed birds, there was appreciable mortality of some species. At the midpoint of the storm, numbers of birds could be seen day and night huddled at sides of houses and garages apparently too weak to feed with the stronger, active birds. When the storm finally spent itself, persons told of finding dead birds along the foundations of houses or in any situation affording shelter, as well as near street curbs where food had been thrown since snow plows left these areas the only surfaces upon which there was not a foot of snow. Slate-colored Juncos and White-throated Sparrows were two species commonly described as found dead following the storm. Reports indicated that robins suffered to a lesser degree.

An unusual behaviorism was exhibited by certain bird species which apparently was provoked by the extreme conditions. This was the attacking, killing and feeding upon a small species of songbird by a larger one.

Walter Anderson, who resides outside of Ely, related that blackbirds repeatedly attacked White-throated Sparrows and Slate-colored Juncos, striking them down in mid-air. The attacking birds would then feed on their victims briefly and leave them. Clifford Ahlgren, resident forester at the Quetico-Superior Wilderness Research Center on Basswood lake north of Ely, noted a robin attacking juncos and sparrows in the same manner. At the residence of L. D. Frenzel this behaviorism was witnessed, and the aggressive species was identified as the Rusty Blackbird. Birds feeding eagerly at feeders were repeatedly noticed to disperse with a conspicuous fluttering and twittering. It was thought at first that a hawk was in the area, but investigation revealed several Rusty Blackbirds had caused this reaction in the smaller birds and two Rusty Blackbirds were observed feeding on a Slate-colored Junco and a White-throated Sparrow. Apparently the smaller birds had been killed in the manner described by Walter Anderson, for immediately before each observation there were no dead birds at either station. It did not appear that the blackbird was selecting weak or dying birds, for there were numbers of these huddled unmolested along the foundation of the house. According to the numbers of reports concerning this phenomenon, it occurred frequently.

Milton Stenlund, area game biologist at Ely, reported:

"Song Sparrows, White-throated Sparrows, Red-winged Blackbirds, Flickers, and Juncos by the thousands were caught in the snow in that area." He added further notes on direct losses to predation and highway kills as follows: "Mr. Esterberg of White Iron Lake reported that Red-winged Blackbirds were attacking and eating juncos at his feeding station. A smilar report was received from the Martilla farm near Burntside lake. Sheriff Al Malnar of Grand Marais reported that Sea Gulls had attacked and killed four Juncos, a

Robin, and a Flicker at his feeding station. Snow plow crews reported hundreds of juncos and other small birds littering the highway along the Iron Range from Hibbing to Ely."

Morris L. Paterson, supervisor of the Kelliher-O'Brien refuge, Blackduck, Minnesota, reported on conditions near Bemidji as follows:

"During the mild weather occurring in the last week of April, 1954, many of our song birds arrived in this area. On May 2, a blizzard swept in, and from observations and numerous reports it was evident that a high mortality of song birds took place.

"On May 3, I made a trip to Bemidji and observed a great many birds en route along the highway. These birds were reluctant to leave the snow-free road and most of them were noticed along highway strips sheltered by woods. Juncos, Song Sparrows, White-throated Sparrows and Robins were most numerous.

"The afternoon of the third while on patrol of my refuge area, similar conditions to those noted in the morning were observed. I picked up a Song Sparrow that had 'balled snow' on the feet, bill, and tail. This bird recovered after getting a warming up. Many other birds were seen with snow clinging to the feet and tails and swallows were observed flying about over Blackduck Lake. On May 4, not as many birds were seen, but reports came in that concentrations of birds were being seen in sheltered areas such as cellar windows, porches, open garages, and barnyards. The temperature climbed on May 6 with the wind velocity going down and the snow settling.

"The following mortality list is believed to be accurate as reports were screened and no recordings made unless assured of their accuracy. Many of these birds were either found by me or brought in to me. The list includes 6 Myrtle Warblers, 42 Purple Martins, 3 Flickers, 16 Robins, 4 Song Sparrows, 7 White-throated Sparrows, 16 Juncos, 1 Tree Swallow, 2 Barn Swallows, 2 Starlings, 1 Lesser Yellow-legs, and 35 unknown reported. From Walker, Minnesota, I received a report of 40 Purple Martins found dead in martin houses and a few reports of frozen eggs (Robins)."

Vernon Gunvalson, area game biologist at Bemidji adds these comments:

"My observations are similar to those made by Paterson and reports to me would indicate that Myrtle Warblers and White-throated Sparrows were especially vulnerable. I found two White-throated Sparrows and a Myrtle Warbler dead under small clumps of brush while checking a forested area in the neighborhood of Gunn lake in Itasca county.

"I, too, noted a great concentration of birds along highways with an aversion to leave the roadway and fluttering about in erratic fashion. This may have been due to the snow balls mentioned by Paterson and an inability on the part of the birds to fly properly. I believe, also that this condition resulted in quite a heavy highway kill. The Killdeer should also be included in the list of birds having trouble."

At the Cloquet Experimental Forest in Carlton county, several different results of the storm were observed by Marshall during the period April 26 through May 7.

The forest itself has abundant heavy brushy and coniferous cover with rough terrain which afford good protection from winds. Even so, seven dead song birds were found (2 Hermit Thrushes, 2 Myrtle Warblers, and one each of the White-throated Sparrow, Slate-colored Junco, and Palm Warbler). The warblers and sparrow were found in the woods on top of the snow where they had apparently dropped from trees or shrubs. However, the thrushes and junco were at the foundations of the headquarters building. Here, there were Black-capped Chickadees, Downy Woodpeckers, and White-breasted Nuthatches heavily using a hanging feeder made of a stick with holes bored in it and filled with peanut butter. But the juncos

and thrushes, which were present in flocks up to a dozen or so, apparently could not get at this food and attempted to feed around the building foundations. These latter species became very listless and inattentive after the third day of the storm.

During several trips made by car to the town of Cloquet between 90 and 100 Robins were noted on the road in the four mile distance. Also observed were Wilson's Snipe, Meadowlarks, Juncos and unidentified sparrows.

Woodcock had been observed on the forest since April 13, and on the evening of April 29 twelve singing grounds were reported active by students making the annual census. Although sleeting and snowing, birds were known to be singing on five grounds on April 30 and three on May 1. On May 2 and 3, the height of the storm, no birds were known to be active. The next night there were only light snow flurries and birds were active on two grounds but not on three others. On the evening of May 5, the weather had become clear and all birds at the six singing grounds checked were very active. The grounds were covered by 6 to 8 inches of snow at this time. Thus the males ceased their mating displays temporarily but there was no sign of loss of birds. It is not known whether nesting had begun.

In a sequence similar to that of the Woodcock, the amphibians stopped calling during the storm. Wood Frogs, Spring Peepers, and Swamp Tree Frogs had been very noisy prior to the storm. No calls were heard on May 2 or 3, but a few Wood Frogs were calling on the evenings of May 4 and 5 even though there was ice on all the ponds and snow remained in the upland areas.

Apparent Effects

Several field observations made in June and July of 1954 indicate detriment of the May snowstorm to bird life. James Beer in making bird censuses of the Basswood lake area, noted a marked decrease in both sight and song records of White-throated Sparrows as compared with that of previous years. Beer also reported that 1954 Red-eyed Vireo and Song Sparrow populations showed a noticeable decrease. An evident reduction in singing of White-throated Sparrows and Red-eyed Vireos was commented on by many persons at the Itasca Biological Station. These reductions noted in White-throated and Song Sparrow populations probably reflected the observed mortality to these species during the May storm. Mortality among Red-eyed Vireos was not reported during the storm, but it is possible that this occurred in situations not under observation.

Summary

1. Weather conditions as a result of a storm which occurred in northeastern Minnesota between April 30 and May 10, 1954, have been described.

2. Influences of storm conditions upon bird life in some more seriously affected areas have been presented with special references to mortality and altered behaviorisms.

3. Several observations have been given of apparent effects of the storm on bird populations.

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University of Minnesota

Ducks, Potholes, and Good Farming

by

James W. Kimball

It is difficult to express the true worth of outdoor recreation in monetary terms, but the dollar is the standard by which we have come to express all values. The 32,500,000 people in America who hunt and fish spent an estimated ten billion dollars on their sport in 1953. There are five and a half times as many hunters and fishermen as farm operators in this country. The money they spent last year is seven times the value of all our hogs, 22 times the value of our sheep, and 83% of the cattle value. Their spending equals two times the sales of all drug stores, four times the sales of men's clothing stores, and was equal to the income of all the filling stations in this country.

