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OBSERVATIONS ON THE MATING AND SPAWNING OF Pimephales promelas (Raf.)

By L. R. RICHARDSON

CONSIDERABLE interest has been aroused in connexion with the raising of the Black-headed Minnow (*Pimephales promelas* Raf.) as forage fish for use in fish culture. Although several papers dealing with the breeding habits of this species, and of the closely related Blunt-nosed Minnow (*Hyborhynchus notatus* Raf.), have been published, so far as I have been able to ascertain no account of the actual mating has been given, the papers dealing rather with descriptions of the physical conditions suitable for breeding, of the nest, and of the strongly developed parental instincts of the male.

During the course of an examination of several lakes in the region of Big Lake Nominingue, Labelle County, for the Fishcultural Branch of the Quebec Government, about the middle of June 1933 many nests of *P. promelas* were observed in several lakes. In one, Lac Smith, a small lake located high in the hills to the south of Lac Saugay, the processes of mating and of egg-laying for this species were observed on June 19th.

Immediately on approaching the edge of this lake, it was obvious that there was much unusual activity amongst the many groups of minnows, principally *S. atromaculatus* (Mitchill) and *C. erythrogaster* (Raf.). These schools, instead of making their way slowly along the edge of the lake as they are generally found to do, were, in this case, in a very nervous state and were continually breaking up and re-forming again.

The cause of this disturbance was soon traced to the presence of many smaller groups of male Pimephales. Generally these occurred in groups of four to six. These bands were passing rapidly along the shore and were frequently observed to force their way through the much larger groups, scattering the latter as described.

Shortly afterwards, having made my way out along a log which extended some twenty feet out over the silt bottom of a small shallow bay, it was found that occasionally one of the males would break away from the group with which he had been travelling and would dart into position below a log, or small branch, at a point where this was raised clear of the bottom by several inches. Here the male would remain, slowly turning round in an attitude of extreme watchfulness, until with a swift movement he would dart out at a passing group of minnows of various species and from them cut out a female of his own species driving her back to the location he had selected.

Usually the female would respond willingly to this treatment without attempting to escape; but in three cases where the male was observed to have considerable difficulty in persuading the female to approach the nest, the male was seen to resort to a brutal chivvying, pushing her and frequently snapping at her whenever she attempted to turn aside.

As the couple approached near to the nest, the male was seen to close up the gap between them and to draw into a position so that his snout came almost to the level of her pectoral fin. It was most commonly found that the male took up his position on the left-hand side of the female. In contrast to this behaviour, it was noted that in the case of those females which the male had some difficulty in leading to the nest, the male took up his position on the right side and with his snout ahead of hers.

On arriving below the log or branch, previously selected by the male, he would, whether in front or behind, by pushing firmly against the side of the female, cause her to swing into an anti-clockwise circle. It is rather noteworthy that in the nine cases where this was observed the circle was in each case of the same type and the male managed his approach to this end by pushing the posterior end of the female in the one case, or by heading her off in the other.

Gradually, with an increasing pressure on the part of the male, the circle was decreased in diameter until eventually it was performed entirely below the log. As the speed of the pair did not appear to have decreased to any extent, the number of revolutions increased as the circle diminished.

At this point, the male, if on the inner side of the female, would slowly commence to sink below her level, so that instead of pressing on her side he would come to press more on her belly and, owing to the circular motion, his tendency was to form a larger circle and to slip out from below her. By pushing himself upwards, the force so created was utilised in pressing on the lower part of the body of the female and resulted in her being slowly rolled over onto her side. Finally she was brought to a position where she was riding almost entirely on her side and on the back of the male who by pressing her upwards brought her into close relationship with the lower surface of the log.

For the completion of this complicated manoeuvre, it would be necessary for the female to reciprocate to some extent the pressure of the male. Such an action could not be observed. However, it is suggested that the ridge of thickened epidermal tissue situated on the back of the male, and described by Wynne-Edwards as being utilised in manipulating the eggs in the nest, may also have a second function in preventing the female from slipping too easily from the back of the male.

As the last part of this circling action was completed the activity of the pair rose to such a height, and the motion churned the water to such an extent, that finally for several seconds the pair were not visible. However, with a sudden cessation of activity, the water calmed down; but there was still no trace of either fish. It was not until nearly half-a-minute later that the pair came into view, when both appeared from beneath the branch and the male, turning viciously on the female, drove her away from the nest, immediately returning to take up his position again below the branch.

Collection of eggs from one nest which had been watched from the time that the male first took up his position down to this point showed that during this performance the eggs had been laid and fertilised. In another nest, the pair were interrupted just as they rose to the branch and it was found that no eggs had been laid. So that it is quite safe to assume that the eggs had been laid in this brief period of apparent activity, and the male had fertilised them before chasing the female away.

In the case of the refractory female, the male would also cause her to swing into a circle by heading her off as described. The circle would thus be also anti-clockwise in direction. Not until the circle had been performed several times and had commenced to decrease in size would the male slip below the female, and so come up on the inside of her in the normal position.

Only once was the performance seen to have been accomplished successfully without difficulty. Generally it was not completed without the female's slipping off the back of the male at least once. In one case interruptions of this nature occurred three times before the operation ended with the female being turned completely over on to her back. The entire performance then took nearly five minutes, a remarkable length of time considering the extreme activity of the pair. Usually, although there may be one or two unsuccessful attempts, the entire operation lasts only a matter of one or two minutes before the male drives the female away from the nest.

Having chased the female away, the male returns and takes up his position below the eggs. His attitude is now one of ceaseless vigilance, and he is seen to turn with slow jerky movements so that in a short interval of time he is brought to face in all directions.

One male was seen to go through this manoeuvre three times, each time with a different female and without variation of the routine. In another case a male mated with two females, one after the other. In the second case one of the females did not proceed willingly to the nest and the male treated her in the fashion described above.

Any intruder is treated with short shrift, and as noted by Wynne-Edwards (2) and by Lord (1) the male is most courageous in the defence of his nest. On several occasions a passing band of males was observed to be attacked by a nesting male and to be driven off. In one instance, four males attacking a nest were driven off only after prolonged battle in which the male first attacked the band as a whole and then followed up this aggression by attacking each individual separately. The latter was somewhat of a misplaced gesture, for while he was busy with one the remainder quietly proceeded back to the nest and made a meal of the eggs.

The significance of the parental care exhibited by the male may be best appreciated when it is pointed out that after the visit of only one

female to a new nest there were only sixty eggs. In another after three females had visited the nest and during the interval between the visits of the second and third females the nest had been raided by three males, only one hundred and five eggs were found. The discrepancy between this figure and that which would be anticipated on the basis of the number of eggs found in the former may be laid to the attack of the three males, and serves to illustrate the extent of the damage consequent upon a raid of this nature. That any eggs should survive the full period of development, running such risks as these, is one of the highest compliments which can be paid to the vigilance of the male.

Both Wynne-Edwards and Lord have established the fact that *Pimephales* is polygamous in habit, basing their statements on the numbers of eggs found in the nests they examined, and also on the fact that many stages of development are to be found in some nests at one time. The above observations bear out this assumption.

This may be further considered in the light of the risks that a nest runs during the time of development of the eggs and would indicate that the male obtains females possibly to make good any losses that may be sustained. Another not inconsiderable factor which enters here is that the female can only bear a small number of eggs since they are relatively large and she is of such small size.

It is interesting to note also in this connexion that the male after having been so vicious in driving off a female which has spawned for him will shortly afterwards drive another into the nest.

Regarding the use of the term "nest", it is well to point out that although over twenty males were under observation for over an hour, and of these nine took up their position for the first time during this period, it was found that apart from being particular in selecting a location for a nest the male did not exhibit any of the meticulous care in its preparation such as is commonly described for the other Cyprinidae.

At Lac Smith all the nests were of the same type as found at several other locations. Although many plants of the yellow pond-lily were present, a careful search of the pads failed to find any cases where the eggs had been placed on these surfaces as described by Wynne-Edwards. All the nests which were located, a total of over thirty, were found to be situated below logs or small branches at points where these were raised some two or more inches from the silt. Many other nests were located, but it was not possible to determine their number as they were situated below old planks and were out of sight, the only indication of their presence being an occasional glimpse of the male.

From Lord's account, in which the fish spawned below planks, and from the above observations, it would appear that *Pimephales* exhibits preference for an object more stable than a lily-pad to which to attach its eggs; though, as Wynne-Edwards has shown, it will resort to the latter on occasion.

The apparent uniqueness of this method of laying eggs and the peculiar use of an "inverted" nest in a member of the Cyprinidae is really only a highly developed exhibition of several rather common characteristics of that family. That there is in many of the members of this group a highly developed nesting instinct is a well-vouched-for fact, and is shown in the many accounts of species which go to considerable pains to construct a nest of stones, a habit associated with the presence of a clean bottom.

In those species which spawn over a silt bottom, both in the members of this family and also in other families, it is found that the nesting instincts are generally poorly developed, and it is far more common to find that the eggs are strewn freely over weeds to which they adhere. This custom is generally to be found only in species of large size capable of laying many eggs.

Recourse to either of these methods is not possible for *Pimephales*, the first since their habits lead them to regions where the bottom is of silt; the second, as pointed out, on account of the small size of the species.

The impossibility of *Pimephales*' clearing away the silt to reach a solid base for spawning is obvious when it is pointed out that this often reaches a depth of three feet and more in the localities where spawning takes place.

In association with the above considerations, the utilisation of the lower surface of some object for the reception of the eggs may be regarded as being the choice of a location best suited for their protection, as well as a means of removing the eggs from any danger of "drowning" in the silt. At the same time, this illustrates a retention and a modification of two of the characteristics commonly found in the family, *viz.*, the nesting instinct and the adhesive nature of the eggs.

It is in the technique employed in attaching the eggs to such a surface that *Pimephales* and, in all probability, *Hyborhynchus* also stand unique among the members of their family.

1. R. F. Lord: Notes on the Use of the Blackhead Minnow, *Pimephales promelas,* as a Forage Fish. Trans. A.F.S., Vol. 57, 1927.

2. V. C Wynne-Edwards: The Breeding Habits of the Black headed Minnow (*Pimephales promelas*). Trans. A.F.S., Vol. 62, 1932.

PEST Vs. PEST

By L. L. SNYDER

THE BALANCE of nature" is a concept very frequently discussed and one which, thought of as a tendency to balance rather than as a state of balance, is a truism. Yet when one wishes to illustrate the point with actual examples, it seems that recorded cases are rather uncommon in the literature. Generalized and more or less theoretical discussions seem more prevalent. The following observation is, therefore, a very small contribution to the literature on particular instances.

We have in Toronto a lawn weed known as Knotweed, *Polygonum aviculare,* which is at all times common. Reference to Gray's *New Manual of Botany* reveals that this plant is stated to be "common *everywhere* in yards, waste places etc." and that it is of Eurasian origin. This can only be interpreted as meaning an extremely wide distribution.

During the season of growth of any year, this plant is a strong competitor of lawn grass. During the past summer (1934), Knotweed was in the ascendancy. The winter of 1933-34 was notably severe and turf or lawn grass suffered conspicuous losses in lawn and park. Extensive blotches of earth where the grass had been winter-killed were much more obvious than after a normal winter. These blotches were, however, gradually erased as the summer growth progressed and their greenness deceived the eye, except that of the expert gardener, until autumn came. Then by degrees the outlines of the winter-killed areas were made apparent again, this time by the warm reddish tint of the overgrowth. The colour was due to the tinted wiry stems of the branching Knotweed which had flourished exceedingly.

The tiny seeds produced by this plant in any city park, if obtainable, could have been measured by bushel units. It appalls a struggling lawnkeeper to think of the possible war with this weed with its bushels of seed ammunition. Personal experience has taught the writer that only a dentist-like extraction of the long and well-set tap-root is feasible for the eradication of the weed, and, at a guess, it seems that every seed is capable of germination. It is then with some pleasure that the second part of this account has been observed.

The writer's daily route has afforded considerable regularity in observing certain areas conspicuously affected by Knotweed. Starting with his own lawn and a small park adjacent, thence across Ramsden Park and to the Museum, about which are the extensive lawns of Queen's Park and the University Campus, sufficient space is covered to demonstrate that conditions are not localized. From early October to November the Knotweed patches were the feeding areas of flocks of English Sparrows (*Passer domesticus*). Several days passed before it was realized that these birds were invariably associated with the dark blotches in the turf. The flocks were merely noted as being unusually large and compact, in fact, it has been suggested that this is a "sparrow year" since they are markedly more conspicuous. The writer is inclined to believe from meagre data that such is the case; that there are more English sparrows during this fall than there have been for a few years past.* However, their concentration in conspicuous open lawn areas no doubt exaggerates their numbers.

At the time of writing, November 14, sparrows are still to be seen regularly visiting the Knotweed patches but this food supply is rapidly disappearing. An examination of several of these areas discloses the fact that the bare skeletons of the whorls of stalks are about all that remain; the seeds are gone and only an occasional tiny leaf is visible. It is quite clear that the bumper crop has already been consumed

*It is unfortunate that the English Sparrow is rather generally ignored in daily bird lists.

and that, although the weed is not annihilated, an apparently effective check has been placed on the spread of the Knotweed. An Old World form has been pitted against an Old World form in what is perhaps an age old relationship.

In conclusion, one might add this question: what proportion of these seeds, if any, are capable of resisting digestion and are subsequently distributed into other "yards and waste places everywhere", to grow more Knotweed to feed more English Sparrows?

SWIMMING HABITS OF MAMMALS

By STUART L. THOMPSON

SOMETIMES a very simple action on the part of an animal leads one to an interesting train of thought and speculation.

On September 1st, 1933, while crossing Belmont Lake in a canoe with my nephew, we came in sight of a black squirrel swimming from a large island to the mainland. The animal was perhaps 200 yards out from the island and had some 500 or 600 yards yet to go to reach the opposite shore. As we hove in sight he turned in his course abruptly and struck out, retracing his steps — or more properly his strokes, — with the evident intention of regaining the island which he had left. I was curious to see him in action while swimming, so we brought the canoe up broadside in his way. He at once swam round it. Again we tried, with the same result. Evidently nothing would stop him in his efforts to gain the shore. It occurred to me to see what he would do if he were brought on board. So the next time we closed on him I reached out a friendly hand to lift him in. He at once bit my finger severely, scrambled up my sleeve, leaped into the canoe, looking like a "drowned rat", ran the length of the canoe plunged into the water and struck out for the shore, which he reached, and then disappeared in the woods.

I recall other experiences with other mammals, *viz.*: surprising them while swimming. Several times on canoe-trips I have come upon deer swimming and, in all cases, the animal kept a straight course, which became long dashing bounds when its feet found bottom, until it reached the opposite shore. There was no attempt to return.

On another occasion we ran down a woodchuck swimming in the Otonabee River, evidently making for the other side. This animal accepted help and was lifted into the canoe on the paddle blade and coolly settled down to rest on the pack between us. When we came near land, although far on down the river from where he would have originally landed, he simply flopped overboard (with nary a word of thanks) and swam the few strokes to the bank.

It is interesting to compare the actions and behaviour of these three creaturees. The determined attempt of the deer for example, — an active animal which ranges widely. It would seem he knew exactly where he was going, having been there before. When surprised he had only one thought — to gain his objective, which was probably as familiar ground as that which he had left. Most likely the wood-chuck was in the same position, although it might be that he was on a voyage of discovery and found he had ventured on more than he contemplated; the river was wider than he had suspected. Being caught in such a fix he made the best of a bad job and was glad to accept a lift, though I can hardly believe that, with wood-chuck mentality, he actually thought this out.

In the case of the squirrel — an active venturesome little animal, it would seem he felt himself surprised, utterly out of his element, consequently at a hopeless disadvantage, and not knowing what the opposite shore had in store for him, he felt instinctively that the best thing to do was to get back to familiar ground again, — the land he knew, — at all costs and with all possible speed — nor would he accept a lift but fought for freedom.

I trust I am not investing these three mammals with attributes too human, but it is certainly interesting to reflect on the different reactions noted above. Not long ago an article appeared in a periodical, dealing with human psychology, especially during panics in a fire-scare at a public meeting. The writer pointed out that the one thought in every panic-stricken mind was to get out, and that "out" was the way he came in, *i.e.* the familiar way. Very few people, the

writer said, take the trouble to look about at leisure and take note of the nearest exit in case of trouble. Do you yourself? The squirrel's mental reaction was similar. His way of escape was back the way he came, even in the face of danger, though a wide lake stretched before him.

Incidently the episode gave us some evidence as to the keenness of the eyesight of the little animal. Not only had he seen us some couple of hundred yards away, but apparently he had chosen the narrowest part of the lake for his swim to the mainland.

ADDITIONS TO THE FUNGUS FLORA OF ANTICOSTI ISLAND AND GASPE PENINSULA[1]

By I. L. CONNERS

THE FUNGI reported below were collected by Mr. J. Adams when he visited Anticosti Island and the Gaspé Peninsula, Quebec, in July and August 1935. With few exceptions, which are indicated, these fungi were not reported in his paper[2] based on his collections made in 1933 and 1934. Short notes on some of the more interesting finds have also been added.

My best thanks are due Mr. Adams for placing these collections at my disposal for study and report. I am also indebted to him for his determination of the host plants.

PHYCOMYCETES

Plasmopara pygmaea (Unger) Schroet. On *Anemone parviflora,* cliff walk, Percé.

ASCOMYCETES

Claviceps purpurea (Fr.) Tul. On *Oryzopsis asperifolia,* along logging railway, Princeton Lake, Anticosti. Previously reported on *Poa eminens* and *Secale cereale.*

Cryptomyces Pteridis (Rebent.) Rehm. On *Pteridium aquilina,* Bic. This collection on the current year's fronds disclosed the conidial stage, *Fusidium Pteridis* Kalchbr.

Fabraea Ranunculi (Wallr.) Karst. On *Ranunculus acris,* ravine, mountain road, Percé.

USTILAGINALES

Cintractia Caricis (Pers.) Magn. On *Carex aquatilis,* logging road, Anticosti, and *C. Buxbaumii,* marsh, near Chateau Menier, Anticosti. Previously reported on *Carex* sp.

Urocystis Anemones (Pers.) Wint. On *Anemone riparia,* cliff walk, Percé.

UREDINALES

Cronartium ribicola J. C. Fischer. On *Ribes glandulosum,* Gaspé and Percé. Previously reported on *Ribes* sp. at Percé. This introduced rust may apparently be collected in Eastern Canada wherever *Pinus Strobus* grows.

Gymnosporangium clavipes Cke. & Pk. On *Amelanchier canadensis,* Bic.

G. Juniperi, Lk. (*G. aurantiacum* Chev., *G. cornutum* Arth.). On *Sorbus americana,* Bic.

Hyalopsora Cheilanthis (Pk.) Arth. On *Cryptogramma Stelleri,* along stream from grotto, Percé. Not previously reported in Canada or in North-eastern United States.

Melampsorella Cerastii (Pers.) Schroet. On *Stellaria borealis* and *S. longipes,* Anticosti, 1934. These two collections were omitted from the previous report.

Nyssopsora clavellosa (Bark.) Arth. On *Aralia nudicaulis,* Ellis Bay, Anticosti; and mountain road, Percé. This rust is known from Saskatchewan eastward and is represented in the Division of Botany Herbarium by five other collections from the Gaspé Peninsula.

Puccinia Asteris Duby. On *Aster acuminatus,* Cacouna.

P. Circaeae Pers. On *Circaea alpina,* cliff walk, Percé. Previously reported from Gaspé County (Can. Pl. Dis. Survey Rept. 13:109, 1934).

P. conglomerata (Str.) Schmidt & Kunze. On *Petasites palmatus,* Anse aux Fraises, Anticosti.

P. coronata Cda. On *Rhamnus alnifolia,* along logging road, Anticosti.

P. Linkii Klotzsch. On *Viburnum pauciflorum,* Percé. Two collections.

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1 Contribution No. 448 from the Division of Botany, Experimental Farms Branch, Department of Agriculture, Ottawa, Canada.

2 Adams, J. Some fungi from Anticosti Island and Gaspé Peninsula. *The Can. Field-Naturalist* 49:107-108, 1935.

P. porphyrogenita Curt. On *Cornus canadensis,* Gaspé. This species is already known from Gaspé County (Can. Pl. Dis. Survey Rept. 13:110, 1934).

P. Pulsatillae Kalchbr. On *Anemone parviflora,* Percé. The Quebec record of this rust on *A. parviflora* published in the N. Am. Flora 7:528, 1922, is based on a collection made by Fernald on the Bonaventure River, August, 1904. (Arthur Herb. 38867)[3].

P. punctata Lk. On *Galium palustre,* open damp meadow, Port Menier, Anticosti. Scarce. Although the rust has been reported on *G. palustre* from Europe, no previous record of its occurrence on this host in North America has been located.

P. sessilis Schneid. On *Iris versicolor,* Ellis Bay, Anticosti.

Puccinia sp. On *Conioselinum chinense* (*C. canadense*), Percé. The aecia of an undetermined rust were collected on *C. chinense* by Mr. Adams on Anticosti in 1933 and reported in his paper as *Aecidium* sp. In the same collection a few telia were present. In the Percé collection telia of the same rust are abundant, while a few old aecial infections may be found. This rust appears to be an undescribed autoecious rust lacking a uredinial stage.

Pucciniastrum Abieti-Chamaenerii Kleb. On *Epilobium angustifolium,* Gaspé and Percé. A common rust.

P. Agrimoniae (Schw.) Tranz. On *Agrimonia striata,* Carleton. Probably not uncommon.

Uromyces Gentianae Arth. On *Gentiana stricta* Michx., Anticosti, 1933. Previously reported on *Pleurogyne rotata* from Quebec, August 3, 1905. (Arthur Herb. 16942).

Uromyces Hedysari-obscuri (DC.) Car. & Picc. On *Hedysarum boreale,* sea cliffs, Percé. Common in the park land districts of Alberta, Saskatchewan, and Manitoba, but previously unreported in eastern North America.

U. Trifolii (Hedw. f.) Lév. var. *Trifolii-repentis* (Liro) Arth. On *Trifolium repens,* Gaspé.

BASIDIOMYCETES

Amanita muscaria Fr. Along grotto trail, Percé.

Clavaria sp. Mountain road, Percé.

FUNDI IMPERFECTI

Cercospora caricina Ell. & Dearn. On *Carex arctata,* cliff road, Percé. (Det. by Charles Chupp).

Cylindrosporium hiemalis Higgs. On *Prunus pennsylvanica,* Carleton. The leaves were affected by a well defined shot-hole disease and although the fungus was only beginning to fruit, it appeared to be the above.

Phleospora Anemones Ell. & Kell. On *Anemone riparia,* cliff walk, Percé. Previous records in the Division of Botany Herbarium are from the Prairie region of the continent.

Septoria increscens Pk. On *Trientalis americana,* mountain road, Percé.

S. micropunctata Ell. & Ev. On *Conioselinum chinense,* Percé. (Det. by J. Dearness). This *Septoria* on *Conioselinum* agrees with the published description of *S. micropuncta* except the spores are slightly longer and narrower. It is not *S. Petroselini* Desm. var. *Treleasiana* Sacc. & Scallia, reported on *Conioselinum.*

Stagonospora Galii Fautr. On *Galium palustre,* Port Menier, Anticosti. Scarce. Pycnidia amphigenous, numerous, scattered, on fading leaves, which finally turn brown, deeply embedded, finally erumpent, nearly globose, 110-125 microns in diam., without a well defined ostiole, opening widely at maturity; walls of the perithecium thin, pale brown; conidia extruded in masses, hyaline, straight or slightly curved, tapered towards the truncate or rounded ends, uniseptate with two gutulae in each cell, often slightly constricted at septum, 17-24 x 2.5-4.5 microns, mostly 20 x 3 microns. Referred to this species with some doubt.

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3 I am indebted to Prof. H. S. Jackson, Dept. of Botany, University of Toronto, for the information on specimens in the Arthur Herbarium.

58th ANNUAL MEETING OF THE OTTAWA FIELD-NATURALISTS' CLUB

COUNCIL REPORT

1. MEETINGS. Three Council Meetings have been held during the year, at the homes of Mr. and Mrs. Hoyes Lloyd, on January 15th; Mr. and Mrs. Herbert Groh, on May 7th; and Miss Grace S. Lewis, on October 29th.

2. LECTURES. Through the Lecture Committee, the following speakers addressed the Winter meetings, held in the Lecture Room of the Carnegie Library:

January 23. — Messrs. E. G. Anderson and W. G. Dore, on "Our Native Wild Flowers", illustrated by slides and herbarium specimens. Dr. Small also spoke to the members on this occasion, on "Botanical Collecting Grounds of Fifty Years Ago", and showed some of his own preserved specimens.

February 27. — Dr. R. M. Anderson, on "Mammals of the Ottawa District", illustrated by slides and specimens.

March 26. — Mr. J. C. McCuaig, on "The Proposed National Park at the Headwaters of the Ottawa, Gatineau, and Lievre Rivers", illustrated by slides.

3. BIRD CENSUS. The annual bird census is taken in conjunction with other Societies in Canada and the United States. The local bird census was taken on December 22nd, 1935, twenty observers, in eight separate parties, taking part. A total of 1,512 individuals, of twenty different species, were observed. The American Golden-Eye, Common Pheasant, Redpolled Linnet, and Tree Sparrow were recorded in numbers that exceeded those of any previous census of this kind in this area.

4. EXCURSIONS. The excursions were held throughout the year, as follows:

March — to Hog's Back.

May — four excursions — to McKay Lake, Britannia, the Central Experimental Farm, and Fairy Lake.

June — two excursions — to the Maplewood Gardens, where refreshments were served through the courtesy of Messrs. Kenneth McDonald and Sons Ltd., and to Long Island, as guests of Dr. M. G. McElhinney on his boat.

September—to Black Rapids, again as guests Dr. M. G. McElhinney.

October — on the 3rd, by Ottawa Electric Coach, to the old carbide works, Meach Lake, and on the 31st, to Taylor's Hill.

Excursions planned to Ottawa West on October 17th, and to Gatineau Point, on November 14th, were cancelled owing to inclement weather.

A tentative programme of six lectures for the coming winter has been drawn up, and presented to the chairman of the Lecture Committee. The first of these lectures was given on November 19th, when the Rev. Father F. E. Banim spoke of "Mosses, Lichens, and Algae", illustrating his lecture with his own slides, Mr. W. E. Harris's microphotographs, and microscopical demonstrations. Through the courtesy of Father Banim, these lectures are being held in the Library of St. Patrick's College. Two meetings of the Committee were held during the year, at which this program was drawn up.

The Committee's finances show receipts of $24.25, comprising: advance from Treasurer $10.00; eight excursion tickets, $8.00; and profits from trips, $6.25. Expenditures of $6.04 leave a net balance of $28.21, which is turned over to the Treasurer.

5. REPRESENTATIVE TO MEETING OF THE ROYAL SOCIETY OF CANADA. Dr. F. J. Alcock represented the Club at the meetings of the Royal Society of Canada, held this year in Quebec City.

6. INTERNATIONAL COMMITTEE FOR THE PROTECTION OF THE BIRDS OF THE WORLD. Mr. Hoyes Lloyd and Dr. Harrison F. Lewis were the representatives on the International Committee for the Protection of the Birds of the World.

7. PUBLICATIONS. No report has been received from the Publication Committee. However, *The Canadian Field-Naturalist* has maintained its usual high standard, and each issue has appeared on time. The January, 1936, number marked the publication's fiftieth anniversary.

8. FINANCE. Three copies of Dr. Macoun's autobiography were sold during the year, and two life memberships were received. It is expected that the Club will show a favourable balance at the close of the year.

9. INFORMATION SERVICE. The Club is most desirous that its members make use of the Information Service. You are invited to submit any questions or problems pertaining to Natural History, and they will be answered through *The Canadian Field-Nautralist,* by correspondence, or at one of the winter meetings.

10. SPECIAL AND MEMBERSHIP COMMITTEES. No reports have been received from these committees.

11. THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. The Association has definitely decided to hold its 1938 Summer Meeting in Ottawa. A Committee, composed of representatives from the city's various scientific organizations, has been formed. Dr. Arthur Gibson has been appointed by our President to represent the Ottawa Field-Naturalists' Club on this committee.

12. THE FEDERATION OF ONTARIO NATURALISTS AND THE "WILD LIFE PROTECTION" SUB-COMMITTEE OF THE VANCOUVER SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS. Communications were received from the Federation of Ontario Naturalists in March. While your Council does not consider affiliation practicable, a letter was sent to the Secretary, expressing the sympathy and interest of the Club. Similar action was also taken with regard to communications from the "Wild Life Protection" sub-committee of the Vancouver Society for the Prevention of Cruelty to Animals.

13. COUNCIL. The Council would like to take this opportunity to express its appreciation of the work and co-operation of many of the members, and to extend its thanks to the Rev. Father F. E. Banim, for his kindness in accommodating the winter meetings, to Dr. M. G. McElhinney, for his continued generous hospitality, and to the leaders of the various excursions. It is hoped that 1937 will see a continued stimulation of the Club's activities.—PEGGY WHITEHURST, *Secretary.*

STATEMENT OF FINANCIAL STANDING
OTTAWA FIELD-NATURALISTS' CLUB, NOVEMBER 25, 1936

ASSETS

Balance in Bank, November 25, 1936	$ 3.12
Bills receivable	127.63
	$130.75

LIABILITIES

Reserve Fund	$ 80.08
Balance	50.67
	$130.75

RECEIPTS

Balance on hand, December 5, 1935	$ 88.17
Fees—Current	761.52
" —Advance, etc.	48.65
Single and back numbers	21.40
Separates and Illustrations	121.99
Miscellaneous	99.20
Borrowed from Reserve Fund	80.08
	$1221.01

DISBURSEMENTS

Printing and mailing The Canadian Field-Naturalist	$ 901.26
Editor's Honorarium	90.00
Postage and Stationery	34.31
Separates and Illustrations	157.11
Miscellaneous	16.75
Bank discount	18.46
Balance in Bank, November 25, 1936	3.12
	$1221.01

WILMOT LLOYD, Treasurer.

Audited and found correct
November 26, 1936.
HARRISON F. LEWIS,
W. H. LANCELEY,
Auditors.

STATEMENT—PUBLICATION FUND
NOVEMBER 25, 1936

ASSETS		LIABILITIES	
Canadian Government Bonds	$900.00	NIL—	
Cash in Bank	103.41	Balance	$1003.41
	$1003.41		$1003.41

RECEIPTS		DISBURSEMENTS	
Balance in Bank, December 5, 1935	$1.15	Payment of Interest to Current Account	39.50
2 Life Membership Fees	101.75	Balance in Bank, November 25, 1936	103.41
Bond Interest	39.50		
Bank Interest	.51		
	$142.91		$142.91

WILMOT LLOYD, Treasurer.

Audited and found correct.
November 26, 1936.
HARRISON F. LEWIS,
W. H. LANCELEY,
Auditors.

STATEMENT—RESERVE FUND
NOVEMBER 25, 1936

ASSETS		LIABILITIES	
Canadian Government Bonds	$1200.00	NIL—	
Cash in Bank, November 25, 1936	169.40	Balance	$1449.48
Current Account temporary advance	80.08		
	$1449.48		$1449.48

RECEIPTS		DISBURSEMENTS	
Balance in Bank, December 5, 1935	$ 193.87	Temporary advance to Current Account	80.08
Bond Interest	54.00	Balance in Bank, November 25, 1936.	$169.40
Bank Interest	1.61		
	$249.48		$249.48

EDWARD F. G. WHITE, Chairman,
Reserve Fund Committee.
WILMOT LLOYD, Treasurer.

Audited and found correct
November 26, 1936.
HARRISON F. LEWIS,
W. H. LANCELEY,
Auditors.