Maintaining our American standard of living means keeping up with the demand for recreation as well as the demand for food and fiber, and the recreational needs are pyramiding at an alarming rate. A survey of the armed forces showed that hunting and fishing are now the most popular of all sports. The number of such licenses sold has doubled in the past ten years.

Conserving the natural resources which provide outdoor recreation for America produces many problems. The Fish and Wildlife Service believes that pothole drainage is the most serious problem facing wildlife conservation in the midwest.

The map shows the region we are speaking of when we talk of the "prairie pothole country of the United States". The southern portion and the valley of the Red River of the North have been stippled; this area has lost most of its duck breeding habitat through agricultural drainage. The area in black has suffered some from drainage but is still highly productive. There is no reliable estimate of the numbers of ducks produced in this entire area before drainage, but an example is found in Iowa. Logan Bennett estimated that 50 years ago, three to four million ducks were produced annually in Iowa; now, because of drainage, waterfowl production in Iowa is not significant. Probably one-half to two-thirds of the productive capacity of the entire prairie pothole region of the United States has been lost through drainage. In spite of this, between four and one-half and five million ducks are still produced each year in the region of the two Dakotas and Minnesota; this we must not lose.

The picture of what drainage has done in the past is discouraging enough but without a change in agricultural philosophy and policy, the future is even more gloomy. Drainage is probably progressing more rapidly now than ever before in history. We are losing 32,000 potholes per year which means a loss of approximately 63,000 acres of prime breeding hatbitat annually. Two to three per cent of the remaining potholes are being drained each year.

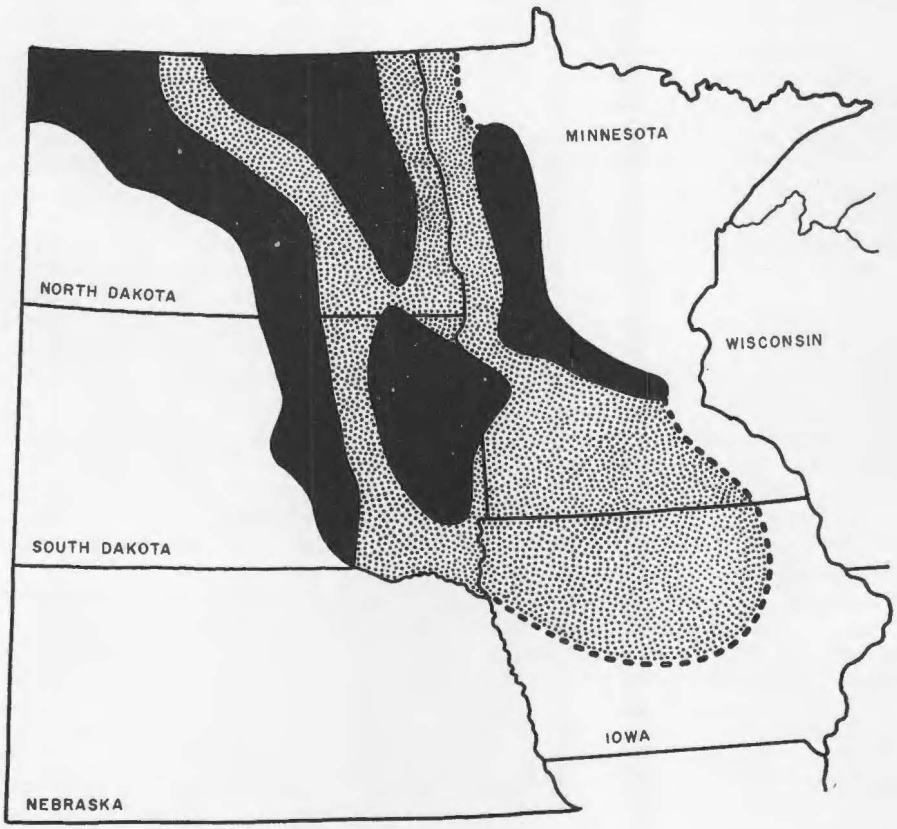
The single ray of light to be found in this gloomy picture is that in the grazing country of the two Dakotas some 50,000 stockponds have been constructed and have created waterfowl habitat where none existed in the past.

These man-made water areas in the short-grass prairie are, acre for acre, some of the most productive waterfowl habitat in this country. Stockponds and dugouts are not only good for ducks; they conserve moisture, reduce floods and advance the best in land use. The Soil Conservation Service and the Agricultural Stabilization and Con-

servation office (formerly the PMA) have done excellent work in fostering this program, but unfortunately, there are not and never will be, enough stockponds to replace a significant fraction of the habitat being lost through drainage of the prairie potholes. In spite of their high productivity per acre of water, the limited number of stockponds does not yield great waterfowl production per square mile. For example, the stockpond country will produce ten to fifteen ducks per square mile while the prairie potholes are producing ten times this amount, or 100 to 150 ducks per square mile.

In the duck-producing pothole country of the Dakotas we find 30 to 40 small water areas per square mile. In a portion of Day county, South Dakota the Fish and Wildlife Service has been conducting an intensive study for the past four years. One of the original objectives of this study was to determine which potholes could be drained without detriment to waterfowl and which types must be retained in order to maintain high waterfowl production. It was soon learned that a major factor influencing waterfowl use of an area was that of permanence, or the length of time which a pothole retained water each year. On this basis, most potholes could be placed in three general categories.

There are the potholes which have been classified as "very temporary". They may hold water for only one week in the spring, or they may retain water for two months or more. Farmers frequently call these "nuisance potholes". Their acreage is generally small, but when they occur in cultivated land, they



are a hindrance to the operation of modern farm machinery. Drainage of some of these is inevitable but, as we will see, they are important to ducks.

The "intermediate" potholes generally retain water throughout the spring and go dry sometime in July. They average approximately one acre in size and are probably the class of pothole which is suffering most from the drainage ditch. Frequently they go dry before broods reach maturity, but they too are very important to ducks.

The larger, deeper, and more permanent areas are called "brood potholes". They retain water throughout years of average rainfall and seldom go dry before late summer. Four years of record on a particular pothole showed that it provided habitat for the rearing of 40 or more broods each year. Last summer, 41 broods were counted on it at one time. In fact, the value of the ducks reared on this pothole is so great that the production of one or two years may equal in value the purchase price of the area.

At this point, we might logically jump at a conclusion. Conservation interests, state, federal and private, could muster their financial resources and purchase brood potholes, thus saving the ducks while the temporary water areas went merrily down the drainage ditch. Before making the fatal jump, we should understand something about ducks; something, in fact, about wildlife biology.

The first thing a game management student must learn is that he must provide an environment to suit the game because he *cannot change the requirements of any species.* He cannot tell prairie chickens that they could just as well live on corn as the pheasant does, or the pheasant that he could survive the winter on tree buds as the ruffed grouse does. Neither can he convince ducks that they could just as well breed and nest on a few large water areas instead of a multitude of small ones.

Here if we take a "bird's eye" view of the same "forty-brood" pothole we begin to see the fallacy in the solution we almost jumped at. In calculating the value of a single pothole, we did not take cognizance of the community relationship of potholes and the space requirements of ducks. Thousands of ducks will crowd into a few acres of open water in the fall and winter. In midsummer, 40 broods are not at all crowded in a 60-acre pothole such as this, but in spring, courting ducks require space and a certain amount of isolation. We see that our large pothole is surrounded by numerous small less permanent water areas. Four years of intensive study of this area indicates that two-thirds of the 40 broods using this pothole were brought in from these surrounding areas, and the small temporary areas were of even greater importance as breeding territories for the mated pairs. The study has shown broods moving as much as two and one-half miles over land from one pothole to another.

All of these water areas, regardless of permanence, are used about equally, acre for acre, while they retain water. Thus, it is impossible to say that one type of pothole is important to ducks and another is not. It is the *community of potholes* that creates production habitat.