NOTES AND OBSERVATIONS

FURTHER NOTES ON WINTERING RED-BREASTED NUTHATCHES. — Following notes on the Red-breasted Nuthatch (Red-breasted Nuthatch Wintering in Alberta, Frank T. Farley, *The Canadian Field-Naturalist,* March 1935, page 61; and Red-breasted Nuthatch Wintering in Manitoba, Fred. J. Rogers, *The Canadian Field-Naturalist,* April 1936, page 68), there has come to light further evidence in respect to the wintering of the Red-breasted Nuthatch in northern latitudes.

Capt. Angus Buchanan, M.C., in his *Wild Life in Canada* describes a very interesting trip on rivers and lakes he made during the summer of 1914 through the country between the Saskatchewan River and the Barren Lands.

During this canoe trip many birds and mammals were collected, and notes were made on all species encountered. Capt. Buchannan was preparing to winter on the barren grounds when news of the outbreak of war reached him, so he came south to enlist for overseas service.

In the annotated list of birds I note the records of two occurrences of Red-breasted Nuthatches. The first is of a male specimen taken at Lake Ile à la Crosse May 25, 1914. The second is of a Red-breasted Nuthatch being seen in winter south of Cumberland Lake, January 11th, 1915. This lake is near the border of Manitoba, but in Saskatchewan west of The Pas, Man., and about 54° latitude.

In a new publication *The Migration of North American Birds* by Frederick C. Lincoln, United States Department of Agriculture, circular No. 363, on page 5 is found this observation, "Also, when there is a good supply of food in the form of pine seeds in Canadian woods, nuthatches (*Sitta carolinensis* and *S. canadensis*) and crossbills. (*Loxia curvirostra* and *L. leucoptera*) will remain through the winter. When these birds appear abundantly in winter at points in southern latitudes, it may be concluded that there is a shortage of their food in the north, or that they have been lured farther south by the greater abundance of this food there."

There appears to be a great deal of doubt in respect to the proper classification of the Red-breasted Nuthatch; but the writer believes, in view of the many published records of wintering birds of this species that it should be put in the same category as our Black-capped Chickadee (*Penthestes atricapillus*). — FRED J. ROGERS, *Hillside Beach, Lake Winnipeg, Man.*

NESTING OF THE AMERICAN GOLDEN-EYE (*Glaucionetta clangula americana*). — The first nest of this species recorded in this district was discovered on May 26, 1935, and two other nests were found on May 29 of the same year.

The first nest was most interesting because it was located in a hole in a large white aspen, forty feet from the ground, excavated by a Pileated Woodpecker (*Coephloeus pileatus*) in April. The Woodpecker was also busy at the hole at the beginning of May.

At the time of examination it was expected that the Pileated Woodpecker would be nesting in the cavity, and great was my surprise to discover it occupied by the Golden-eye, with four eggs on the 26th. The size of the cavity was approximately eight inches deep, and seven inches in diameter inside.

The entrance measured, roughly, 4½ inches vertically, by 3½ inches at the base, across; and 2¼ inches across an inch from the top. The tree was green and about 70 feet in height, and 18 inches in diameter.

The other two nests were also located in Pileated Woodpecker excavations, but these latter were old cavities. One nest, 25 feet up in a dead aspen of 18 inches diameter contained about four eggs, but was too deep for an accurate count to be made. The egg-shaped entrance was 5 inches vertically by 3½ inches wide across base and 2¼ inches across top an inch from the top. Inside, the cavity was 9 inches in diameter, and 16 inches deep. The female was observed entering the nesting hole about 9.30 a.m.

The second nest differed little from the others. The two found on May 29th were only about 50 feet apart. The last nest was also in a large aspen of 18 inches diameter and some sixty feet in height. The latter tree was also dead, and the nesting hole 30 feet from the ground.

Measurements taken of the third nest showed an entrance 4½ inches long (egg-shaped) by 3½ inches across the base, and 2¼ inches across the top an inch from the apex. The cavity inside was approximately 7 inches in diameter and 15 inches deep. There were about five eggs in the nest.

The first set of eggs was collected and found to be all fresh.

These nestings were in low ground in mixed woods of black poplar, aspen, ash, birch, spruce, etc.

It is remarkable to note the part the Pileated Woodpecker played in these nestings of American Golden-eyes by providing suitable nesting cavities. It is also interesting to note the uniformity of the three nesting holes measured, there being very little variation. It may be suggested, however, that the depth of only eight inches in the first nest indicates that the Pileated Woodpecker abandoned the nesting site before completing the excavation.

The average arrival date of the Golden-eye here is April 18th. — FRED J. ROGERS, (*Lake Winnipeg*), *Hillside Beach, Man.*

A NEST-HUNTING BROAD-WINGED HAWK, (*Buteo platypterus platypterus*). — Upon reading the following statement by Francis H. Allen (*The Auk*, January, 1936) "Moreover, birds nesting in trees are usually well hidden from passing hawks, which, so far as I know, never make a practise of nest-hunting....", I remembered proving a case of nest-hunting on the part of an adult male Broad-winged Hawk.

It happened on July 20, 1925, at which time I was camped in a red pine wood bordering Golden Lake, Renfrew County, Ontario. Just after lunch, I heard a commotion among the birds overhead in the pines. I ran out of the tent and saw a hawk make off with what appeared to be a young Robin. There was a Robin's nest in the tree where I first saw the hawk. Late in the afternoon the disturbance was repeated, and this time I got the hawk, a Broad-wing. Its stomach contained four nestlings, three of which seemed to be of the general appearance of young Chipping Sparrows with their quills just started, while the fourth was probably a half-grown nestling Robin.

Forbush, *Birds of Massachusetts*, says of the Broad-wing — "most of the birds found in the stomachs examined were fledglings taken from the nest, or when learning to fly."

Dr. A. K. Fisher, in *Hawks and Owls of the United States*, on the authority of an article in *The Auk*, Vol. 1, 1884, p. 96, records that James W. Banks found the remains of three unfledged thrushes in the stomach of a Broad-wing killed near St. John, New Brunswick. — HOYES LLOYD.

UNUSUAL NESTING OF EASTERN REDWINGS.— Having read in the November, 1935, issue of *The Canadian Field-Naturalist* of the unusual nesting site of Eastern Redwinged Blackbirds, contributed by C. E. Hope, Royal Ontario Museum of Zoology, perhaps the following may be of interest to your readers:

Where we spend the summers at Sylvan Lake, Alberta, our land runs back a mile. The half nearest the lake is covered with old timber; but the other half, where a fire ran over several years ago, is densely covered with young trees and underbrush. Walking along a path through this part, I was much surprised to find a large colony of Redwings nesting there, and the nearest water — the lake — just half a mile distant. A large reed bed, further up the lake, has been eaten out by horses, so Redwings and other birds have had to seek new nesting sites; and I have little doubt our birds came from there. This occurred last year (1934), but this season was so wet that I was unable to find out if they again nested there. However, I think they must have done so as, during the nesting season, I saw numbers flying down to the lake to drink and bathe. — ELSIE CASSELS.

THE GOLDEN-WINGED WARBLER (*Vermivora chrysoptera*) IN THE TORONTO REGION. — Of recent years the Golden-winged Warbler has been reported quite frequently in the Toronto region. The increase of records during the past six or eight years is probably due to the greater number of bird students in the field rather than to an increase of the species. The majority of observations have been made during the May migration, though two June records suggest that the species might breed rarely in the Toronto region. To date, however, no breeding evidence has been found.

The accompanying list of occurrences contains records of three collected specimens. The remainder are sight records made by reliable observers.

Specimen in the National Museum of Canada, No. 309, taken near Toronto, no date, sex ♂, from the G. Holman collection. Recorded by J. H. Fleming, *Auk*, January, 1907, p. 88.

One observed May 6, 1893, at Toronto by W. H. McNairn, published *Wilson Bull.*, N. S. vol. 2, January 15, 1895.

One identified at Lambton Golf Club, Toronto, on May 17, 1908, by J. S. Wallace.

A singing male identified in Cedarvale Ravine, Toronto, on May 16, 1928, by C. E. Hope.

Two observed by G. H. Richardson in High Park, Toronto, on May 19, 1928.

A female collected on May 21, 1928, by J. H. Fleming in his garden on Rusholme Road, Toronto. Published in *Auk*, Vol. 47, January, 1930, p. 71.

A singing male was watched by a number of the members of the Brodie Club, on the occasion of their annual field day at Pottageville, York County, Ontario on May 19, 1929.

One observed on June 2, 1929, at North Toronto by T. F. McIlwraith.

One seen in High Park, Toronto, by R. J. Rutter on May 8, 1930.

One seen at Armour Heights, Toronto, on May 24, 1930, by G. H. Richardson.

One seen near King City Village, York County, Ontario, on August 17, 1930, by R. D. Ussher.

One seen at Pottageville, York County, Ontario, by S. L. Thompson on May 25, 1931.

A singing male collected by C. E. Hope in a ravine at Armour Heights, Toronto, on June 7, 1931. The specimen is now in the J. H. Fleming Collection.

A female observed by J. L. Baillie, Jr., in High Park, Toronto, on May 20, 1932.

A male seen on May 23, 1933, by J. H. Fleming, in his garden on Rusholme Road, Toronto.

A male observed at close range by C. E. Hope on May 12, 1935, at Mount Dennis, Toronto, Ontario. — C. E. HOPE, *Royal Ontario Museum of Zoology.*

SHORT-EARED OWL (*Asio flammeus flammeus*) AT BAKER LAKE, N. W. T. — In the spring of 1928, I received two specimens of the Short-eared Owl from Mr. W. O. Douglas, who was then stationed at Baker Lake. Although badly battered in the long overland journey by mail, both specimens were preserved and are now in my collection. In all probability they were taken in 1927. This occurrence of the species may help fill a gap in the recorded range. — HOYES LLOYD.

THE KENTUCKY WARBLER, AN OLD QUEBEC RECORD. — The late John Neilson, of "Dornald", Cap Rouge Road, St. Foy, Quebec; was a constant contributor to the "Fur, Fin and Feather" column of *The Quebec Chronicle.*

In the issue of March 15th, 1884, Mr. Neilson published "Land Birds of the Vicinity, the surrounding Parishes, and Mountain Region North of the City of Quebec". In this is the following: "Kentucky Warbler. — *Oporornis Formosa* — (S. R.) very rare, a pair showing every indication of breeding, first detected near my residence, July 2nd, 1879; observed daily in the same locality, till about the 15th, when they suddenly disappeared. Nest not found, more about this stranger in future notes."

The only other reference I can find is in a manuscript list dated February, 1886, and entitled, "Land Birds of the County of Quebec"; a copy of this list was sent by Mr. Neilson to Montague Chamberlain who used the Kentucky Warbler record in his *Catalogue of Canadian Birds,* 1887, page 106.

Though widely quoted the record is improbable, and was doubted by Chamberlain, who in a letter to Neilson, dated from St. John, N.B., March 13, 1886, writes "I think I forget to enquire of you concerning that record of Kentucky Warbler — Will you kindly tell me how and by whom the bird was identified. You of course know that this species is extreamly rare even as far north as southern New England, and this occurrance at Quebec will be questioned by the critics, so we must be fully prepared to defend the statement."

John Neilson was a careful observer and this is the only case of a doubtful identification by him contained in several manuscript lists of Quebec birds in my library. — J. H. FLEMING.

NOTE ON A WINTER ACTIVITY OF THE AMERICAN GOLDEN-EYE DUCK (*Glaucionetta clangula americana*). — On February 13, 1934, I observed a flock of fourteen American Golden-eyes, including four adult males and ten birds that were either females or young males, on a small rapid in the Magog River, in the midst of the city of Sherbrooke, Quebec. Their position was near two busy streets, to the traffic of which they had apparently become accustomed, with the result that they could be watched continuously at close range without difficulty.

I noticed that, while the flock maintained itself in the swift current with very little change of position, each bird repeatedly, at intervals of a minute or so, dipped its head for an instant in the stream and then raised it quickly, thus causing a sheet of water to pass over all of itself that was above the surface of the river. The members of the flock did not do this simultane-

ously, but individually, so that, in the flock as a whole, the individual movement was repeated at intervals of only a few seconds. The birds did not seem to be feeding.

When this observation was made, the temperature of the air was about zero Fahrenheit, or 32° colder than the water. It is suggested that probably the Golden-eyes were repeatedly dipping their heads in the stream and throwing cold water over themselves in order to keep themselves warm and to prevent the formation of ice on that part of their plumage that was exposed to the air. — HARRISON F. LEWIS.

AN UNUSUAL NEST OF THE COMMON PIGEON. — There was recently added to the collection of the Royal Ontario Museum of Zoology an interesting nest of the common pigeon, *Columba livia*, var. *domestica*.. The nest, taken on June 22, 1934, is normal in size and style of construction but instead of the usual material, namely sticks and straw, it is composed entirely of bits of rusted wire from two to three inches in length.

The circumstances under which this nest was found suggest an explanation for its peculiarities. It was found on one of the steel structural girders of the Toronto Maple Leaf Stadium or ball park. There is a comparative absence of vegetation in the surrounding territory and consequently there is a scarcity of vegetable debris within a convenient radius to the nesting site. A further circumstance pertains to the protecting wire, the type ordinarily referred to as chicken wire, which shields the spectators from the foul balls and wild throws at home plate. This had become badly rusted and fragments from this screen have fallen and accumulated on the ground in front of the grandstand.

In responding to its inherent behaviour in selecting nesting material, the pigeon found an abundant supply of objects similar in size and shape to sticks and straws and constructed its nest of these. The resulting structure is ancient in architecture but strictly modern in materials. It seems entirely likely that if both sticks and wire had been present, this bird would probably have used, at least for the most part, the former. The use of wire merely demonstrates a slight flexibility in the habit which dictates selection of nesting material. The range of this habit or the amount of adaptability displayed is approximately parallelled by the range of habit in selecting a nesting site. The wild rock pigeon of Europe nests on ledges in caves. A small horizontal surface, well off the ground, in a somewhat darkened retreat seems to cover most of the immediate requirements of the species for a nesting site. The differences between a cave and a grandstand or a stick and a bit of wire, are apparently mostly in name, so far as a pigeon is concerned. — L. L. SNYDER.

In the Ottawa Naturalist (*Canadian Field-Naturalist*) 32:28, 1918, is an account by C. L. Patch of a similarly unusually constructed Purple Martin nest. The nest in question contained,—

36 bits of window glass
33 bits of rock
9 pieces of clam shell
4 scraps of tin roofing
4 nails — 1 to 4 inches
1 slate pencil
1 bit of dry orange peel
1 safety pin
1 pint of usual twigs, dead grass and green leaves. — ORNITH. ED.

REVIEW

A CONTRIBUTION TO A BIBLIOGRAPHY OF THE DESCRIBED IMMATURE STAGES OF NORTH AMERICAN COLEOPTERA, by *J. S. Wades. No publisher indicated; mimeographed (evidently by the author or by the U. S. Bureau of Entomology and Plant Quarantine), pp.* 1-114. *September,* 1935.

Except for a short introduction, the volume consists entirely of a list of species arranged alphabetically, first by genera and then by species in each genus. For each species, the author gives references to the literature and includes an indication as to the various developmental stages which are considered in each reference. The nomenclature follows that of Leng's "Catalogue of the Coleoptera of America North of Mexico." The last similar publication was one by Beutenmuller which appeared in 1891 in the Journal of the New York Microscopical Society. In view of the very large number of scattered notes and papers which have appeared since that date, Mr. Wade's compilation is timely and will be very useful to all entomologists and to other biological workers. — W. J. BROWN.

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1934-35

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Meetings are held each Monday evening, except on holiday from October to April, in the physics theatre of the University Winnipeg. Field excursions are held each Saturday afternoon during May, June and September, and on public holidays during July and August.

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Meetings held the second Monday of the month, except during the summer.

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All meetings at 8 p.m., Auditorium, Normal School, 10th Avenue and Cambie Street unless otherwise announced.