We have seen what drainage has done and is doing to our waterfowl habitat, but we must realize that there are several kinds of drainage. Some has little or no effect upon duck production, some is inevitable regardless of its effect on ducks, and there is some which is extremely harmful to ducks and at the same time, is believed by soil and water conservationists to be of very questionable value to, or even harmful to, the long-term interests of agriculture and this nation. The kind of drainage being done is largely determined by topography, soil, and other factors. The prairie pothole region may be divided into two broad categories: the flat lands of northern Iowa, southern Minnesota, and ex-

tending north to the Canadian line along the James and Souris river valleys and the valley of the Red River of the North where the soils on this level land are deep and fertile and erosion is seldom a serious problem. With adequate drainage, this area is highly productive of row crops. Here, we find that drainage has been accomplished by tiles leading into large county or judicial ditches.

Frequently, the tile merely drains excess soil moisture from fields; this, of course, has no effect upon waterfowl. However, great ditches have in the past, and still are, removing large waterfowl marshes which have been some of the finest waterfowl areas on the continent. Much of this drainage would be done whether or not the landowner received engineering assistance and subsidy payments. Saving waterfowl habitat in this area involves outright purchase or, where possible, proving that drainage is not economically feasible.

The second catagory includes land that instead of being the deep-soiled flat land of the first type is rough to rolling country with soils which are fertile but shallow and extremely susceptible to erosion by both wind and water.

The first thought of a farmer seeing this view of the pothole country would be "how can I get rid of all of that water?" But take a closer look and you will see that the barren eroded hilltops are as numerous and large as the spots of land covered with water. Farm plans in this country call for retiring the eroded hills as the water-covered depressions are drained. Of course, in practice, these eroded hills are very seldom retired. In fact, pothole drainage may be actually retarding the shift to a grassland economy. Farms are frequently small and operators believe it necessary to crop every possible acre. A few fertile acres salvaged from the bottom of a pothole may act as a stop-gap, but as erosion progresses, the infertile slopes will tend to force a shift to grassland farming. We heartily endorse the soil conservation policy of encouraging a shift to grassland farming; the kind of farming for which this land is best suited, the kind of farming which will preserve these shallow erodible soils.

Drainage in this rolling country is

accomplished almost entirely by open ditches.

Here is the kind of farming in the pothole country that is not harmful to waterfowl. The rolling land produces excellent grass and hay and the potholes provide water for the cattle and homes for the ducks. It is most encouraging to note that an increasing number of soil conservationists and agriculturists are pointing out the need for keeping much more of our land under grass. For example, Dr. W. M. Myers, head of the University of Minnesota Department of Agronomy and Plant Genetics, states "Grassland farming will save and restore soil, reduce farm production costs, and in most cases, result in higher food yields per acre". "This" he states, "is true in the level deep soils of southern Minnesota and the need for more grassland farming greatly increases as we get into the rolling shallow-soiled country. The advantages of grass over corn increases by leaps and bounds as we move north".

An ever increasing number of SCS field men are encouraging grassland farming and discouraging pothole drainage. Some drainage is inevitable and we are not critical of the farmer who drains his own land at his own expense. On the other hand, we do not believe it in the best interests of this country to subsidize, through ACP payments and free technical assistance, drainage which destroys waterfowl habitat of great national value. Nothing is of greater benefit to this country than the wonderful work being done by the agricultural agencies in preventing soil erosion. With less emphasis on marsh and pothole drainage, more ACP payments and more technical services by the SCS will be available for true water and soil conservation practices. Every dollar and hour spent on drainage must be deducted from the money and time spent on soil and water conservation. Elimination of federal assistance to drainage will mean no over-all loss to the farmer. He will get that much more assistance in soil and water conservation and the whole nation will benefit. The U. S. Fish and Wildlife Service, many state governments and private agencies are spending vast sums to preserve and create waterfowl habitat. Should the government, at the same time, assist in destruction of waterfowl breeding grounds which are better than any we can create?

In these days of farm surpluses, we do not need additional land under plow. Land in potholes will keep until it may someday be needed, but barren hillsides will never produce. Why don't we spend our time and money saving the land we have instead of exploiting new lands which will keep just fine under water and which are producing this nation's waterfowl?

These remarks are in no way critical of agricultural agencies or farmers. The purpose is to point out a condition which we believe can be improved as soon as it is understood. We have excellent working conditions with the S.C.S. and A.S.C. In fact, the Fish and Wildlife Service has just inaugurated a new project which has put five well trained biologists in the field. These men are working closely with the S.C.S. men, and their services are offered to the soil conservation districts, the agricultural stabilization and conservation committees, and the farmers. They will assist with farm youth programs and we hope the sportsmen will call for their services.

Saving this nation's soil and water is the most important job — but we believe that our duck and goose program fits in well with a true soil and water conservation. If the time ever comes when man must choose between food and recreation, he will, of course, choose food; but have we reached the stage where man must lower his standard of living to maintain his standard of eating? We think not. "Man does not live by bread alone", and as long as he has "bread" in abundance, should we forfeit the beauty of waterfowl and the sport of wildfowling? — *U. S. Fish and Wildlife Service, Minneapolis, Minn.*

A Bibliography of Minnesota Warblers

by

Jane Bettenhausen

The sources of information for this bibliography were *The Flicker* and *The Journal of Minnesota Ornithology.* The volumes considered cover the period of 1937 through 1953; however, some information on warblers observed in Minnesota prior to that time is listed in several of the earlier volumes. An excellent reference for warblers recorded between 1852 and 1932 is the bibliography section of Dr. T. S. Roberts' work, *Birds of Minnesota.* Where not obvious from the title of an article, any warblers mentioned or discussed in the article are also included.

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Martini, Regina

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(Continued on page 144)

A VISIT TO A NORTH SHORE DEER YARD IN WINTER

By Les Blacklock

Winter camping in a deer yard can be fun. Make a springy, fragrant balsam bough bed.

No matter how long you must wait in a cold blind, it's worth it . . .

. . . if you get an occasional shot like this.

But if the experimental deer enclosures are young forests inside, deserts outside . . .

. . . and the entire deer yard is overbrowsed . . .

. . . you can know that ravens will feast on many starved deer in this yard. The hunter or the wolf is needed here to thin the deer herd so that young trees and bushes can grow large enough to withstand reasonable browsing.

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Moore, Tilford
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Nordick, Sister Estelle, O.S.B.
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Olin, Mrs. Walter C.
1942 Fall Bird Notes from Lester Park. *The Flicker*, 14 (4): 49-50. (Redstart).

Orr, Kathleen
1943 A Birds' Paradise, the Forest Lake Region. *The Flicker*, 15 (1,2): 9-10. (Cerulean, Black and White, Golden-winged, Yellow, Myrtle, Blackburnian, Chestnut-sided, Bay-breasted, Black-poll, Pine and Wilson's Warblers, Oven-bird, Northern Yellow-throat and Redstart).

Owen, Stella P.
1946 Black-headed Sapsucker, Red-bellied Woodpecker and Cardinal. *The Flicker*, 18 (1): 13. (Also mentions the Myrtle Warbler).

Palmer, Evelyn S.
1946 Oven-bird's Nest in Hunters Park. *The Flicker*, 18 (1): 17.

Peterson, Mrs. C. E.
1937 Yellow-breasted Chat. *The Journal of Minnesota Ornithology*, 1 (2): 10.

Peterson, Meyers
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1941 Minnesota Nesting Record, 1941. *The Flicker*, 13 (3,4): 27-31. (Myrtle, Cerulean, Blackburnian, Pine, Connecticut and Mourning Warblers, Northern Yellow-throat and Redstart).
1943 Records of Nest Destruction. *The Flicker*, 15 (1,2): 7-8. (Yellow Warbler).

Roberts, Thomas S.
1944 Early Rambles of a Bird Lover in Minnesota. *The Flicker*, 16 (3): 39-46. (Blue-winged, Golden-winged, Myrtle and Yellow Warblers).

Roberts, T. S., Ornithology Club, George W. Friedrich's Ornithology Class and Nestor Hiemenz
1937 Bird Calendar. *The Journal of Minnesota Ornithology*. 1 (2): 12-14. (Myrtle, Black and White, Orange-crowned, Pine, Palm, Tennessee, Nashville, Yellow, Magnolia, Black-throated Green, Blackburnian, Blackpoll, Chestnut-sided, Wilson's and Canada Warblers, Oven-bird, Grinnell's Water-thrush, Northern Yellow-throat and Redstart).

Rosenberger, Cyril J.
1937 Highlights of the 1936 Season. *The Journal of Minnesota Ornithology*, 1 (2): 6-9. (Cerulean Warbler, Yellow Warbler and Redstart).

Rosenwinkel, A. C.
1946 Twin Cities, A Good Birding Area. *The Flicker*, 18 (4): 105-103. (Northern Yellow-throat).
1948 Birds of Interest at Whitewater State Park. *The Flicker*, 29 (3): 82. (Blue-winged and Cerulean Warblers).
1948 Interesting Fall Records. *The Flicker*, 20 (4): 108. (Myrtle Warbler).
1950 Feeding Your Young. *The Flicker*, 22 (4): 124. (Chestnut-sided, Myrtle, Black and White and Mourning Warblers, Northern Yellow-throat and Redstart).
1950 Birds Along the Nature Trail. *The Flicker*, 22 (4): 125. (Magnolia, Black-throated Green, Chestnut-sided, Myrtle, Black and White, Golden-winged, Connecticut, Canada, Yellow, Orange-crowned and Nashville Warblers, Redstart, Oven-bird and Northern Yellow-throat).
1952 Autumn Birding on the North Shore. *The Flicker*, 24 (4): 162. (Palm and Myrtle Warblers).

Rysgard, G. N.
1940 Highway Destruction of Vertebrates. *The Flicker*, 12 (1,2): 6. (Eastern Yellow Warbler).
1940 Wilson's Birds. *The Flicker*, 12 (4): 40-41. (Tennessee, Nashville, Northern Parula, Magnolia, Cerulean, Bay-breasted, Northern Pine, Kentucky, Connecticut, Mourning and Wilson's Warblers).

Shoberg, Joan
1952 Birds in Our Science Room. *The Flicker*, 24 (3): 136-137. (Palm Warbler).

Smythe, Mrs. L. L.
1943 Bird Triangle. *The Flicker*, 15 (1,2): 13. (Yellow Warbler).

Sneed, Thelma
1944 Do Birds Like Music? *The Flicker*, 16 (1): 1-3. (Yellow Warbler).

Sparkes, Vera
1948 1948 Annual Meeting of the Minnesota Ornithologists' Union. *The Flicker*, 20 (3): 76-78. (Orange-crowned, Nashville, Yellow, Myrtle, Magnolia, Black-throated Green, Blackburnian, Chestnut-sided, Palm, and Wilson's Warblers, Grinnell's Water-thrush, Louisiana Water-thrush, Northern Yellow-throat and Redstart).
1952 Minnesota Nesting Records, 1951. *The Flicker*, 24 (1): 20-25. (Golden-winged, Blue-winged, Nashville, Yellow, Myrtle, Mourning and Black-throated Green Warblers, Grinnell's Water-thrush, Northern Yellow-throat and Redstart).
1953 Minnesota Nesting Season — 1952. *The Flicker*, 25 (1): 10-23. (Prothonotary, Blue-winged, Yellow, Myrtle, Cerulean, Chestnut-sided, Connecticut, Mourning and Canada Warblers, Oven-birds, Northern Yellow-throat and Redstart).

State Bird Commission
1949 Tentative List of Candidates for State Bird. *The Flicker*, 21 (3): 67-70. (Redstart).

Swanson, Gustav
1940 Wildlife in the Canoe Country. *The Flicker*, 12 (3): 24-28. (Mourning Black-throated Green, Chestnut-sided and Tennessee Warblers).
1943 Summer Birds of Itasca Park. *The Flicker*, 15 (3): 25-28. (Black and White, Orange-crowned, Nashville, Parula, Yellow, Magnolia, Cape May, Myrtle, Black-throated Green, Blackburnian, Chestnut-sided, Black-poll, Bay-breasted, Pine, Western Palm, Connecticut, Mourning and Wilsons' Warblers, Oven-bird, Grinnell's Water-thrush, Northern Yellow-throat and American Redstart).

Swanson, Gustav and Kenneth Carlander
1940 Summer Bird Observations at Lake of the Woods. *The Flicker*, 12 (1,2): 1-5. (Black and White, Yellow, Orange-crowned, Nashville, Cape May, Myrtle, Black-poll, Pine,Palm and Wilson's Warblers, Oven-bird, Grinnell's Water-thrush, Northern Yellow-throat and Redstart).

Swedenborg, E. D.
1939 Ten Years of Nesting Records. *The Flicker*, 11 (1,2): 3-5. (Parula, Prothonotary, Blue-winged, Tennessee, Bay-breasted, Connecticut, Palm, Black and White, Nashville, Yellow, Magnolia, Black-throated Blue, Myrtle, Cerulean, Blackburnian, Chestnut-sided, Pine, Golden-winged, Black-throated Green, Mourning and Canada Warblers, Yellow-breasted Chat, Grinnell's Water-thrush, Louisiana Water-thrush, Northern Yellow-throat, Oven-bird and Redstart).
1939 Summer Birds of the Lake Vermilion Region. *The Flicker*, 11 (3,4): 14-16. (Black and White, Tennessee, Nashville, Parula, Yellow, Black-throated Blue, Magnolia, Myrtle, Black-throated Green, Blackburnian, Pine, Chestnut-sided, Connecticut, Mourning and Canada Warblers, Redstart, Grinnell's Water-thrush, Northern Yellow-throat and Oven-bird).

Theodore, Brother I.
1952 Kentucky Warbler in Winona County. *The Flicker*, 24 (4): 159-160.

Thompson, Milton D.
1939 Spruce Grouse at Grand Rapids, Minnesota. *The Flicker*, 11 (3,4): 21. (Mentions the Nashville Warbler).
1947 Field Trip in Houston County. *The Flicker*, 19 (3): 70-71. (Prothonotary Warbler and Yellow-breasted Chat).

Voth, Richard
1937 Bird Study at Heron Lake. *The Journal of Minnesota Ornithology*, 1 (2): 4-5. (Yellow Warbler and Northern Yellow-throat).
1941 Bird Notes from Stanchfield Lake. *The Flicker*, 13 (3,4): 25-26. (Yellow Warbler, Oven-bird and Northern Yellow-throat).

Warner, Dwain W.
1950 Summer Bird Life at Carimona Woods, Fillmore County, Minnesota. *The Flicker*, 22 (2): 27-34. (Blue-winged, Yellow and Cerulean Warblers, Oven-bird and Redstart.)
1951 The Nesting Season — 1950. *The Flicker*, 23 (1,2): 1-8. (Yellow, Blue-winged, Pine and Mourning Warblers, Northern Yellow-throat, Oven-bird and Redstart).
1952 Yellow-breasted Chat in Southeastern Minnesota. *The Flicker*, 24 (2): 88-89.

Wells, Mrs. Rollo H.
1944 Thoughts While Watching a Warbler Wave. *The Flicker*, 16 (1): 15-16. (Yellow, Black-throated Green, Myrtle, Tennessee, Black-poll, Magnolia, Palm, Chestnut-sided, Parula, Black and White, Wilson's, Nashville, Canada, Bay-breasted and Orange-crowned Warblers, Northern Yellow-throat, Grinnell's Water-thrush, Oven-bird and Redstart).

Wilson, Ellen
1943 Notes from Cloquet. *The Flicker*, 15 (4): 53-54. (Pine Warbler and Oven-bird).
1944 Notes from Cloquet. *The Flicker*, 16 (2): 33-34. (Black and White Warbler).

Zimmerman, Fern
1943 Winter Feeding at Cloquet and Spring Observations at Forestville. *The Flicker*, 15 (3): 35-36. (Yellow Warbler, Northern Yellow-throat, Redstart and Oven-bird).

University of Minnesota, Duluth; Duluth, Minnesota

Seasonal Report

by

Mary Lupient

From October 1 to date of this writing, December 27, Minnesota enjoyed pleasant fall weather. Precipitation in November was below normal and temperatures a few degrees above. The first snow of the season fell at International Falls and other northern localities on October 25 and in the Twin Cities October 29. It was a light snow however and disappeared before a two-week Indian Summer beginning November 7 that was exceptionally beautiful. Deer hunting was not very successful until the last of the season because of lack of snow. Large deep lakes were still open in spots December 20, and many ducks waited for colder weather to force their departure. Minneapolis lakes were partly open and Arthur Norgard reported open water in Whitefish lake, Crow Wing county as late as December 22. The flight of Mallards and other ducks from the far north occurred the last few days of November and the first few days of December which was somewhat late and a disappointment to hunters. Observers and hunters reported fewer ducks this season, especially Wood Ducks which, however, could not be taken. A higher number of Pintail Ducks appeared on the Minnesota river marshlands this fall.