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CHANGES IN THE NATURAL HISTORY OF THE HIGH RIVER DISTRICT, ALBERTA

By ROY L. FOWLER
Aldersyde, Alberta

NATURE STUDY was not a hobby with our pioneers and old-timers. but because they lived in the open as traders and trappers, as cowboys and ranchers, they took note of the things of nature around them. From the observations of these pioneers I have written the following notes on the changes that have taken place in the natural history of the High River district during the last fifty years. High River is situated about 30 miles south of Calgary, Alberta, near the western margin of the prairie country.

The extinction of the Buffalo (*Bison bison*) was the turning point in the change from the primeval to the new west. In 1877 thirty thousand buffalo hides were shipped out of Fort Benton, Montana; the following year only fifty-seven hundred were shipped, and after 1885 there was not a solitary wild buffalo left in southern Alberta. There is residing at Morley a Stoney Indian by the name of Peter Ear, the only living Indian who participated in the last buffalo drive. He was on hand when a lone buffalo was killed at 18-mile Coulee near Starling in the winter of 1885. Mrs. Alice Stockdale, of Lethbridge, verifies the story of the killing of this last buffalo.

According to Senator D. E. Riley, who settled here in 1882, and Herb Miller (52 years with the Bar U Ranch), no buffalo were seen in this district between Macleod and Calgary after 1882. This was because the U. S. Indians made every effort to hold the buffalo south of the international line and after the above mentioned date, our Canadian Indians were literally starving.

The Wolf (*Canis nubilis*), which subsisted on the buffalo herds, turned to prey upon the great droves of cattle that were coming in to stock the newly founded ranches. Most old-timers are emphatic in considering these wolves as distinct from the common coyote (*Canis latrans*); the wolves were larger and ranged in colour from nearly white to almost black. The Stock Growers' Association paid a bounty on wolves but it was not until about 1910 or 1912 that they ceased to be a menace to the ranching business. The last wolf skin was brought to High River in 1917.

The Coyote (*Canis latrans*) used to be very plentiful but during the last few years professional hunters have so reduced the number that a person on the prairie will only see five or six coyotes during a whole year. They are more plentiful in the foothills district.

The Badger (*Taxidea taxus*) has been hunted almost to the point of extinction, and unless it is given government protection at once will completely disappear in another few years. From the beginning of settlement everyone has made it his business to destroy badgers on sight, because their numerous dens and burrows were a menace to galloping riders. The high price of badger skins during the last five years has been a great inducement to amateur hunters, and as a result the badger appears doomed.

The Kit-fox (*Vulpes velox*) became extinct quite early; in fact, only those people who were here before 1900 can recall having seen a kit-fox. My father states that the last bunch of kit-foxes he saw was in the summer of 1897. These had their den in a sandy knoll about a mile north of High River. There were two litters, of about thirty in all.

As the young Jack Rabbits (*Lepus townsendii campanius*) were the usual food of the coyotes, the decrease in the latter has brought about a corresponding increase in rabbits. This is the reason given for what appears to be a greater number of rabbits than would be accounted for by the usual periodic increase.

The closed season on Beaver (*Castor canadensis*) has prevented these rodents from becoming extinct in this district. In the fur trading days of 1860 to 1878, when there were trading posts at High River, beaver were plentiful along our streams.

Forty years ago the Antelope (*Antilocapra americana*) left these parts, and while they have since increased around Medicine Hat and Vauxhall, they have never returned to the High River district.

Moose (*Alces americanus*) and Elk (*wapiti, Cervus canadensis*) used to frequent the foothills area twenty-five miles west of High River; the weathered antlers of Wapiti may still be found.

Moose and Elk appear to be increasing in numbers back in the first trough of the Highwood Range. On rare occasions, these animals have been seen as far eastward as the Sentinel Ranger Station. At such times they had been driven out by forest fires. But ordinarily these animals stay at least thirty-five miles west of where they used to pasture.

In regard to our bird life one change has taken place which is very noticeable; there are very few Prairie Chicken (*Pediocetes phasianellus*) or Sharp-tailed Grouse on the prairie now. The chicken have been driven into the brush country of the foothills by the Hungarian Partridge (*Perdix perdix*), which were introduced in 1920 and are now very plentiful indeed.

The English Sparrow (*Passer domesticus*) has become a pest throughout the country, and is everywhere on the farms and in the towns. Mr. Harry Gould, a well-known naturalist and bird lover, reports that he did not see an English sparrow here until 1907.

The Earthworm or Angle Worm is found in many gardens, but is not native to the country; it was brought in on rhubarb plants from eastern Canada. The Colorado Potato Beetle (*Leptinotarsa decemlineata*) has been here for over thirty years but it is only during the last few years that it has done any appreciable harm to the potato crops.

In the first ten years, after breaking the sod summer fallowing was unnecessary because weeds were negligible. Many plants and weeds have been introduced since, but very few of these immigrants serve any useful purpose. Brome Grass, Sweet Clover and Timothy are fast spreading along the edges of the fields and into the fence corners, and are choking out harmful weeds.

Stinkweed or Frenchweed (*Thlaspi arvense*) and wild Oats (*Avena fatua*) were spread by the grain seed supplied to farmers by the government during the dry years of 1887 to 1896. Every farm in the country is now infested with these weeds. Most of the mustards, and the Russian Thistle (*Salsola Kali*, var. *tenuifolia*) disseminated in the horse-feed supplied to the construction crews on the main line of the Canadian Pacific Railway in 1883, and on the Calgary-Macleod branch in 1892. Russian thistle is never a nuisance in this district, as it does not seem to thrive on clay soil during the wet years. It was in 1907 that Dandelions (*Taraxacum* spp.) were first noticed along the railway at High River and Okotoks, and since then they have spread everywhere, even back into the foothills. Some weeds introduced very recently are: Bladder Campion (*Silene latifolia*), Toadflax (*Linaria vulgaris*), European Ox-eye Daisies (*Chrysanthemum Leucanthemum*).

Many successful wind-breaks have been planted during the last twenty-five years, and the hardy varieties of trees used seem to do very well. Caragana, Russian Poplar, Manitoba Maple, (*Acer negundo*) are foreign trees that stand our climate well, but it is a curious fact that they never spread beyond the confines of the area in which they are planted. I have never seen caragana or Manitoba maple spring up along a fence or beside a rock pile as our native willow or western poplar does. Several old-timers have remarked that there are now many natural groves of willow (*Salix* sp.) and western poplar (*Populus tremuloides*) where none existed fifty years ago. They believe that the prairie was absolutely treeless in the early days because of the devastation of prairie fires.

In 1896 Thomas Thompson brought some red currant bushes to his farm on Gladys Ridge. This small but delicious fruit has since spread, and is now found wild along Bow River twenty miles northeast of High River.

At Okotoks are a number of Hawthorn bushes (*Crataegus* sp.) which are growing wild and which are slowly spreading. This is another immigrant shrub which may adapt itself to our variable climate.

These notes from the casual remarks of old-timers throw an interesting light on the effects of advancing settlement upon nature.

N.B.—The writer wishes to thank Dr. L. S. Russell and P. A. Taverner for their assistance in preparing this paper.

NOTES ON THE CARE AND HABITS OF SOME INTERESTING URODELES

By Wm. H. BENNETT

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THE PURPOSE of the present study was to obtain more fundamental information on the habits of some of our more interesting Canadian Urodeles. In so doing, much was learned about their mating habits, but observations of this nature simply verified the statements made by others in the field, and will not be discussed here.

Since many naturalists have experienced difficulty in the care of these amphibians, it might be well to mention the conditions under which the various species were kept, and how they were fed.

Five sexually nature specimens of the Mudpuppy, (*Necturus maculosus*), were obtained from different parts of Ontario. One of the individuals was very ferocious, even during the supposed mating season, and it was found necessary to separate it from all of the others. This individual was kept in an ordinary goldfish globe (12″ diam. at the widest part), containing about 4 inches of water. Sand was placed over the bottom of the globe, and water plants were anchored at the centre. The aquarium was small, but the mudpuppy in question lived and thrived there for over two years, when it was moved to a larger space. The four remaining individuals were kept in a very large, glass aquarium (1½' x 3' and 1' high), which was partly filled with water to a depth of 9 inches. Environmental conditions were made as natural as possible; a one-inch layer of sand was scattered over the bottom, and several large flat rocks (Dundas shale) were arranged at one end, that the mudpuppies might hide during the day. The aquarium was then balanced by the addition of various water plants.

It having been found that this species was most contented in a semi-dark, cool place, the aquaria were set near a glazed window in the cellar. They were so arranged that a garden hose, attached to the laundry tap, could be used to siphon out the dirty water, etc., and to refill the aquaria when necessary. The sudden changes in tap-water temperature did not seem to disturb the mudpuppies; they appeared to thrive best in water cooler than 60° F., and were quite active in water from 40° F. to 50° F.

Earthworms, under 4 inches, and small white worms were preferred as food. Small pieces of beef and liver were also accepted; but when these were not eaten immediately, the water soon become polluted. It was sometimes found necessary to tease an individual with the food clasped in a pair of blunt-pointed forceps. All five individuals, and others that have been kept, no matter how hungry, could never be induced to eat the eggs of whitefish or perch.

On March 25, 1934, an attempt was made to find out if mudpuppies would eat other amphibians, while in captivity. With this thought in mind the specimens had not been fed for four days, and they had become so hungry that they would bite at wire, or almost anything that was moved in front of them. Two adult specimens of *Triturus pyrogaster* (Japanese newt) were then admitted to the aquarium. They also were hungry. When the mudpuppies moved, the newts were attracted by the spots on their sides, and frequently bit at them. This seemed to cause no discomfort, and the newts were passed unnoticed. Finally one was discovered and a mudpuppy commenced to move ever so slowly toward it; but surprising as it may seem, the newt, as Necturus approached, turned about to face it. They challenged one another in a peculiar salamander way (nose to nose). The mudpuppy blew water at the newt several times, but the newt held its ground. At last, after smelling (?) or eyeing (?) one another for a few moments, each went its own way. This was repeated with the different individuals, and the newts remained unharmed. They were kept in the aquarium for three days and nights, when they were removed. Ambystoma larvae, under 2 inches, and larvae of Necturus, when very small, were quickly eaten. These larvae were fish-like in appearance.

During the month of February, 1934, each of the four specimens was placed in a separate rectangular aquarium. Each aquarium was small (1' x 1' x 1'), but the same depth of water as in the large aquarium was maintained. In the small aquaria, the individuals would never eat pieces of meat (beef or liver) that were placed on the bottom, but they would eat meat when moved in front of them with forceps. However, in the large aquarium, meat placed on the bottom was always eaten during the night. Furthermore, when in the small aquaria, where perhaps the water was not properly aerated, the indivi-

duals frequently resorted to lung breathing (by rising to the surface and gulping); they were never observed to do this in the large aquarium.

About this time it became evident that while lung-breathing, as in the case of the isolated male in the goldfish globe, all sexually mature mudpuppies did emit a distinct, unmistakable bark. This bark was emitted every few minutes, or perhaps only once or twice a day, depending upon the impurity of the water. Perhaps the shape of the globe helped to produce this sound, and very likely, the shallow water played an important part. When the water was 4 inches deep, Necturus was able to place its hind feet on the bottom, raise its head from the water, and take plenty of time to exchange gases; in deep water, Necturus would swim to the surface, take a hurried gulp, and begin to sink immediately, blowing bubbles of air from the mouth while so doing. In deep water Necturus never barked, but made a peculiar bubbling sound.

One evening, the mudpuppy in the goldfish globe was observed partly out of water, apparently breathing atmospheric air. The water in the aquarium had not been changed for several days and it was not properly aerated. For some time the mudpuppy had resorted to lung-breathing, but this evening, the individual had projected part of its head from the water, and seemed to be breathing atmospheric air; it did not gulp, but remained quietly in this position for over an hour. When tobacco smoke was lightly blown into the aquarium, one half minute elapsed before the creature gulped and went under water. It had then continued gulping every few minues as before, until the water was changed.

A further observation on lung-breathing was made when a common turtle (*Chrysemys marginata*), placed in the large aquarium, had removed both gills from one of the specimens. The latter was immediately transferred to an aquarium in which the water was kept very fresh. Owing to the shallowness of the container, the mudpuppy had found no difficulty in escaping, which it accomplished during the night. The next day, after much searching, it was found beneath a paper, some 40 feet distant, and still very much alive. How long it had been out of water, or how far it had wandered, was not known.

Amongst the mudpuppy's many peculiarities, perhaps the most mystifying was that observed one evening when a specimen was found in a state of dormancy. The forelegs were raised, elbows high, the toes pointing forward, parallel to the black bands masking the eyes. To all appearances it seemed dead, except, as mentioned above, for the peculiar position of the forelegs. Normally the individual was very nervous, and could not be touched, but on this occasion it was gently pushed about with a pencil. Finally it was turned upside down, and indeed, the creature was thought to be dead, when suddenly it sprang to life and splashed about the aquarium, apparently quite alarmed at being disturbed. This state of dormancy, has since been frequently observed by the writer. It has been noticed with different specimens under various conditions.

When mudpupies were kept in the aquarium for several months, they became tame and often sluggish. At such times, short periods of dormancy were common, and the creatures often refused to eat. If however, the animals were prodded with a stick, and once more made timid, they seemed to recuperate, and became normal again.

The remainder of the study was largely devoted to two western species, which, although common, have received very little attention in this country.

Two specimens of the Rocky Mountain Newt (*Triturus torosus*) from British Columbia and 23 specimens of the Tiger Salamander (*Ambystoma tigrinum*) from Manitoba were kept together during the winter in a large wooden box (10′ x 2′ and 2″ high) with a removeable screened cover. The box had been partly filled to a depth of 6 inches with loam, except at one end where a round tub of water was admitted, presenting the appearance of a miniature pond. Some humus, dead leaves, and decaying logs were scattered over the soil, while lichens and sphagnum moss were arranged about the pool. The whole was placed in a cool, semi-dark room in the cellar.

Both species were admitted to the box on September 24, 1933, the newts remaining in the water; and the salamanders on land. On the following day both newts had left the water, and remained terrestrial until spring.

The soil in the box was watered frequently, so that conditions were kept fairly moist.

For a time both species were fed every evening with the aid of a spotlight. Small pieces of raw beef were quickly removed from the ends of blunt-pointed forceps. It was not long before the salamanders had adapted themselves to the conditions of captivity; they had learned to associate the electric light with food, and would come waddling as fast as they could from all corners as soon as the light was turned on. As cold weather approached, both species became

less voracious, and at times, when the room was cold, weekly feedings were adequate.

In the month of February, 1934, the specimens that had not hibernated were fed every Saturday. Often throughout the week, when the lid was removed from the box, some of them, attracted by the light, would come from hiding to obtain food. They were very hungry on Fridays, even on Thursdays. On Friday, February 9th, a rather remarkable change in the feeding habit was noticed. The temperature outdoors at the time was extremely low, and consequently the room in the basement was much cooler than usual (47° F. in the box). When the spotlight was turned on, and the salamander box opened, no salamanders came out for food. For experiment a small lamp was placed above the box, and the light was left burning. It was not until five hours later (11 p.m.) that any salamanders had emerged, and at that time only one half-grown, and two adult Tiger Salamanders had appeared. But the most interesting thing was that all three salamanders removed the food from the forceps by thowing out their tongues. Heretofore, since September, they had always removed food by snapping and catching it between the jaws. Later a specimen of *T. torosus* appeared, but it devoured the beef by snapping. The individuals of this species, however, had been observed, during the past month, to catch small flies by throwing out the tongue; *T. torosus* never used its tongue to capture pieces of beef. By February 22, all the salamanders had ceased throwing out their tongues to obtain food.

While feeding them in late February, it was noticed that the male B.C. newt clasped the female (on land) and went through the sexual motion characteristic of the species. It was thought, however, that the male was fighting the female (as salamanders, particularly Tritons, attack or challenge one another at feeding time). When an attempt was made to feed the female newt, an adult Tiger Salamander, attracted by the movement, crawled along the log, and tried to seize the raw beef. Immediately the male B.C. newt left the back of the female and, attacking the Tiger Salamander, took several very quick bites at one of his rival's big projecting eyes. This seemed to cause much distress, and the big fellow was quickly driven away. In order to continue this most entertaining combat the newt was enticed to approach the head of another Tiger Salamander. Immediately the male newt mounted the big salamander and, clasping the neck with the hind feet, seemed to go through the same writhing and twisting motions as before. At the same time the newt continually pressed its nose against the head of the Tiger Salamander and rode "horseback" all over the logs. Strangely enough the newt, by downward pressure of the head, would not permit the other to take food until he himself had had been fed. whereupon his opponent was released and all hostility ceased.