The peak of goose migration in eastern Minnesota was the last two weeks in October. Many flocks, predominently Snow Geese were seen passing over the Twin Cities. One flock, approximately 1000 individuals, was reported by Dr. and Mrs. S. Koontz.

Flocks of migrating Whistling Swans appeared in many sections of the state this season. It was an exceptionally large fall movement for Minnesota. On the first of November a storm caused large flocks of ducks, geese and swans to seek rest and shelter on Minneapolis lakes. More than 50 spent the night at Whitefish lake November 2 and J. D. Anthony reported them at Grand Rapids, November 11. Several reports indicated that their migration through western Minnesota occurred during the first part of November.

Single individuals of Bald Eagle were reported from many places, possibly wandering around during migration although some do stay all winter. An immature Bald Eagle too weak to fly was captured in Martin county December 2. It had been banded at Cedar Grove, Wisconsin, October 29. Another immature Bald Eagle that had harried penned-up turkeys on a turkey farm was wounded by the owner of the farm. It was brought to the Museum of Natural History October 2 where it was cared for, but failed to live. An immature Golden Eagle was observed by this writer October 21 flying over Deep lake near St. Paul. Florence and Lee Jacques reported a Goshawk November 18 at the Hill Farm.

A flock of 109 Sandhill Cranes was reported October 10 near Borup, Clay county by Raymond Glassel and he estimated that there were about 100 more in the vicinity.

About 25 Black-bellied Plovers and a few Golden Plovers fed in a field on the outskirts of Minneapolis near the airport October 8. In the same field more than 50 Golden Plovers were seen by this writer October 25. The occurrence of so many Golden Plovers in this area during fall migration is somewhat unusual. The shore bird migration was otherwise normal.

Franklin's Gulls interrupted their mi-

gration again this fall to sojourn in eastern Minnesota. There were many reports. A few were still flying over Minneapolis lakes November 9. Bonaparte's, Franklin's, Herring and Ringbilled Gulls flew sociably together over Deep lake October 21.

On November 11 one of John Futcher's pupils at McGregor brought him a dead Hawk Owl which had been shot while chasing chickens. One had been caught in a trap about the same date in 1953. A Long-eared Owl was brought to John October 5. It had been injured by being caught on a barbed wire fence and subsequently died. Many reports of Snow Owls were also brought to him and after careful investigation he reported at least six authentic records. One of the birds was killed by a farmer after it had just attacked a domestic duck. J. D. Anthony, Grand Rapids, said that a Snowy Owl pounced on a Canvas-back Duck that had just been shot and carried it six or eight feet, but apparently the duck was too heavy for the owl and it was dropped. There were 26 records of Snowy Owls, the earliest at Goose lake, Hennepin county, November 6 by Edward Martin and the farthest south was Winona county by Brother Theodore.

Not many Northern Shrikes were reported. Dr. W. J. Breckenridge had one at his feeder, November 6. One apparently endeavoring to prey on birds at a feeder owned by Mrs. Ray Fuller, Lake Minnetonka, was shot and brought to the Museum of Natural History, December 5. It appeared at the feeder November 14.

Tufted Titmice appeared at feeders in and around the Twin Cities. At Vadnais forest near St. Paul three were seen by A. C. Rosenwinkel at feeders installed by the St. Paul waterworks partly because of the interest and efforts of R. E. Cole who assists in maintaining them.

Mr. Rosenwinkel and others stated that Red-breasted Nuthatches were very abundant in the forest. He saw three Red-headed Woodpeckers at the Hill Farm, December 18.

There was a heavy migration of Ruby-crowned Kinglets on the Gunflint Trail about ten miles from Grand Marais, October 3. A few Chestnut-sided Warblers accompanied them. Good sized waves of warblers (mostly Myrtles), Ruby-crowned Kinglets, White-throated Sparrows, Slate-colored Juncos, Brown Creepers and Vireos migrated through Minneapolis October 4 to 11. In a woodland a few miles south of Minneapolis, large flocks of sparrows were observed October 8. There were immature and adult Harris, White-crowned, Gambel's, Tree and White-throated Sparrows. Flocks numbering hundreds of Slate-colored Juncos and Tree Sparrows were seen in the forests of Crow Wing county November 2.

American Pipits and Northern Horned Larks were abundant at Grand Marais, October 1 to 3. The Pipits crept in and out of piled logs that were to be shipped for pulp wood. They wandered with the Horned Larks about the streets and yards of the town.

A large concentration of Western Meadowlarks appeared near Afton just at sundown, October 21. Apparently they were in migration. They stopped in a field and sang for some time before settling for the night.

Pine Grosbeaks were reported at Vadnais forest, December 16 by R. E. Cole. He saw about 25; A. C. Rosenwinkel saw about 40 at Pleasant lake, Hill Farm, November 20; C. Kinsey reported them at Tamarac refuge November 21; Carl Johnson at Worthington November 13; and several were seen near Walker December 16 by Mrs. P. A. Becker. The Beckers established a bird sanctuary at Hilltop Acres two years ago, and now have more than 200 Evening Grosbeaks coming to their feeders. John Futcher stated that about 25 Evening Grosbeaks appeared at McGregor November 2. In Minneapolis a small flock fed on pine cone seeds at Lake Nokomis, November 7.

A large flock of Lapland Longspurs and Prairie Horned Larks roamed the fields at the outskirts of Minneapolis near the airport, October 8. Snow Buntings flew along the highway at Mille Lacs lake, November 2. J. D. Anthony reported them at Grand Rapids November 6.

Dr. O. Lakela saw a very large concentration of Bohemian Waxwings flying over the campus of the Duluth branch of the U of M, December 22. She estimated that there were about 500. Later in Duluth she saw 103 more feeding on mountain ash berries.

A very unusual influx of White-winged Crossbills occurred in the Twin Cities and vicinity, also southward. A flock of 25 fed on pine cone seeds at Lake Nokomis November 4 and remained for at least two weeks, possibly more. They were reported from several localities the most southern being Red Wing, date of October 31. This report was sent by Marjorie Vogel.

The unusual record of a Townsend's Solitaire is credited to Charles Wiberg. It appeared at Lake Nokomis in Minneapolis November 7 and was seen later by several Twin City observers.

Minneapolis, Minneosta

Announcement — 1955 Spring Meeting
Lake Itasca Forestry and Biological Station
Itasca Park

Preliminary plans have been made for the spring meeting at Itasca park on May 28, 29 and 30. The Biology station will be open early Saturday afternoon for you to arrive, get settled down, and do a little preliminary birding. Dinner will be served at 6:00 p.m. with an evening session scheduled for 8:00 o'clock, of introduction to the park and briefing on Sunday's field trips.

On Sunday you may choose either of two long trips scheduled. One west via the highway 113 to Waubun and Fertile where outstanding waterfowl producing pothole country, Mima mounds, and the Fertile sand dune area will be visited. The latter has a mixture of nesting western and eastern songbirds in very high densities. The second trip is to the Mud Lake Migratory Waterfowl refuge near Thief River Falls where the management program of the refuge and a rich variety of marsh and waterbirds will be seen. These trips are in the neighborhood of 200 miles each and, with an early start, will take all day. Persons desiring to do so can, of course, stay in the park for field work all day.

On Monday morning several trips to choice birding areas in the park itself will be organized. Following lunch the meetings will break up for a leisurely return home.

Lodging will be in student cabins with bunk beds and washroom facilities. Linen, blankets, and pillows will be provided. The meetings will be held in the assembly hall. Meals will be served in the dining room except for Sunday noon which will be in the field.

Total cost will be $9.00 for two nights lodging and five meals.