During the study it was often noticed that when two different species met, they would face one another and touch noses. Each seemed to eye the other for a few moments, and then wander away. This habit was noted with specimens of *A. tigrinum*, *T. torosus*. and *Diemyctylus viridescens* (the Crimson-spotted Newt), and others. A specimen of *A. tigrinum* would seize anything moving, even a finger, but if a smaller salamander, one the same size as a finger, approached and nosed it (or eyed it), the Tiger Salamander would not bite.

At the beginning of the study, the legs of the different individuals had been banded so that a record might be kept of their activities during the winter. Four of the individuals went into a semi-dormant state late in December and remained so, without food, until the week of March 5th to the 12th. When one of these salamanders was examined, by gently lifting one of the logs, it seemed to be in a kind of stupor. The individual would not move when prodded, but when placed on its back, made feeble attempts to turn over. When warmed by the hands, it gradually recovered and after a few hours in a warm room was quite normal. When placed in the box again it did not reappear until March, as stated above.

The average weight of the four individuals before hibernation was 47 grams. The average weight of the same four after hibernation was a little over 42 grams. The loss in weight was approximately the same in each individual.

The remaining 19 specimens became dormant whenever the temperature of the room dropped very low. Sometimes they would not appear for a whole week. Some individuals became dormant at higher temperatures than others; but during the winter, whenever the temperature in the box dropped to 42° F. and lower, no salamander or newt could be made to appear even at feeding time.

As mild weather approached and the various individuals became more active, it was found that the Tiger Salamanders greatly disliked having water sprinkled on their backs. Upon such occasions they would run and bump head-on

into objects, and eventually dash into the pond where they would remain for perhaps five minutes. They seemed too confused to hide beneath the logs. Distilled, luke-warm water had the same effect as tap-water. Had they been placed in the pool before sprinkling, they would have climbed out immediately.

Since adult Tiger Salamanders and B.C. Newts are supposed to migrate to the breeding ponds during an early spring rainfall, it was thought that this observation might serve as a reasonable explanation. However. the B.C. Newts (thick skinned) were not disturbed by drops of water; they seemed to enjoy a sprinkling.

At last, in early March with the advent of Spring, migration to the pond commenced, and as the different individuals entered the water, they were transferred to larger aquaria for the purpose of studying their breeding habits.

EXPERIENCES WITH TRAPPED BIRDS

By R. V. WHELAN
Smoky Falls, Kapuskasing, Ontario

A FOUR-COMPARTMENT Potter trap is so located that it is under observation from our dining table and consequently we gather a great deal of interesting notes concerning the birds which feed around the traps.

On May 11th, 1934, at about 7 p.m.. we were watching two male Purple Finches (*Carpodacus purpureus*) which had just been trapped when a pair of American Sparrow Hawks (*Falco sparverius*) flew to the branch of a Poplar close to the trap. The female soon after flew towards the trap with feet in position to grasp one of the trapped finches; being unable to get the birds from the top she endeavoured to get them from the sides; unsuccessful in this attempt also she flew about ten feet from the trap, alighting on a heap of sods. After landing she immediately whirled and flew toward the top of the trap again, feet prepared to grasp one of the birds. Five times she repeated this latter manoeuvre and having spent fifteen minutes in these fruitless efforts to take the trapped birds she finally flew up to join her mate on the branch of the tree. Just as she alighted beside him he attacked her and the pair fluttered down the tree trunk fighting like a pair of game-cocks. Landing on the ground they fought for a few seconds and then rapidly flew away in different directions. About three minutes later the female returned to the tree and sat on a branch preening her feathers. I decided that the trapped birds had had sufficient excitement for one evening so I went out and banded them. The hawk flew away at my approach.

The first time the hawks arrived in the tree the trapped birds tried to get away, but the second time they both remained quiet, flat on the ground.

I banded six Sparrow Hawks and they were all taken in compartments of that trap next to those occupied by small birds such as Lapland Longspur, Redpoll, Purple Finch, Slate-coloured Junco and White-throated Sparrow.

On April 25th, 1934. after banding a Sparrow Hawk, I opened my hand to release the bird but it refused to fly away. Kneeling on the lawn, and with my hand close to the ground I tossed it a foot or two into the air, but it dropped to the ground and remained still. I turned it over as it lay on the grass but it made no movement; finally I turned my back and walked away and the bird flew rapidly off.

On May 25th, 1934, a male Sparrow Hawk endeavoured to take two Chipping Sparrows from single compartment Potter traps, flying alternately from one to the other. The attempt lasted for half-an-hour, the hawk resting now and then on the top of the traps, looking down at the trapped birds, then projecting itself a few feet above the trap and coming down with feet in position to grasp the birds. Although there were Purple Finches in the four-compartment trap two feet away the hawk made no attempt to get them.

I found the hawks very docile and delightful birds to handle while banding; most of them emitted their peculiar screech while being removed to the collecting cage.

I did not trap any Sparrow Hawks after May 26th, 1934, and although they remained in the vicinity they made no effort to take trapped birds after that date.

I explained to my children, who witnessed the attempts of the Sparrow Hawks to take the trapped birds and whose sympathy was entirely with the latter, that I thought necessity and not choice was responsible for their action.

Although I counted fourteen banded Bronzed Grackles (*Quiscalus quiscula*) on the roof of my house last Spring, all I believe, banded by me in 1933, I only succeeded in getting one return record. It was most aggravating to see half-a-dozen banded grackles taking bread within a foot or two of my traps but refusing to enter them. My records for 1933 show that almost all the grackles I banded in that year repeated from one to six times, yet last Spring they kept away from the traps as though the traps had plague. I tried a variety of paints on the traps, I moved them to a dozen different locations in the course of the summer. I placed the traps on my lawn where I knew the cutworms were plentiful (1934 was a banner year for cutworms). I placed pieces of bread in a line in front of the traps, gradually working the line of bread from crumbs to large morsels, but much as they evinced a desire to have those large morsels they would not venture closer than six inches, then they only took those pieces of bread by bracing their bodies for flight and stretching their necks to the limit.

I consoled myself with the thought that I would have better luck when the adults and juveniles started foraging, but here also I was doomed to be disappointed because I only managed to band two juveniles out of the dozens that fed around the traps. It looked very much as though the adults prevented their young from entering the traps.

CHRISTMAS BIRD CENSUSES, 1936

WOLFVILLE, NOVA SCOTIA, DECEMBER 25, 1936. — Temperature 30°. Ground bare but frozen hard. Time spent in the field, 10 a.m. to 1 p.m. In company with Ronald W. Smith of Wolfville a trip was taken on foot over a sparsely wooded country to the Gaspereau River, which stream was followed for the distance of about one mile, then followed open fields and woodlands to the Cornwallis River and home across the marshlands adjacent to the Cornwallis. The following birds were observed: Black Duck, 3; American Golden-eye, 11; American Common Merganser, 2; Eastern Goshawk, 1; Nova Scotia Ruffed Grouse, 11; Herring Gull, 12; Northern Flicker, 1; Northern Horned Lark, approx. 200; Blue Jay, 4; Northern American Raven, 1; Eastern Crow, approx. 1,000; Black-capped Chickadee, 50; Acadian Chickadee, 25; White-breasted Nuthatch, 2; Brown Creeper, 2; Eastern Golden-crowned Kinglet, 15; Eastern Purple Finch, 7; Eastern Goldfinch, 9; Slate-coloured Junco, 35; Eastern Tree Sparrow, 5; Eastern Song Sparrow, 3; Common Snow Bunting, 30. Total, 23 species, approximately 1,430 individuals. — R. W. TUFTS.

MONTREAL, QUEBEC, DECEMBER 20, 1936. — 8 a.m. to 4 p.m. Mild with strong south winds, storms of sleet and rain, partly fine and clear in the afternoon; temperature 34° at 8 a.m., maximum 39°; 8 inches of old snow in the woods, but fields almost bare.

Four parties of observers worked separately in the morning, as follows: (i) Mount Royal (east side) and Outremont, (ii) Mount Royal (west side) and Westmount, (iii) Cote St. Luke Woods, Montreal West, and (iv) St. Lambert. At noon the first three parties joined forces and drove to Caughnawaga, observing along the river shore to Laprairie (7 miles).

American Golden-eye, 10; American Common Merganser, 1; Red-breasted Merganser (?), 1; Great Black-backed Gull, 3; Herring Gull, 101; Great Horned Owl, 4; Barred Owl, 1; Hairy Woodpecker, 1; Downy Woodpecker, 13; American Crow, *c.* 200; Black-capped Chickadee, 120; White-breasted Nuthatch, 19; Brown Creeper, 10; American Robin, 1; Cedar Waxwing, 2; Northern Shrike, 1; Common Starling, *c.* 310; English Sparrow (not counted); Common Purple Finch, 3; Pine Grosbeak, 5. Total, 20 species, *c.* 806 individuals (not counting English Sparrows).

A Brown Thrasher was first seen in Westmount on December 9, and frequently thereafter. Although it was not to be found on the day of the census, it was seen again the following day (Dec. 21). The Snowy Owl, Arctic Three-toed Woodpecker, and Snow Bunting have been seen in the past week.

The most interesting observation in the census was the large flock of Crows, estimated at 200 birds, seen at Laprairie. We were also interested to find out the exact number of Great Horned Owls on Mount Royal. It may be added that Great Black-backed Gulls are now regularly seen at Lachine Rapids in the fall and early winter, though it is only a few years since they were known only as rare accidental visitors.

Observers: MISS E. E. ABBOTT, A. E ALLIN. J. D. CLEGHORN, H. A. C. JACKSON, A. C. NICOL, L. M. TERRILL, F. R. TERROUX, MRS. TERROUX, V. C. WYNNE-EDWARDS. V. C. WYNNE-EDWARDS, for *The Province of Quebec Society for the Protection of Birds.*

OTTAWA, ONTARIO, DECEMBER 26, 1936. — The Christmas Bird Census of 1936 was taken in the vicinity of Ottawa by twenty observers, organized in nine separate parties. The sky was heavily overcast all day; hail fell most of the time from 10.00 a.m. to 1.00 p.m.; the wind was easterly and of moderate strength; the ground was covered with about five inches of snow and ice. The temperature at the Dominion Observatory was 14° at 8.30 a.m. and at 1.00 p.m.

Species observed that are sufficiently unusual in the Ottawa census to be of special interest are the Great Horned Owl, Arctic Three-toed Woodpecker, Golden-crowned Kinglet, and Evening Grosbeak.

A diminution in recent years in the number of American Crows wintering about Ottawa is reflected in the census.

The parties participating in the taking of the 1936 census and the routes followed, in East, South, West, North order were: (1) Hoyes Lloyd, Peggy Whitehurst, 9.00 a.m. to 4.30 p.m., village of Rockcliffe Park and property of Federal District Commission in that vicinity, 10 miles by auto, 7 miles on foot; (2) R. M. Anderson, 2.00 p.m. to 4.00 p.m., 58 Driveway to Ottawa East, north bank of Rideau River, and return by Riverdale Avenue, 6 miles on foot; (3) C. E. Johnson, Gifford Johnson, Stanley Sternberg, G. W. Dennis, and Donald Blois, 9.45 a.m. to 3.30 p.m., Bronson Avenue refuse-dump, thence via White's Bridge and C.P.R. to Metcalfe Road, returning by C.P.R. tracks, 10 miles on foot; (4) R. E. DeLury and H. Groh, 8.30 a.m. to 1.00 p.m., Experimental Farm, Rideau Canal and River to Hog's Back and vicinity, returning same route, 7 miles by auto, 2 miles on foot; (5) B. A. Fauvel, 10.30 a.m. to 2.30 p.m., Holland Avenue to Britannia, 5 miles on foot; (6) Harrison F. Lewis, C. R. Lewis, and Barnard McL. Lewis, 8.35 a.m. to 4.35 p.m., Deschenes, Aylmer, Queen's Park, and 1 mile beyond, returning to Aylmer, 14 miles on foot; (7) G. H. Hammond and T. S. Hennessey, 8.30 a.m. to 4.20 p.m.. back roads between Tetreauville and Breckenridge, south of Laurentians, 65 miles by auto, 10 miles on foot; (8) Arthur D. Nelles, 10.00 a.m. to 4.15 p.m., Old Chelsea to Wrightville by ski trails, 12 miles on skis, also McLeod Street, Ottawa, in early morning; (9) W. H. Lanceley, R. F. Clarke, and Rev. F. E. Banim, 10.20 a.m. to 4.30 p.m., Fairy Lake, Farmer's Rapids and vicinity, to Gatineau Point, 15 miles on foot, also Lindenlea, Ottawa, in early morning. — HARRISON F. LEWIS, *Chairman of Bird Census Committee.*

CHRISTMAS BIRD CENSUS, OTTAWA, ONTARIO, DECEMBER 26, 1936.

Species of Birds	Route Nos. as in Text									
	1	2	3	4	5	6	7	8	9	Total
American Golden-eye	..	..	..	1	20	11	10	..	..	42
American Common Merganser	1	..	..	..	..	..	..	..	..	1
Ducks (not further identified)	..	..	..	..	..	..	..	..	9	9
Ruffed Grouse	..	1	4	..	..	..	..	..	..	5
Eastern Screech Owl	..	..	..	..	..	..	..	..	1	1
Great Horned Owl	..	..	..	1	..	1	..	..	..	2
Hairy Woodpecker	1	1	1	..	..	1	..	..	..	4
Downy Woodpecker	2	..	..	6	..	1	..	1	..	10
Arctic Three-toed Woodpecker	1	..	..	..	..	..	..	..	..	1
Blue Jay	..	..	..	..	..	..	1	..	..	1
American Crow	..	..	6	1	30	..	1	..	..	38
Black-capped Chickadee	9	..	13	14	5	27	10	6	1	85
White-breasted Nuthatch	2	..	3	6	2	2	..	2	..	17
Brown Creeper	1	..	2	1	..	..	..	..	..	4
Golden-crowned Kinglet	..	..	1	..	..	..	..	..	..	1
Shrike (sp. ?)	..	..	..	1	..	..	..	..	..	1
Common Starling	3	50	200	5	7	..	18	1	2	286
English Sparrow	..	200	150	85	100	10	25	2	50	622
Evening Grosbeak	9	..	..	..	..	..	..	..	..	9
Pine Grosbeak	..	..	..	..	..	4	..	..	..	4
Redpolled Linnet	..	..	..	..	..	..	..	26	..	26
American Goldfinch	..	..	..	..	..	..	60	..	..	60
Snow Bunting	..	..	..	..	150	..	1	..	..	151
Total Individuals	29	252	380	121	314	57	126	38	63	1380
Total Species	9	4	9	10	7	8	8	6	5	

PAKENHAM, ONTARIO, DECEMBER 26, 1936. — 8.15 a.m. to 3.30 p.m. Dull sky, light east wind, turning to sleet at 10 a.m. Clearing in the afternoon. Visibility good but hearing bad. Disagreeable travelling through 5 inches soft snow with a light crust underneath.

Temperature 12° at start, 16° at finish.

Observers separate, travelling 15 miles on foot.

Canada Ruffed Grouse, 6; Hairy Woodpecker, 3; Downy Woodpecker, 1; Blue Jay, 3; American Crow, 21; Black-capped Chickadee, 29; White-breasted Nuthatch, 5; Red-breasted Nuthatch, 1; Common Starling, 25; English Sparrow, 16; Evening Grosbeak, 6; Snow Bunting, 30. Total, 12 species, 146 individuals. — E. G. Ross, V. M. Ross, A. F. Ross.