The Canadian Lakehead

by

A. E. Allin

The late summer and the early fall of 1954 were drier and warmer than usual with an absence of severe storms or other conditions which might influence bird movements. Not until the end of October was there sufficient cold to freeze the marshes. Three inches of snow fell in the Pigeon river area on October 29. The temperature fell to 20° that night and to 13.7° on October 31 when the marshes and small lakes were frozen for the first time. On November 1, the area experienced one of the worst storms for that date in many years. The snowfall totalled ten inches. November as a whole, however, proved to be mild; the snow disappeared from the ground and lakes and marshes re-opened. Winter really commenced after a permanent heavy snowfall of November 27-28.

The above snow covered the weed seeds, and ground-feeding Juncos, Tree Sparrows and Snow Buntings were deprived of their food supply. Not so for many northern visitors. There is a very heavy crop of fruit on both highbush cranberries and rowans. The Manitoba maples in town and mountain maples in the bush are loaded with keys. There is an exceptional crop of seeds on the white birches as well as a heavy cone crop on the spruce trees. One should expect a local invasion of Pine Grosbeaks and Bohemian Waxwings, of Evening Grosbeaks, of Redpolls and Siskins, and of the two Crossbills to feed on their favorite foods. There is some danger the numerous Starlings will strip the rowans in the cities so there will be no berries available for the Pine Grosbeaks.

Probably as a consequence of the mild fall, migration studies were not as interesting as usual. L. S. Dear reported Northern Phalaropes swimming in Lake Superior, 50 yards off-shore, on September 1 and Dr. E. N. Wright observed one in Quetico park about the same time. These are the fourth and fifth local records for that species. Dear also reported four Wood Ducks on Whitefish Lake on September 13. Heavy flights of Myrtle Warblers occurred on September 12 and 27 and again on October 3. On the latter date there was a heavy migration of Crows, Juncos, White-throated Sparrows, Robins, Ruby-crowned Kinglets, Brown Creepers, and Lapland Longspurs. A flock of thirty Killdeer feeding on the sanatorium lawn on September 27 were undoubtedly migrating birds. Thousands of migrating Juncos were seen by Geo. Whitefield on October 15.

Grackles were very common during September. Late in the afternoon of September 4, we were told that birds were dying in numbers in a local area of Fort William. On visiting the region, many Grackles were noted in the trees. They were very noisy; some were perched on the roofs of near-by buildings. They appeared to be sick; their calls were distressed. A few fell from their perches while we watched. Twelve of these were collected and placed in the ice box overnight at —8°C. To our amazement one of these was sitting up, apparently healthy, when we opened the refrigerator the next morning. We have no suggestions as to the cause of death of these Grackles. We suspect poison and are attempting to have the bodies analyzed.

During 1952 and 1953, C. E. Garton noted Broad-winged Hawks migrating along the Port Arthur shore in mid-

September and in 1953 we felt we had definitely located a fly-way when on September 21 we watched a fairly heavy migration of Broad-wings and also saw seven other species. This year no hawks were seen in this area despite considerable study. Possibly we concentrated our efforts on too narrow an area for on September 26 a few Red-tails, and Sparrow Hawks, as well as one Pigeon Hawk were seen migrating in a southwesterly direction, in an area several miles inland. There is a heavy migration along the north shore of Lake Erie. Twenty-five thousand Broad-wings were counted there on September 23, but the following day freshening southerly winds pushed the flight 30 miles inland. The same prenomenon may have occurred locally.

The first northern birds to arrive were Lapland Longspurs in mid-September. Tree Sparrows appeared on September 27. Mrs. Knowles reported a Northern Shrike on October 15 and another was seen at Whitefish lake on October 30 (David Allin). A few others were reported in November. On October 3, a magnificent adult Goshawk dashed in front of our car. No Rough-legged Hawks were seen during the fall; usually they are fairly common. Snow Buntings appeared at Whitefish lake on October 9. Flocks of one to two hundred were seen regularly until mid-November. Ravens were fairly common. One was observed patrolling a stretch of highway on November 7, and we clocked its speed at 18 miles per hour. Several observers state Canada Jays have been unusually common. An occasional Evening Grosbeak was reported in October.

Pine Grosbeaks finally made their appearance on November 7, a month later than usual. Subsequently, they have been fairly common. Another abundant northern visitor is the Redpoll, great flocks of which are seen daily in Fort William feeding on the seeds of the white birch. A few Bohemian Waxwings were seen on November 7 (Dorothy Allin) and the Allins saw a single bird on November 20. Sigurd Olson reported numbers at Ely, Minnesota, about the same date so there may be a major invasion of these visitors this winter. The presence of a heavy crop of cones on the spruce suggested the possibility this might be a Crossbill year. R. Robb reported the first White-winged Crossbills on September 2. He saw them in numbers on November 14.

D. Adams reported a flock on a gravelled road on December 9, and two were struck and killed by her car. Miss Adams thought they were feeding on some substance on the road. Possibly it was calcium chloride which had been used to treat the surface. Several years ago, we observed both species picking at a gravelled area so treated. E. Forbes reported Red Crossbills at Sibley park on November 13 and the Allins saw three, 50 miles southwest of Fort William, on November 20.

Several unusual observations were reported in November. E. Forbes saw a Glaucous Gull in Port Arthur on November 18. C. Watkins gave an excellent description of a male Cardinal he saw in Marks township, west of Fort William, on November 10. This is the second regional record for the Cardinal. The Mourning Dove is an occasional visitor. One was killed by a car at Shebandowan on November 21. On the other hand there was an almost complete absence of our usual summer residents remaining into October and November, although a few Robins were still present in mid-November.

Probably the most interesting November visitors were the owls. The first Snowy was reported on November 3 and several were seen later in the month. A Hawk Owl was seen by C. E. Garton, on November 4, the first local record since 1939-1940 when three were observed. A second Hawk Owl was shot by a misguided grouse hunter a few days later. There have been only three local records of the Long-eared Owl but two were brought to our at-

tention during the month. One was brought to me on November 5 and a second was given to Garton on November 21. Both were injured birds. As usual, several Great Horned Owls were observed. Museum authorities are as yet uncertain as to the sub-species regularly occurring in Thunder Bay district although most specimens collected approach *virginianus*. Several years ago Dear collected an adult from a nest. This was tentatively identified at the Royal Ontario Museum of Zoology as the Labrador Horned Owl, *heterocnemis*! On November 13, the Allins observed a Great Horned Owl as pale as a Snowy. Was it a visiting Arctic Horned Owl, *wapacuthu*?

The Ruffed Grouse is probably in the trough of its cycle. During the October open-season relatively few were reported, but more were seen during the November season. We actually saw 20 birds this fall in comparison to 30 a year ago. Approximately the same amount of travelling was done each year. The birds were all large and well-developed and we suspect they were not hatched in 1954. As was the case in 1952 and 1953, one copper-ruffed individual was reported. On July 14, John Budd reported four newly-hatched young. This was a very late date and suggested the probability of a second nesting attempt. The majority of the birds shot had crops filled with the fruit of bunchberry and rowans even after early November when they had commenced budding on alders, aspens and white birch. The Spruce Grouse has not declined like the Ruffed Grouse. They were abundant in the Black Sturgeon area, northeast of Port Arthur, and at Graham, 100 miles west of Fort William, where very large numbers were present on October 11.

Very few Sharp-tailed Grouse were seen this year. Although the prairie form at one time increased locally until it was not uncommon its numbers appear to be steadily declining. The introduced Hungarian Partridge continues to hold its own within the limits of the two cities obtaining abundant food and shelter about the elevators, but the surrounding country lacks sufficient shelter and winter food. These birds are the descendants of 40 pairs introduced by local sportsmen in 1932. The Ringnecked Pheasant was introduced about the same time and a few persisted for a decade and possibly longer. It is again being raised at Hymers, southwest of Fort William, by a sportsman who hopes to reintroduce it. We do not anticipate he will be successful due to our excessive snowfall.

In October, your scribe was subpoenaed to appear as an expert witness in a murder trial. The prosecution claimed certain eggs were those of the domestic hen; the defense claimed they were those of a wild bird! The trial for a time developed into a discussion of the species of grouse in this region, their relative abundance, how readily a nest with fresh eggs could be found by a newcomer from Europe and the effect the late, wet spring might have on the probabilities of fresh grouse eggs being available at the end of June. The eggs were obviously those of the domestic fowl and the jurymen I believe appreciated that fact even though it did not affect their verdict!