ARNPRIOR, ONTARIO, DECEMBER 25, 1936. — 9.00 a.m. to 4.30 p.m., cloudy, 5 inches snow on ground, light north wind until 12.30 p.m. then east wind with snow; temp. 15° at start, 11° at return. Eighteen miles on foot. Observers separate.

Canada Ruffed Grouse, 7; Northern Pileated Woodpecker, 3; Eastern Hairy Woodpecker, 6; Northern Downy Woodpecker, 5; Blue Jay, 9; Eastern Crow, 3; Black-capped Chickadee, 42; White-breasted Nuthatch, 12; Red-breasted Nuthatch, 5; Eastern Brown Creeper, 3; Common Starling, 1 plus; House Sparrow, 1 plus; Eastern Evening Grosbeak, 4; Common Snow Bunting, 1 plus (heard). Total, 14 species, 102 plus individuals. Subspecies determined geographically. No attempt made to count Starlings or House Sparrows. Seen recently, flock of 1500 to 2000 Snow Buntings. — LIGUORI GORMLEY and CHARLES MACNAMARA.

HALIBURTON, ONTARIO, DECEMBER 23, 1936. — 8 a.m. to 12.15 p.m. and 1 p.m. to 4.25 p.m. Overcast, slight snowfall, 16 inches of snow, wind southerly, moderate, temp. 30° (a rise of some 60° in a little more than 24 hours); about 15 miles afoot, chiefly by road and logging trail. Great Horned Owl, 1 (heard at 8 p.m.); Pileated Woodpecker, 1; Hairy Woodpecker, 3; Arctic Three-toed Woodpecker, 1; Blue Jay, 3; Black-capped Chickadee, 35 (est.); Red-breasted Nuthatch, 1; Golden-crowned Kinglet, 1; Evening Grosbeak, 2+; Pine Grosbeak, 3+; Common Redpoll, 18; Pine Siskin, 6+; Snow Bunting, about 100 (2 flocks). Total, 31 species, about 175 individuals. Other species of recent record: December 15, Bohemian Waxwing, 3; Barred Owl; December 21, Ruffed Grouse and Crossbill (sp. ?); December 22, White-breasted Nuthatch. — E. W. CALVERT.

TORONTO, ONTARIO, DECEMBER 27, 1936. — Forty-three observers collaborated to take the 12th Christmas Bird Census of the Brodie Club and with such an array in the field it would seem that there was small chance of any local birds going unrecorded. The list, however, is quite an average one and with a few exceptions can be said to show rather well the normal winter birds of the Toronto region. The Pintail and Pigeon Hawk are new to the census lists, the first being seen on Lake Ontario at Sunnyside by number 4 party and the latter at Armour Heights near the northern city limits by Harrington and Allin who left their own territory long enough to invade that of number 3 and make this important observation. The Great Horned Owl appears for the first time since 1931 and although only one was seen it has more significance than the record would indicate for it is a fact that these owls have been quite rare at Toronto for the past five years but appeared in conspicuous numbers during fall and early winter of 1936. This is the second consecutive census on which the Starling has shown a decrease and although this has not been large it supports the opinion of most observers here that this species reached its maximum locally two or three years ago. Almost twice as many Herring Gulls, Downy Woodpeckers and White-breasted Nuthatches as ever before were seen, but these figures are probably of more interest than significance.

It is interesting to notice that a day of extraordinary weather conditions produced such an ordinary list of birds. There was no snow on the ground and the official temperatures at Toronto Observatory showed a maximum of 52° and a minimum of 44° with a south-west wind. Similar weather, moreover, had prevailed during most of December although there was a short period of rather severe cold in late November.

Those taking part in the census and their parties were as follows: 1. H. M. Halliday, J. Walty, T. Murray; 2. L. L. Snyder, G. S. Bell, R. J. Rutter, R. E. Bennett, R. Wootton, H Wootton, R. G. Dingman, J. M. Speirs, T. M. Shortt, K. Neilson, L. Prince, D. Scott, J. Medcof, D. Miller, A. Lawrie, F. Banfield; 3. C. E. Hope, G. H. Richardson, S. Downing; 4. J.

L. Baillie, R. Russell, G. Kennedy, W. C. Mansell, F. Cook, E. Boissonneau, M. Boissonneau, D. Boissonneau; 5. P. Harrington, A. E. Allin; 6. H. H. Southam, S. L. Thompson, W. Gunn, D. Beacham, F. Norman, I. Ellis, D. West, G. Beare; 8. H. H. Brown, F. H. Emery, R. V. Lindsay, L. Owens.

THE BRODIE CLUB,
Per: R. J. RUTTER, *Secretary*.

CHRISTMAS BIRD CENSUS OF THE BRODIE CLUB—TORONTO
DECEMBER 27, 1936

Species	Parties:	1	2	3	4	5	6	8	Totals
Pintail		....	....	....	1	....	....	....	1
Greater Scaup Duck		....	....	....	22	356	600	....	978
American Golden-eye		....	....	....	44	150	40	....	234
Buffle- head		....	....	....	1	....	....	....	1
Old-squaw		....	....	....	5	176	300	....	481
King Eider		....	....	....	....	....	1	....	1
American Common Merganser		....	....	....	6	8	5	....	19
Eastern Red-tailed Hawk		2	....	....	....	....	....	....	2
Eastern Pigeon Hawk		....	....	1	....	....	....	....	1
Eastern Sparrow Hawk		....	....	....	....	....	1	....	1
Common Ring-necked Pheasant		52	16	....	3	1	1	1	74
American Coot		....	....	....	1	....	....	....	1
Glaucous Gull		....	....	....	....	1	....	....	1
Great Black-backed Gull		....	....	....	2	23	10	....	35
Herring Gull		10	174	40	226	2000	1500	88	4038
Ring-billed Gull		....	....	....	1	....	....	....	1
Great Horned Owl		....	....	1	....	....	....	....	1
Saw-whet Owl		....	....	....	....	....	3	....	3
Eastern Belted Kingfisher		1	1	....	1	....	....	....	3
Eastern Hairy Woodpecker		1	3	....	2	....	....	....	6
Northern Downy Woodpecker		4	24	5	14	1	2	1	51
Blue Jay		1	30	6	3	5	....	3	48
Eastern Crow		....	3	....	....	....	....	....	3
Black-capped Chickadee		30	99	16	85	6	12	1	249
White-breasted Nuthatch		....	18	7	15	5	1	1	47
Brown Creeper		6	3	3	4	....	....	2	18
Eastern Robin		....	1	....	....	....	....	....	1
Eastern Golden-crowned Kinglet		2	....	....	....	....	....	....	2
Northern Shrike		....	1	....	....	....	....	....	1
Common Starling		2	234	74	246	100	200	15	871
English Sparrow		30	482	186	220	850	300	165	2233
Rusty Blackbird		1	2	....	4	....	....	....	7
Eastern Cardinal		....	2	....	....	1	....	....	3
Eastern Purple Finch		....	2	3	3	....	....	....	8
Pine Siskin		....	....	....	12	....	....	....	12
Eastern Goldfinch		1	33	1	1	....	....	....	36
Slate-coloured Junco		1	52	10	60	....	1	....	124
Eastern Tree Sparrow		4	49	17	62	....	15	....	147
Swamp Sparrow		....	....	....	1	....	....	....	1
Eastern Song Sparrow		....	4	....	7	....	1	....	12
Total individuals		146	1235	370	1052	3683	2993	277	9756
Total species		15	22	14	28	15	18	9	40

Sub-species determined geographically.

BRADFORD, SIMCOE COUNTY, ONTARIO, DECEMBER 27, 1936. — 10 a.m. to 4.30 p.m. Weather mild; a.m. cloudy, p.m. light rain; temperature at start 48°, at finish 51°; moderate west wind. Eight miles on foot along the Holland River, west from Bradford. Observers together.

Ruffed Grouse, 7; Great Horned Owl, 2; Blue Jay, 2; Black-capped Chickadee, 25; White-breasted Nuthatch, 2; Brown Creeper, 1; Common Starling, 5; English Sparrow, 5; American Goldfinch, 2; Tree Sparrow, 16. Total, 10 species, 67 individuals. — O. E. DEVITT and C. E. MOLONY.

VINELAND, ONTARIO, DECEMBER 28, 1936, — 1:00 p.m. to 5:00 p.m.; clear and bright; wind moderate; temperature during afternoon — maximum 38.2°, minimum 33.6°; no snow.

Route followed: Shore of Lake Ontario, Experimental Farm, Ball's Falls and edge of Jordan Marsh. Four miles on foot, remainder by automobile. Observers together.

Buffle-head, 6; Merganser (sp. ?), 10; Common (Ring-necked) Pheasant, 1; Gull (sp. ?), 10; Eastern Screech Owl (red phase), 1; Downy Woodpecker, 3; Black-capped Chickadee, 13; Brown Creeper, 1; Eastern Golden-crowned Kinglet, 4; Cedar Waxwing, 2; House Sparrow, 75+, Eastern Purple Finch, 13; Eastern Goldfinch, 2; Slate-coloured Junco, 15; Eastern Tree Sparrow, 30; Song Sparrow (subsp. ?), 1. Total, 16 species, 187+ individuals.

December 26, Eastern Goldfinch, 60+.

December 29, Cardinal Grosbeak, 1.

This particular individual has been frequently observed on the Experimental Farm since the middle of October. — W. E. HURLBURT, J. RD. ROTHWELL, R. C. ROSS, D. A. ROSS.

HAMILTON, ONTARIO, DECEMBER 26, 1936. — Dawn till dark, clear, very muddy, moderate southwest wind, temp. 42° to 46°. Burlington Bay, Dundas Marsh, Ancaster, and Stony Creek were the principal regions covered. Horned Grebe, 2; Great Blue Heron, 1; Black Duck, 150; Greater Scaup Duck, 24; American Golden-eye, 254; Old-squaw, 35; American Common Merganser, 16; Red-breasted Merganser, 1; Red-tailed Hawk, 1; Marsh Hawk (G. S.), 1; American Sparrow Hawk, 2; Ruffed Grouse, 22; Hungarian Partridge, 28; Common (Ring-necked) Pheasant, 67; Glaucous Gull, 2; Great Black-backed Gull, 200; Herring Gull, 10,325; Ring-billed Gull, 4; Bonaparte's Gull, 8; American Screech Owl, 2; Great Horned Owl, 2; Yellow-shafted Flicker (G. S.), 1; Downy Woodpecker, 29; Blue Jay, 18; American Crow, 22; Black-capped Chickadee, 124; White-breasted Nuthatch, 29; Brown Creeper, 4; Common Starling, 132; English Sparrow, 129; Eastern Meadowlark, 1; Cardinal, 6; Pine Siskin, 30; American Goldfinch, 12; Slate-coloured Junco, 73; Tree Sparrow, 334; Swamp Sparrow (D. H.), 1; Song Sparrow, 16; Snow Bunting, 91. Total, 39 species, 12,199 individuals. — *Hamilton Bird Protection Society* (DON HASELL, PETER HENDERSON, H. E. KETTLE, JACK MARTIN, REV. CALVIN MCQUESTEN, MRS. J. P. MORTON, GEORGE NORTH, H. C. NUNN, BLAIR RONALD, G. SACKRIDER, DAVE SCOTT, DOUGLAS SIMPSON, VERNON TROTT, J. H. WILLIAMS).

KITCHENER AND WATERLOO, ONTARIO, DECEMBER 26, 1936. — Two automobile parties afield: the first (5 observers) reaching German Mills and Cressman's Park, from 9 a.m till noon; the second (2 observers) covering Victoria Park (Kitchener) and Paradise Lake (10 miles northwest) from 8:15 till noon, and the vicinity of Bridgeport Dam from 2 to 4.30 p.m. (Territory as a whole incompletely covered).

Mostly cloudy, but clear much of later a.m.; moderate southwesterly winds; quite mild, temperature continuing unseasonable, from 38° to about 45°. Appreciable snow remaining chiefly in wooded locations; many open places quite disagreeable to walk through — muddy or wet and slippery.

Few kinds of birds seemed present — the "key" northern species almost totally absent — and those found averaged subnormal in numbers. Gulls, starlings, chickadees appeared preponderant. Striking paucity of woodpeckers and native sparrows; absence or rarity of raptorial forms.

Ruffed Grouse, 3; Herring Gull, 26; Ring-billed Gull, 3; Belted Kingfisher, 1 (called freely, flew close overhead, at Bridgeport); Hairy Woodpecker, 1; Downy Woodpecker, 1; Blue Jay, 4; American Crow, 1; Black-capped Chickadee, 75 ±; White-breasted Nuthatch, 3; Brown Creeper, 2; Golden-crowned Kinglet, 3; Common Starling, 90+; English Sparrow, 170+; American Goldfinch, 3. Total, 15 species, 386+ individuals. On or about December 17, a Northern Shrike was seen at the south limits. American Screech Owl, Cardinal (1 ♂, December 23, Victoria Park; also, 1 pair, long at Forest Hill Gardens Estate), Tree Sparrow (2, December 23), American Robin (1, about December 20, Forest Hill Gardens vicinity) and 2 or 3 moderate or small flocks of Snow Buntings have also been noted during the past month or so.

(NOTE: Difficulty in differentiating subspecies afield is why only the specific common names appear here.)

Census observers, by respective parties: (1) ALLEN BAIN, MR. and MRS. FRED H. BENDER, F. W. R. DICKSON, F. A. SHANTZ; (2) G. W. KNECHTEL (preparator of report), F. H. MONTGOMERY. — *via* C. B. PRICE, *Secretary, Kitchener-Waterloo Naturalists' Club.*

WOODSTOCK, ONTARIO, DECEMBER 27, 1936. — 9.15 a.m. to 5.30 p.m., no snow covering, high southwest wind, cloudy with occasional showers until 2.30 p.m. and heavy rain from then on, temp. 50°, becoming colder. Ten in party, separated into three groups, working along Cedar Creek, hardwood areas and cedar swamps around Hodge's Pond and Sweaburg. Distance covered, 8 miles by car, 10 miles on foot. Cooper's Hawk, 1; Red-shouldered Hawk, 1; Ruffed Grouse, 2; Great Horned Owl, 1; Downy Woodpecker, 1; Blue Jay, 3; American Crow, 23; Black-capped Chickadee, 40 plus; White-breasted Nuthatch, 2; Brown Creeper, 2; Golden-crowned Kinglet, 1; Common Starling, 200-250 (est.) in one flock; English Sparrow, uncounted; Tree Sparrow, 19; Song Sparrow, 5. Total, 15 species, 301 plus individuals. Seen on December 26 — Common (Ring-necked) Pheasant, 9; Hairy Woodpecker, 2; Horned Lark (subsp. ?), 2. — H. MILNES, E. DUTTON, G. NUTT, C. COOKE, N. NEALE, T. BEST, C. POOLEY, MRS. H. MILNES, MISS F. JONES, MISS P. FARMER.

LONDON, ONTARIO, VICINITY OF, DECEMBER 26, 1936. — 8 a.m. until dark. Temp. 42° at 8 a.m., remaining stationary until nightfall, when it rose slightly. Ground bare after several mild, rainy days. Wind light, west to south-west. Sky overcast. Combined list of eight parties, 28 individuals.

Great Blue Heron, 4; Black Duck, 54; American Golden-eye, 29; American Common Merganser, 145; Sharp-shinned Hawk, 2; Cooper's Hawk, 1; Red-tailed Hawk, 2; Red-shouldered Hawk, 2; Bald Eagle, 1; American Sparrow Hawk, 2; Ruffed Grouse, 2; Bob-white, 5; Common Pheasant, 43; Herring Gull, 151; Ring-billed Gull, 4; American Screech Owl, 1; Belted Kingfisher, 4; Hairy Woodpecker, 4; Downy Woodpecker, 41; Blue Jay, 70; American Crow, 355; Black-capped Chickadee, 127; White-breasted Nuthatch, 38; Red-breasted Nuthatch, 1; Brown Creeper, 19; Winter Wren, 1; American Robin, 3; Golden-crowned Kinglet, 26; Common Starling, 120; English Sparrow, (not counted but seem to be diminishing in numbers); Cardinal, 35; Common Purple Finch, 81; Pine Grosbeak, 1; Redpoll (sp. ?), 21; Pine Siskin, 19; American Goldfinch, 6; Slate-coloured Junco, 51; Tree Sparrow, 114; White-throated Sparrow, 1; Song Sparrow, 9.