The fall waterfowl migration was better than in 1953 but was below average. The first Canada Geese were reported on October 6 and the occasional flock was reported throughout the month but few, if any, Snows and Blues were seen. Coot appeared in small numbers on October 9 and about two dozen were still present when the marshes froze at the end of the month. Pond ducks were scarce throughout the fall. Numbers of Blue-winged Teal had gathered by mid-September but left shortly after the opening of shooting. Green-winged Teal were uncommon. One was reported at Whitefish lake on October 30, a late record. We saw only one Pintail, and only a few Mallards, Blacks, and Baldpates were present. Mergansers were

very scarce; a single Hooded was seen on Whitefish lake on October 30. We saw no Ruddys, Scoters or Eiders. Few American Golden-eyes were seen after early October, although we expect their numbers to increase in late October. A few were present in late November on Lake Superior. Buffleheads were scarce; a few were seen in mid-October. As usual, Canvasbacks were rare visitors; one flock was still present on Lake Superior in early November. We failed to see a Redhead. The usually heavy migration of Ring-necks expected in late September and early October failed to materialize for the second successive year unless they were the "Bluebills" reported in thousands on Whitefish Lake on October 13. A few Lesser Scaup appeared as early as October 1 and remained in small numbers until the end of the month. Formerly we did not expect Greater Scaup until late October or early November. They appeared in mid-October, 1952; few, if any, were seen in the fall of 1953. This year they appeared on October 9. A few were present until October 30 but no large migration was recorded.

Although it did not appear at the Lakehead, an unusual reverse migration of ducks is of interest. Ducks Unlimited reported thousands of ducks returning to the marshes of southern Manitoba on November 22. These included Mallards, Blacks, Baldpates, Lesser Scaup, Redheads, Canvasbacks, and Blue-winged Teal. The majority left the night of November 24, but many thousands remained until driven out by the cold wave of November 26. Al Hochbaum checked the Lower Souris refuge and found this northward movement had also been noted in North Dakota. — *Regional Laboratory, Ontario Department of Health, Fort William, Ontario.*

Notes of Interest

PHOEBE BROODS AT ITASCA STATE PARK, MINNESOTA — Between June 21 and July 11, 1954, I banded 11 broods of the Phoebe (*Sayornis phoebe*) at or very near Itasca State Park, Minnesota. At the time of banding (approximately 1-4 days before fledging), these consisted of 6 broods of 5 each, 3 broods of 4 each, 1 brood of 3, and 1 of 2. The mean number per brood was 4.3. Further details of these broods are given in the accompanying table.

The banding of the first 9 of these broods in the last 10 days of June, as opposed to only 2 broods in the next 11 days, suggests to me that these 9 were probably all first broods.

Only two of the 11 broods were affected by mites. One of these lost 1 young in the four days prior to banding; the other involved a nest in which all 5 young subsequently failed to fledge. In another nest (not listed in the table) 1 egg was found smashed on the ground on June 28 when the (presumed) female was incubating 3 eggs. The preliminary evidence seems to point to initial clutches of 5 for Phoebes in this region, with predators, parasites and addling (or infertility) reducing this to fledgling broods of the order of 4.3.

Banding Date	*No. in Brood*	*Miscellaneous Data*
June 21	5	
June 22	3	4 young June 18; 1 egg left in nest
June 22	4	Known 1st nest (Sister Emilene Radtke)
June 23	5	
June 23	4	1 egg failed to hatch
June 28	2	2 young also seen June 22
June 28	5	All frightened off by bander
June 28	5	All fledged July 2 (*vide Haber*)
June 30	5	Young failed to fledge
July 7	4	From 4 eggs seen June 21
July 11	5	From 5 eggs seen June 22 and 28

Margaret Brooks Hickey, University of Minnesota Forestry and Biological Station, Lake Itasca, Minn.

* * *

HENSLOW'S SPARROW IN VIRGINIA — On September 19, 1953 in a weed patch on the outskirts of Virginia, in what is known locally as the Mill Forty, just south of Olcott park, I saw what I am convinced was a Henslow's Sparrow. My attention was first attracted to the bird, definitely a sparrow, because as it flew it seemed to have almost no tail. By following it the short distance that it moved, I was able to get two good looks at the bird with a 6-36 binocular. The straight line of beak and head, the dark streaks on sides and breast, even the two gape lines, as well as the brown of wings were all clearly seen. It was under observation for several minutes and both the behavior and the alarm note fitted description given. The first of the flight of northern birds had just arrived and, as I have observed the birds in that particular area for years in both spring and fall and have never seen one of these before, I am inclined to think it arrived with the migrants. However the possibility that it nested somewhere in the vicinity along with Savannah Sparrows and other meadow-loving birds cannot be ruled out.

Vera Barrows, Virginia, Minn.

OPENING DAY DUCK RECORDS — A comparison of the opening days of duck hunting for the past four years in the Mankato area is available from records turned in by students in the senior high school biology classes. It occurred to me that the picture thus presented might be of interest to sportsmen and other ornithologists of the state.

Species	*1951 Oct. 8*	*1952 Oct. 1*	*1953 Oct. 5*	*1954 Oct. 2*
Common Mallard	116	94	68	91
Black Duck	8	2	7	1
Gadwall			1	
Baldpate	2	1	3	4
Green-winged Teal	32	38	13	35
Blue-winged Teal	122	96	272	229
Shoveller	13	5	14	4
American Pintail	10	25	22	24
Wood Duck	11	25	52	12
Redhead	23	10	14	9
Canvas-back	4	2	4	
Scaup	2	2	3	
Ring-necked Duck				1
Buffle-head				1
Ruddy Duck	14	3	6	4
Blue Goose			1	

It must be explained that I requested that in the event that Wood Ducks were mistakenly shot I wished to have that information turned in also, in hope that we might get some idea of the value of protection of one species of duck.

Robert W. Hanlon, Senior High, Mankato

* * *

BLUE BIRD TRAIL, DULUTH - 1954 — The very limited success of its Blue Bird trail during the seasons of 1952 and 1953 did not discourage the members of the Duluth Bird club. During the winter of 1953-54 Joe Antonio built an additional 100 houses, which were set out the early part of April on roads north of Duluth. Eighty of the 100 new houses were occupied, nine remained empty and 11 were missing or destroyed. The percentage of Bluebird nestings was highly encouraging. Fifteen, or approximately 20% of the houses occupied contained Bluebirds. Tree Swallows nested in 63 houses and House Wrens in two. Although no accurate check was made, some of the Bluebirds nested a second time. Our Bluebird trail now extends over a distance of 75 to 100 miles and an accurate record of eggs and young is difficult to maintain. Many of the young birds were banded during the past season. Joe Antonio is busy building new houses to replace those missing or destroyed, and we are anxiously awaiting the next year to see if our percentage can again be increased. Our record of all houses during the past season is as follows:

Tree Swallows	88
Bluebirds	16
House Wrens	3
Empty	11
	118

J. K. Bronoel, Duluth Bird Club

SOME OBSERVATIONS ON THE DENSITY OF POPULATION OF CERTAIN BIRDS — For several years it has seemed to me that the Willow Thrushes or Veeries, the Red-eyed Vireos, the Chestnut-sided Warblers, and the Oven-birds were unusually abundant on a particular stretch of highway north of Virginia. So, this spring, it was decided to obtain some definite information on the matter. The road mentioned is what is known as the old Tower road and runs north from Higgins Location, connecting with the present highway to Tower some ten miles out of the city. It was once a part of the main highway but was abandoned in favor of another route, is no longer in good repair, and is not heavily used. From the north boundary of Higgins the part under investigation crosses a highway for ore-laden trucks, climbs over a hill, descends and rises again, finally falling to the level of a swamp, where it branches in a Y.