Total 40 species, 1595 individuals, plus English Sparrows.

McIlwraith Ornithological Club, per RAY BROWN, J. F. CALVERT, ROBERT CALVERT, J. H. CAMERON, D. H. CARR, E. M. S. DALE, E. DALY, ELI DAVIS, KAY FETHERSTON, V. FRANKS, H. GIRLING, W. G. GIRLING, ROBERT HAY, J. C. HIGGINS, HARRY HOWARTH, W. JARMAIN, W. LOTT, C. MADDEFORD, TAIT MONTAGUE, ROBERT MORGAN, W. MORRIS, E. H. MCKONE, J. PURSER, K. REYNOLDS, W. E. SAUNDERS, R. STANDFIELD, W. D. SUTTON.

MEAFORD, ONTARIO, DECEMBER 29, 1936. — 9 a.m. to 2.30 p.m., weather very bright, temp. 32°. Area covered, a strip of shore line of Georgian Bay, one quarter of a mile wide, beginning at Meaford and extending two miles east. American Golden-eye, 3; American Common Merganser, 12; Ruffed Grouse, 2; Herring Gull and Ring-billed Gull together, 200; Pileated Woodpecker, 1; Hairy Woodpecker, 3; Downy Woodpecker, 3; Blue Jay, 8; Black-capped Chickadee, 50; White-breasted Nuthatch, 12; Common Starling, 12; English Sparrow, 50; Slate-coloured Junco, 4; Tree Sparrow, 2. Total, 15 species, 362 individuals

Also 4 leopard frogs and the following mammals: 10 red squirrels, 2 black squirrels, 1 porcupine, 1 varying hare, 1 European hare, 1 New York weasel, apparently just killed. — L. H. BEAMER, for *Meaford Natural History Club*.

GREATER WINNIPEG, MANITOBA, DECEMBER 27, 1936. — 8 degrees below zero; north wind, 8 miles an hour; brilliant sunshine in morning, cloudy in late afternoon. Nine feeding stations and six field parties in Winnipeg and surrounding municipalities:

American Goshawk, 2; Marsh Hawk, 1; Ruffed Grouse, 1; Sharp-tailed Grouse, 10; Common (Ring-necked) Pheasant, 1; Hairy Woodpecker, 11; Downy Woodpecker, 16; Horned Lark, 3; Canada Jay, 2; Blue Jay, 82; Black-capped Chickadee, 42; White-breasted Nuthatch, 21; Brown Creeper, 1; American Robin, 1; Golden-crowned Kinglet, 1; Bohemian Waxwing, 93; Evening Grosbeak, 73; Pine Grosbeak, 1; Redpoll (sp. ?), 1; White-winged Crossbill, 2; Slate-coloured Junco, 1; Snow Bunting, 1; 22 species, 367 birds. Feeding station operated by Miss G. Childs, Mesdames J. S. Jones, E. J. McMillan, A. W. Murdoch, A. S. Robinson, F. H. Telfer, P. Thompson and Messrs. H. C. Pearce and H D. Whellams. Field parties formed by Misses B. Haak and M. Pratt; Mrs. J. Haak and Messrs. M. Atkins, C. L. Broley, B. W. Cartwright, R. Fryer, A. Haak, J. Haak, A. M. Lawrence, A. G. Lawrence, H. C. Pearce, G. Rutherford, A.

H. Shortt, R. Sutton, and A. Wolverton. Natural History Society of Manitoba.

Black-capped Chickadees much below average; Hairy and Downy Woodpeckers double the average number; White-breasted Nuthatches somewhat above average; Blue Jays well above average; Grouse below normal. Horned Larks and Golden-crowned Kinglet are first recorded wintering for this area. Canada Jays have reappeared in city after several years' absence; Pine Grosbeaks and Redpolls scarce. — A. G. LAWRENCE.

SASKATOON, SASKATCHEWAN, DECEMBER 15, 1936. — 9 miles along Saskatchewan River and home. Partly by dog-team and partly on snowshoes. North wind; clear sunny day with temperature above 15° and below 10° below zero.

Mallard Duck, 2; Sharp-tailed Grouse, 3; European Gray Partridge, 7; Arctic Horned Owl, 1; American Magpie, 5; Long-tailed Chickadee, 7; Bohemian Waxwing, 60; English Sparrow, 20; Evening Grosbeak, 3; Hoary Redpoll, 6; Common Redpoll, 30.

Total: 11 species, 144 individuals.

The mallards, male and female, are wintering on water kept open by steam overflow from power plant. — FARLEY MOWAT and BRUCE BILLING.

BATTLE RIVER, ALBERTA, DECEMBER 26, 1936. — A party of five (J. E. Appleby, R. Hawkins, J. Buckingham, N. Neville, and A. Vernon Craig), of the Camrose Bird Club, journeyed seven miles south from Camrose to the Battle River area for their annual Christmas Bird Census on December 26th.

The first seven miles of the trip were made by car, after which the party split up, one section tramping east, the other west, through the spruce woods for three and a half miles. Although the party lacked their leader and mainstay, Frank L. Farley, a fair day was spent.

Although Great Horned Owls (*B. v. virginianus*), Sharp-tailed Grouse, and Hungarian Partridge are in the district, none was noted on the twenty-sixth. Hungarian Partridge flocks have been somewhat depleted during the past year, presumably because of the cold severe winter of 1935-36.

The outline of the trip is as follows: 11.30 a.m. to 3 p.m., bright sunshine, no wind, temp. 14°. Battle River valley, spruce, black and aspen poplars, birch, willow. There was good cover. 14 miles by car, 14 on foot.

Ruffed Grouse, 2; Common (Ring-necked) Pheasant, 4; Snowy Owl, 1; Hairy Woodpecker, 2; Northern Downy Woodpecker, 3; American Three-toed Woodpecker, 1; Blue Jay, 2; American Magpie, 25; Long-tailed Chickadee, 15; Hudsonian Chickadee, 10; Brown Creeper, 4; Common Redpoll, 50; White-winged Crossbill, 12; Snow Bunting, 20. Total, 14 species, 151 individuals. 15 Pine Grosbeaks were recorded on December 29. — A. VERNON CRAIG.

VEDDER CROSSING, BRITISH COLUMBIA, DECEMBER 28, 1936. — Vicinities of Vedder Crossing, Cultus Lake, and Sardis. Weather cool but not freezing, sky overcast by cumulus and cirrus clouds, calm in morning, light northeast wind in afternoon. Northeast shore of Cultus Lake, from its outlet to Smith Falls, returning by road — 4 miles on foot, 11 a.m. to 1.30 p.m. Bank of Vedder River near Vedder Crossing — 1 mile on foot, 2 to 2.30 p.m. C.N.R. track from Cannor station to the Sumas River, with side excursions in the McGillivray Creek Game Reserve — 3 miles on foot, 3 to 4.30 p.m. The 22 miles between these points was covered by auto. One observer. Numbers greater than 15 are estimated. Common Loon, 1; Horned Grebe, 6; Western Grebe, 3; Pied-billed Grebe, 2; Great Blue Heron, 1; Mallard Duck, 100; Baldpate, 200; Pintail, 20; Redhead, 1; Canvas-back, 3; Lesser (?) Scaup Duck, 3; American Golden-eye, 12; Barrow's Golden-eye, 2; Ducks (not further identified), 600; Sharp-shinned Hawk, 1; American Coot, 70; Wilson's Snipe, 1; Glaucous-winged Gull, 80; Herring Gull, 1; Gulls (not further identified), 500; Marbled Murrelet, 6; Red-shafted Flicker, 1; Hairy Woodpecker, 2; Downy Woodpecker, 1; Steller's Jay, 1; Raven, 2 (heard); American Crow, 13; Black-capped Chickadee, 12; Chestnut-backed Chickadee, 16; Little Bush Tit, 2; Red-breasted Nuthatch, 3; Brown Creeper, 2; American Dipper, 3; Winter Wren, 4; Golden-crowned Kinglet, 60; Ruby-crowned Kinglet, 1; House Sparrow, 3; Pine Siskin, 50; Spotted Towhee, 2; Oregon Junco, 150; Song Sparrow, 4. Total, 39 species, about 1945 individuals. Also 1 Greater Yellow-legs, not certainly identified. Bald Eagle seen December 24. The Bush Tits were in low brush, with a flock of Golden-crowned Kinglets and Chestnut-backed Chickadees; one of them was observed closely at about 200 feet, with glasses. — WILLIAM E. RICKER.

COMOX DISTRICT, VANCOUVER ISLAND, BRITISH COLUMBIA, DECEMBER 24, 1936. — A.B., 9.30 a.m. to 12.30 p.m., T.P., 9.30 a.m. to 4.30 p.m.; both on foot and working separately. Sunny, calm after slight frost (winter very open so far), temp. around 40°. Courtenay to Comox, from there around Harbour and Goose Spit, mainly on shore line with detours, about 12 miles.

Common Loon, 63; Pacific Loon, 175; Red-throated Loon, 3; Holboell's Grebe, 100; Horned Grebe, 80; Western Grebe, 570; White-crested Cormorant, 3; Violet-Green Cormorant, 12; Northwest Coast Heron, 7; Black Brant, 5; Mallard Duck, 250; Baldpate, 425; Pintail, 5; Green-winged Teal, 10; Canvas-back, 17; Greater Scaup Duck, 1150; Lesser Scaup Duck, 80; American Golden-eye, 950; Barrow's Golden-eye, 5; Buffle-head, 545; Old-squaw, 9; Harlequin Duck, 5; White-winged Scoter, 2150; Surf Scoter, 1330; American Scoter, 70; Hooded Merganser, 2; American Common Merganser, 6; Red-breasted Merganser, 77; Northern Bald Eagle, 1; Pheasant (sp. ?), 1; American Coot, 46; Black-bellied Plover, 20; Black Turnstone, 240; Aleutian Sandpiper, 2; Red-backed Sandpiper, 800; Sanderling, 3; Glaucous-winged Gull, 1750; Thayer's Gull, 4; Short-billed Gull, 100; California Murre, 700; Pigeon Guillemot, 1; Marbled Murrelet, 30; Horned Owl (subsp. ?), 1; Western Belted Kingfisher, 4; Northwestern Red-shafted Flicker, 4; Pileated Woodpecker, 1; Harris's Woodpecker, 2; Gairdner's Woodpecker, 1; Northern American Raven, 15; Western Crow, 2; Northwestern (Fish) Crow, 220; Chestnut-backed Chickadee, 6; Western Winter Wren, 3; Seattle Wren, 3; Northwestern Robin, 2; Western Bluebird, 1; Western Golden-crowned Kinglet, 11; Ruby-crowned Kinglet, 4; Audubon's Warbler, 1; English Sparrow, 4; Western Meadowlark, 37; California Purple Finch, 4; Pine Siskin, 60; Oregon Towhee, 6; Oregon Junco, 85; Rusty Song Sparrow, 19. Total, 66 species (two introduced), 12,298 individuals (the larger numbers are estimates). During previous 10 days two more Audubon's Warblers were recorded (T.P.). — ALLAN BROOKS and THEED PEARSE.

SOME NOTES ON THE SAND CRICKET, (Tridactylis apicalis Say.)

By F. A. URQUHART, B.A.
Royal Ontario Museum of Zoology

THE SAND CRICKET, *Tridactylis apicalis* Say, is very seldom represented in amateur insect collections and often escapes the specialist owing to the fact that it is a burrowing form and does not readily take to flight. It is a very widely distributed insect being found in southern New England, Georgia, Louisiana, Texas, Southern California, Mexico and South America. Its most northern record is Toronto, Ontario, having been collected by Professor E. M. Walker and by myself in large numbers in the Don Valley region.

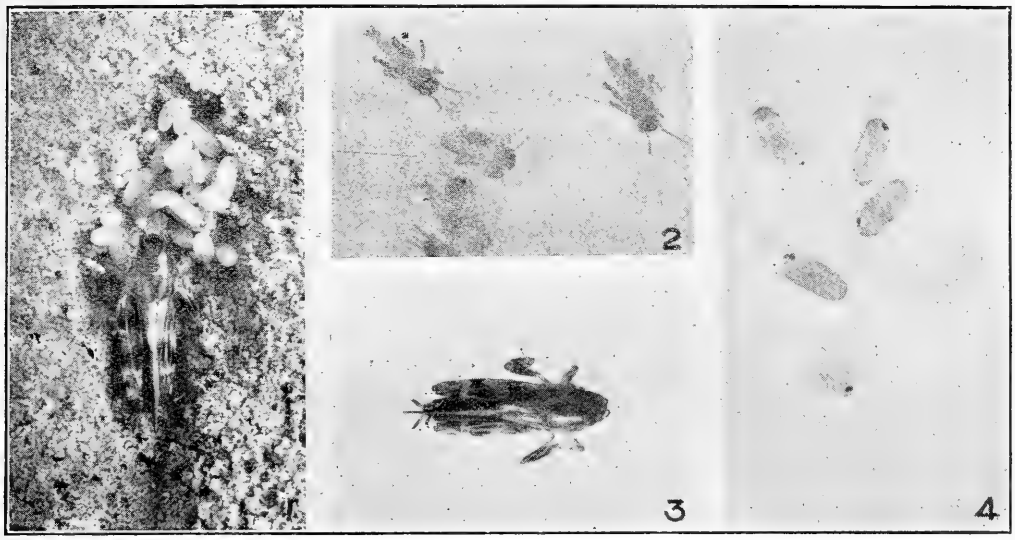
In order that Canadian naturalists may add this insect to their collections, I am including a description of it taken from Blatchley's Orthoptera of North Eastern America together with my method for collecting them:

> "Colour variable, usually black or dark brown; occiput and thorax with pale markings; tegmina with dorsal area and a spot behind middle yellowish; fore legs dull yellow; hind femora dull yellow with upper half of outer face brownish or with three dark cross-bars. Disc of pronotum with apical fourth constricted and a faint median groove. Tegmina with tips broadly rounded." (Fig. 3)

In addition to this description one might add the presence of fossorial fore legs and saltatorial hind legs. Although classed as a cricket my recent studies have shown that it properly belongs with the Acridoidea and a better common name for it would be "Sand Grasshopper". The reason for its present systematic position is owing to its superficial resemblance to the mole cricket (*Gryllotalpa* sp.).

Most of my specimens were taken along the banks of Don Creek at Sunnybrook Farm in north-eastern Toronto. Although I was able to obtain specimens throughout the year, they were more abundant in late summer.

On January 17th, I visited the above locality in order to find at what depth the insects were



Tridactylis apicalis Say

FIG. 1—*Female and batch of eggs; roof of burrow removed* (x2.5)
FIG. 2—*Newly emerged nymphs* (6x)
FIG. 3—*Female* (2.5x)
FIG. 4—*Eggs* (5x)

hibernating. It was found that they had burrowed to a depth of 1 1-2 to 2 feet below the surface, having penetrated a layer of sandy clay and were hibernating in the soft sand beneath. These specimens were mostly nymphs although a great many imagines were also unearthed. The nymphs were quite active and would leap from their burrows as soon as they were exposed. The imagines, on the other hand, were quite inactive and only showed signs of life when taken indoors.

On August 2nd the above locality was again visited and they were found to be very abundant. While walking along the bank of the creek numerous immature nymphs would jump into the water and, with vigorous strokes of their hind legs, swim back to the shore again. Having chosen a likely position at the side of the bank, where numerous small pits gave evidence of adult forms, I dug a short distance and unearthed a great many females. The tunnels were rather shallow extending to a depth of from 1 to 1 1-2 inches below the surface, broadening out into a small chamber at the far end within which the female could be seen lying beside a batch of eggs. (Fig. 1). The eggs were about 1.5 mm. in length and there were from 10 to 27 eggs in each batch. (Fig. 4). Some of the eggs were much larger than others. The larger eggs showed more development, the eye-spots in each embryo being plainly visible through the transparent chorion. In some cases the young nymphs were found crowded around the female. It would seem from this that the female guards the eggs until they have hatched as in the case of the earwigs. The newly emerged nymphs were white in colour and not very active (Fig. 2). Fifteen minutes after eclosion they had turned a dark brown in colour and became very active, jumping vigorously for a distance of a foot or more.