The count was taken on birds not more remote than 500 feet from the highway on either side, though by far the larger number of birds were within 100 feet. There can be no question of duplication, as at each stop only those birds were listed which were immediately to the rear, to the side, or directly ahead and, for almost all of them, their song did not carry one-tenth of a mile. Both days were sunny and warm but on June 8 there was a considerable breeze from the southeast. Observations were made from the car or from the road and no attempt was made to look for birds except in cases were the identity of the singer was in doubt as was true for the Mourning, the Canadian, and the Black and White Warblers. However in some cases the birds were both seen and heard. This was true of the Cowbirds and Crested Flycatcher. No doubt there were some birds which did not reveal their presence by song or call. That such was the case I have reason to believe inasmuch as Redstarts, Cuckoos, and additional White-throated Sparrows were heard on the return trip or at subsequent times along the same stretch. A second trip was made to check the results of the first, but no further checks could be made because of absence from the city. The results, on the average were:

33 Chestnut-sided Warblers per 2.7 miles or 1 every 432.0 feet,
24 Red-eyed Vireos per 2.7 mile or 1 every 593.7 feet,
25 Oven-birds per 2.7 miles or 1 every 570.0 feet,
23 Nashville Warblers per 2.7 miles or 1 every 619.8 feet,
16 Willow Thrushes per 2.7 miles or 1 every 891.0 feet.

If the singers were all mated males the population of each species would be doubled and the distance apart would represent the separation of pairs. Furthermore at least 27 species probably nest in the area. That any were migrating is doubtful inasmuch as, for all species represented, the peak of north-bound movement came in the third and fourth weeks of May or earlier. There was a uniformly smaller count on the east side of the road which may have been due to the fact that the driver sat on the left side, though both car windows were open, and often the count was taken from out in the road. Unfortunately, it is expected that the entire area may eventually become a huge open pit mine. — *Vera Barrows, Virginia, Minn.*

* * *

WHITE-WING SCOTERS IN BLUE EARTH COUNTY — On Friday, October 15, four White-winged Scoters were shot out of a flock of nearly 30 on Lake Elesian, near Elesian, Blue Earth county, Minnesota. All four birds appear to be juveniles since they are sooty brown to black on the crown and back and lighter on the breast and underside. There are small patches of white in the ear region and between the eye and bill. The birds were shot by Howard Schaub and party and were turned over to me as a result of a talk I had given to the Key City Sportsmen club of Mankato a few days before, the topic being duck identification.

Robert W. Hanlon, Senior High School, Mankato

The Book Page

OUR BEAUTIFUL WESTERN BIRDS, Russell T. Congdon M.D. 408 pp. 185 black and white ill., 4 color ill. Exposition Press N. Y. $9.00.

With today's rapidly increasing number of bird books appearing on the market it becomes necessary to choose those books that fulfill specific needs. First, a field identification manual is a "must" in getting acquainted with the differences between species. Detailed information on the courting, nesting, food habits and other life history facts require reference volumes for the library. Then come those books largely for recreational reading which tell you how and why others are finding this field of such absorbing interest. The present volume falls in this latter category.

An easy chair by the fire with your robe and slippers while listening to the wintry winds howl through the screen porch sets the stage for this book and a pleasant evening of vicarious "birding" in many faraway places. It is perhaps best suited to the already initiated birder who has experienced some of the thrills of making the field acquaintance of unusual species, although it also will serve well as an introduction to the sport for the neophyte. Readers will find themselves traveling willingly with Dr. and Mrs. Congdon from Churchill's Golden Plovers, Hudsonian Godwits and Parasitic Jaegers to visit their own close-to-home Avocets, Ravens and Sage Grouse, then on south to Texas' wintering Whooping Cranes and the gulfcoast migrations.

The chapters vary from a single page to ten or twelve pages depending on just what Dr. Congdon found sufficiently interesting to write about in each experience. In fact, this is primarily a picture book. The writer makes no pretense of contributing to the science of ornithology but merely relates the happenings and some of his impressions surrounding the adventures of getting the shots. The accounts reveal what a close companionship existed between Dr. and Mrs. Congdon, whom he refers to constantly as "Partner", and what wonderful times they must have had together in their decades of photographing birds in the "back country" wherever and however they could reach it. And some unusual observations they made: the Ravens that built a nest in a deserted cabin attic and laid a corduroy road of cross sticks from the nest over the open rafters to the broken window through which they entered; the Parasitic Jaeger that flew off with both his hat and his headnet when he intruded too close to the nest; and the Least Sandpiper that gently nudged open Partner's hands holding the newly-hatched young, then slipped in to brood them between her open palms.

Four attractive color prints are placed unexpectedly inside both front and back covers. Having seen actual prints of many of Dr. Congdon's superb bird shots, I was a bit disappointed in the somewhat grainy reproductions which lost much of the sharpness and vitality of the originals. The publisher's attempt to achieve the new and unusual by employing a dark green ink in both text and illustrations, I feel, was not an unqualified success. But in spite of these weaknesses, the wide variety of really excellent bird portraits (185 of them) makes the book a very attractive one for recreational reading and should be an excellent gift for that friend who is just opening the door to the fascinating hobby of birding.

W. J. Breckenridge

BOOKS FOR SALE BY THE M.O.U.

The M.O.U. policy committee has appointed Walter Jeracek and C. C. Prosser to handle the sale of books on ornithology and other subjects of interest. All profits will go into the treasury of the M.O.U.

You are now receiving *The Flicker* for $2.00 per year. On the basis of about 450 members the cost to the M.O.U. is nearly 90 cents per copy. It is quite evident your treasury can not continue to pay out $3.60 a year for *The Flicker* and you pay only $2.00. The solution, every member of an affiliated society must get one or more new members. Every owner of a feeding station, bird house, conservation groups, scout leaders, teachers, etc., are all prospects for membership. Six hundred copies of *The Flicker* are printed now, 400 additional copies will only add about $40.00 to the cost of printing so it is up to you *now* to get the new members *now* if you want your M.O.U. to continue to publish *The Flicker*. Prompt action by every member is necessary if the M.O.U. *Flicker* is not going to meet the fate of the Passenger Pigeon and the Dodo.

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If you are going on a trip west of the Dakotas you will want to take along Roger Tory Peterson's *Field Guide to Western Birds* at $3.75.

Robert's manual, *Key to Minnesota Birds* is $2.75.

Where to Find Birds in Minnesota — Morrison & Herz is $1.50.

Minnesota Rocks and Waters — Schwartz & Thiel. This is a new book on Minnesota geology written for the amateur and highly recommended at $4.00.

Ferns of Minnesota — Rolla Tryon Jr. is $4.00.

Canoe Country at $2.50 and *Snowshoe Country* at $3.00. Northern Minnesota delightfully described in a gay and charming manner by Florence Page Jaques and beautifully illustrated with black and whites by F. Lee Jaques.

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MINNESOTA ORNITHOLOGISTS' UNION FIELD TRIPS FOR 1955

On May 14 and 15, 1955, the Minnesota Bird Club extends a cordial invitation to all members and friends of the Minnesota Ornithologists' Union to meet with them at the Old Frontenac Point Methodist campus, Frontenac, Minnesota.

This is an excellent birding area and it is possible to see well over a hundred species of birds. Warblers, shore birds, waterfowl or gulls may be seen. Views of the rare Blue Gray Gnatcather and the Prothonotary Warblers are almost certain.

Registrations will begin at 1:00 p.m., Saturday, May 14, 1955, at the hotel on the Old Frontenac Point Methodist campus, Frontenac, Minnesota. Those who wish to arrive early to bird may do so. Bring a picnic lunch and we will meet, Saturday noon (12:00) as a group on the Methodist campus. We will have sleeping accommodations at the Old Frontenac inn and will be served Saturday evening dinner, Sunday breakfast and dinner Sunday noon.

Reservations must be made not later than Wednesday, May 4, 1955. If you fail to make reservations bring a lunch as no food is available except in Red Wing or Lake City.

RESERVATIONS

PLEASE NOTE: NO FOOD OR LODGING WILL BE AVAILABLE UNLESS RESERVATIONS ARE MADE.

Make the following reservations for me. (Check on the dotted line)

Saturday lodging	$1.50	Sunday breakfast	$.65
Saturday dinner	1.10	Sunday dinner	1.10

A check or draft made to the order of the Minneapolis Bird Club for the ENTIRE AMOUNT of the reservations must be sent to Mrs. Boyd M. Lien at 5148 - 29th Ave. South, Minneapolis 17, Minn., not later than Wednesday, May 4, 1955. If checks are drawn on other than Twin Cities banks please add 10 cents for bank exchange. When you register at the hotel, you will be handed an envelope containing tickets for each item that you have reserved.

Name ..... Address .....

Minnesota Ornithologists' Union

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