The only other species of North American Tridactylidae is *Ellipes minuta* Scudd. which is not known from Canada.

NOTES AND OBSERVATIONS

WESTERN MEADOWLARK NEAR LONDON. — On April 15, 1936, I stopped my car about seven miles north of London and at once heard the song of a Western Meadowlark. He gave me two songs, each one repeated some six or eight times, and then flew about a third of a mile, alighting on the ground, and ceased singing. Rain came on and I went to London for Mr E. M. S. Dale. Together we returned, and at 5.30 p.m. he was singing again for a short time. A very noticeable feature of the song was its tremendous carrying power. When we first heard it, at a range of about a quarter of a mile, he was in the top of a tree, and the song seemed to come from a tree about 75 yards ahead of us. Failing to find him in that tree, we walked

on and soon discovered him several hundred yards in advance. On the following morning, four cars of bird students arrived about seven a.m. and he favoured us with numerous songs from several perches, usually in a tree or from a fence-post. Everyone remarked on the likeness of his song to the flute-like tones of the Baltimore Oriole; and all agreed that his song was unmistakable, and bore only the most remote resemblance to the song of our local meadowlarks. The chirp used by this bird was the "tlk" of the western species, and never once did he use the rattle which we are accustomed to hear from our own larks. On the seventeenth I visited the place at 11.30 a.m. but, though the morning was intermittently clear and the sun shone for a part of the time we were there, the only song that might have been his came from so far away that we could catch only an occasional prominent note against the strong north wind.

Later on in the same day, he was heard by a visiting party, and since then he has been heard almost daily by one person or another.

He seems to have pre-empted a territory for himself and chases other larks away from it, though we have seen nothing that would incline us to suspect that he has any friendly feeling for any female. However, if no Western Lark comes to him, we are hoping that he will surrender to the charms of one of our local birds, and settle down for the summer.

I do not recollect any previous reference to one of these birds in Eastern Ontario, but the fact that they occur in some numbers in Northern Michigan makes their occurrence quite probable.

Pectoral Sandpipers have again been found in this vicinity; beginning about April tenth, a number of flocks have been seen. None of them have been very near to London, and the only flock I personally have seen was near West Lorne, 40 miles southwest, where a flock of about fifty flew around for some minutes, giving us much entertainment. It is now about seven years since they first appeared here in numbers, and they are now looked for as a regular thing, whereas before that time only single birds were seen, and at intervals of several wears. — W. E. SAUNDERS.

PILEATED WOODPECKER BREEDING IN TORONTO REGION. — A note in *The Canadian Field-Naturalist* for January, 1936, mentioned the reappearance of these woodpeckers near Toronto after a long absence. On May 19, 1935, I was in a low-lying hardwood bush near Pottageville, Township of King, when a Pileated Woodpecker flew up and, on seeing me, immediately swung off and disappeared. Five minutes later she (presumably) returned to a Basswood stub, circled it once, and entered a hole some forty feet up, facing east.

On May 24th I again visited the nest with Mr. J. L. Baillie, Jr., F. H. Emery, and others. Much hard thumping on the tree failed to flush the bird, which flew only when someone attempted to climb up; then it circled about over the tree tops calling until we left. The second bird did not appear.

Prolonged visits on June 2 and 14 showed no sign of the birds, even when the stub was hammered. Again on June 22 I was about to leave the spot, when as I was about fifty yards away, the characteristic sound, quite loud, of young woodpeckers being fed was heard. Running back, I was just in time to see a bird leave the hole, utter a few warning cries, and vanish. The young ceased their cries at once.

I am indebted to Mr. Baillie for the information that on June 27 young were seen at the entrance to the nest, and again on the next day, when both adults were present; also to Mr. R. V. Lindsay for the dimensions of the hole; 3 inches horizontally by 4 inches vertically.

This spring birds have been heard drumming in several localities in King township, and a possible site, apparently used before, was seen 35 feet up in the main trunk of a large Sugar Maple. — R. D. USSHER.

ERRATA. In the article by Ian McTaggart Cowan on "Notes on some Mammals in the British Columbia Provincial Museum with a List of the Type Specimens of North American Recent Mammals in the Museum" which appears on pages 145 to 148 of the issue for December, 1936, the following errors occurred:

Page 145, Col. 2, Line 19, for 'Vancouver' read 'Vancouver Island'

Page 145, Col. 2, Line 31, for 'Vancouver' read 'Vancouver Island'

Page 146, Col. 2, Line 16 from bottom, for 'Vaseux' read 'Vasseaux'

Page 147, Col. 1, Line 6 from bottom, for 'pedical read 'pedicel'

Page 147, Col. 1, Line 5, the words 'now spelled Clayoquot, V. I., B.C.' should be in square brackets.

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*WINTER CARRYING CAPACITY OF MARGINAL RUFFED GROUSE ENVIRONMENT IN NORTH-CENTRAL UNITED STATES**

By PAUL L. ERRINGTON

POPULATION studies centering upon the Bob-white Quail (*Colinus virginianus virginianus* (Linn.)) have now been carried on for a period of seven years (1929-36) in north-central states, principally in Iowa and Wisconsin (Errington and Hamerstrom, 1936). Incidental to the field research on bob-whites, notes have been taken relative to the numerical status and winter mortality of the Ruffed Grouse (*Bonasa umbellus umbellus* (Linn.)) cohabitants of several of the areas under observation.

The ruffed grouse populations with which we commonly had to deal were so sparse and unevenly distributed that we felt that direct enumeration had greater promise of effectiveness than a sampling technique. Populations, then, were usually calculated on the basis of birds to be flushed in or near regularly occupied coverts — a method for which we claim no advantages except when grouse are present in very low densities. Densities were often as low as two to five birds per square mile, with occupied coverts widely separated and not infrequently isolated, as by open fields. On the whole, if the birds could once be located, they could be found without excessive difficulty thereafter; and locating them in the first place was facilitated by the finding of tracks, droppings, feathers, dust baths, and similar "signs".

The most important of our observational areas, both from the standpoint of the bob-white and of the grouse, was located east of Prairie du Sac, Wisconsin, where the author received very material help from local residents, particularly A. J. Gastrow. This area consisted of five square miles of nonglaciated agricultural land with partially wooded hills and valleys in cultivation or in pasture. The general habitability of the wooded tracts for grouse seemed to vary with the extent to which wood cutting and pasturing had modified the flora. Grouse environment was restricted to wooded hills comprising roughly one-sixth of the area and was broken up into five chief woodlots ranging in estimated size from 20 to 300 acres. (For a map illustrating the distribution of cover types on the area, the reader may be referred to Errington and Hamerstrom, 1936, pp. 394—395).

During the first winter of the studies (1929-30), only three of the five square miles were kept under observation. There were about an even dozen grouse resident in early winter on the three square miles, from which pro-rata calculations would place the population for the five square miles in the vicinity of 20 birds or one per 160 acres. This population seemed fairly secure, as there was scant evidence of mortality except for one bird killed by nesting Great Horned Owls (*Bubo virginianus virginianus* (Gmelin)). Later in the spring ruffed grouse remains were found in the nest of a Red-tailed Hawk (*Buteo borealis borealis* (Gmelin)). Remains of grouse, including those of one of the kills mentioned above, were found in 2 of 53 horned owl pellets collected in winter and early spring.

Numerical estimates of the wintering grouse population could not be located among the 1930-31 notes, although these old notes strongly imply that the population did not differ greatly from that of the preceding season. Analyses of 150 horned owl pellets showed no grouse remains, and no other evidence of winter mortality was recorded.

For 1931-32, the early winter grouse population was calculated at 25, and the mortality rate seemed to rise conspicuously. One bird was known to have been shot by a poacher, but most of the losses were traceable to Gray Foxes (*Urocyon cinereoargenteus* (Schreber))

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and to horned owls, in about equal proportions, despite the listing of ruffed grouse remains in but two of 232 horned owl pellets. The total winter toll from predation seemed to amount to between 6 and 8 birds.

A pronounced increase in grouse was observed by the season of 1932-33, and the early winter population figure arrived at was 33. This increase was attended by a terrific acceleration of predation. Grouse kills were encountered throughout the woodlots during the winter, the mortality being largely attributable to gray foxes and to horned owls. Of 99 horned owl pellets, 3 contained ruffed grouse remains. It is probable that nearly half of the population was killed by enemies in the course of the winter.

The initial 1933-34 winter population amounted to about 18, or about what one would judge to be the approximate carrying capacity of the land. None of the 21 horned owl pellets collected showed grouse contents, nor was other evidence detected of winter predation upon the species.

For 1934-35, we had a surviving population calculated at 17. Remains of 2 kills found during late winter—both by horned owls—would indicate an earlier population of at least 19. There were no grouse remains in 42 horned owl pellets.

A wintering population established at 15 grouse suffered no recorded losses during 1935-36. No horned owl pellets were collected.

The ruffed grouse survival data from the seven seasons' observations at Prairie du Sac may be summarized in Table I.

TABLE I

Ruffed Grouse Survival Data from Five Square Miles Near Prairie du Sac, Wisconsin.

Season	December Population	March Population	Medium of Reduction
1929-30	20?	18?	predation of horned owls
1930-31	20?	20?	no loss detected
1931-32	25	16-18	poaching; predation by gray foxes and horned owls
1932-33	33	17?	predation by gray foxes and horned owls
1933-34	18	18	no loss detected
1934-35	19?	17	predation by horned owls
1935-36	15	15	no loss detected

It may be seen, by checking over the approximate survival figures in the March population column of the table, that the area seems to exhibit a rather definite season to season carrying capacity for ruffed grouse. Definiteness of carrying capacity seems to be a characteristic of bob-white environment under stable agricultural conditions in north-central states (Errington, 1934; Errington and Hamerstrom, 1936), but our grouse data are too inadequate, both as to quantity and as to quality, to justify many conclusive statements.

The concept of some definiteness of carrying capacity of ruffed grouse environment is supported by observations made by W. J. Breckenridge, University of Minnesota, on a square mile of partially farmed land near Anoka, Minnesota. He has been carrying on ecological studies on this tract for four years (1931-35) and is of the opinion that the ruffed grouse population surviving each winter has remained constant at from 8 to 10 birds, or at one bird per 64 to 80 acres. This section has been repeatedly burned and cut over, so the vegetation is predominantly of brushy and herbaceous types, with scattering growths of oak woods. I would call it distinctly marginal for ruffed grouse but superior to the Prairie du Sac area. Horned owl pellets were examined on a considerable scale only for the season of 1932-33; of a total of 269, ruffed grouse remains were found in two.

From what season to season data on ruffed grouse populations we have been able to obtain in north-central states and also from the recent findings of Clarke (1936, pp. 47-48) in Ontario, it appears that marginal environment may hold the species at low but comparatively uniform

levels and may not permit the strong ascendencies associated with the upgrade of the grouse cycle in regular range. Whenever the population exceeded the apparent winter carrying capacity of the land, the surplus had a way of being reduced from one cause or another.

Conversely, adult populations within carrying capacity exhibited a notable security of position, seemingly irrespective of the kinds and densities of predatory enemies. Of the latter, great horned owls and gray foxes were responsible for most of the mortality traced down, but fluctuation in numbers of these and other possible enemies from winter to winter had no perceptible effect on the net intensity of predation. As in the case of bob-white population studies (Errington, 1934; Errington and Hamerstrom, 1936), the severity of winter loss from predation appears far more a matter of how many birds the environment can safely accommodate under existing conditions than the always variable composition of the predator factor. Fluctuations of "buffers" such as rabbits and mice, within observed limits, have also had no perceptible influence on the severity of depredations suffered by either wintering bob-whites or ruffed grouse.

General field experience from 1929 to 1932 in obviously marginal ruffed grouse country in southern Wisconsin gave no impression of increasing grouse densities, though I was interested in observing any increase corresponding to the cyclic peak which wilderness populations were at that time approaching. Populations in stronger environment did mount noticeably, nevertheless; and, in some exceptionally good environment, the grouse probably became as abundant as they would have under primal conditions.

Carrying capacities of some samples of southern Wisconsin ruffed grouse environments, where enough work has been done upon which to base fair tentative estimates, are listed for what they may be worth. Tracts of land in the vicinity of Lodi, Verona, Mazomanie, Pine Bluff, Daleyville, Roxbury, Black Earth, and Arena have supported populations varying between one bird per 80 acres and one per 200; superior environment near Gross Plains, Denzer, Mazomanie and Sauk City, between one bird per 15 acres and one per 25. The wild and extensive Baraboo Hills seemed to carry a population of about one grouse per 6 acres on samples examined, though this latter figure must be regarded as little better than a well considered guess.

While my observations have dealt for the most part with populations living almost entirely in environment marginal for the species, R. T. King, University of Minnesota, has been carrying on ruffed grouse field studies on wilderness and semi-wilderness range since 1929. His studies at Cloquet, Minnesota, and elsewhere, lead him to believe that winter populations cannot maintain themselves even on optimum range at densities exceeding one bird per four acres. His evidence indicates that if this approximate level is reached, the adult population curve flattens out and is thus maintained for a time before the cyclic decline, instead of rising to a really top-heavy peak and falling abruptly.

The degree to which superior ruffed grouse environment may show definiteness of carrying capacity is problematical, at best, in the light of our present knowledge, and further uncertainties may be introduced by differences in geographical location. Gardiner Bump (letter, July 19, 1935) writes from his experience in good grouse country: "All in all, I do not feel that in New York adult grouse populations within the carrying capacity of the range exhibit any significant security of position." We are plainly on safer ground scientifically if we confine our discussion to marginal environment.

How may we explain the definiteness of carrying capacity so far observed? Do the scanty data we have point to broader biological application of the population vulnerability thesis originally advanced with reference to the northern bob-white (Errington, 1934)?

King's concept of a population saturation point peculiar to the ruffed grouse, and considerably lower than the bird per acre saturation point of the bob-white under optimum living conditions (Stoddard, 1931; Leopold, 1931), is in keeping with the evidence available. As the bob-white may show a decided intolerance of over-crowding at levels far below its specific saturation point, so the even greater apparent aversion of the ruffed grouse to crowding may have a profound influence on the adjustment of populations in an environment of low carrying capacity. A given environment does not need to have a heavy population of birds to be over-populated; it may be over-populated if there are only a few birds, provided that the environment is incapable of accommodating even a few.

What actually determines the upper stable densities at which ruffed grouse may exist

under given environmental conditions has been the concern of investigators who have done far more intensive work on the species than I have, and so far as I am aware no one has worked out the answer.

Up to date, it has been our experience as well as Clarke's (1936, p. 48) to find the wintering grouse population of a marginal environment distributed in essentially the coverts that have been occupied season after season. At times when the environment was evidently over-populated, grouse were noted in coverts in which they were not usually to be found, and in which they usually did not stay during the whole winter. Some other coverts were evidently so satisfactory that they always had birds if any were in the locality.

Mixed stands of hardwoods and low-growth conifers seemed to be especially, though not exclusively, favoured. Indeed, grouse sometimes wintered in coverts that did not look particularly attractive to our eyes at all, and they were absent from coverts we would judge to be of exceptional quality. In short, while the consistently sparse ruffed grouse populations of the marginal portions of its range may not offer great promise from the sporting standpoint, they offer almost endless and interesting possibilities for field study.

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SOME 1933 BIRD NOTES FROM LONDON, ONTARIO

By E. M. S. DALE

HAVING heard of a field near Denfield where some Short-eared Owls (*Asio flammeus flammeus*) had been seen, we drove out on February 28th to see if we could find them. The field certainly looked promising but although we tramped over it thoroughly we could not stir up any of the birds. On enquiring at the farm house we learned that some owls had been roosting in the spruce trees around the house of a nearby neighbour. We went over expecting to find "Long-ears" in such a location but much to our surprise and delight as we entered the front gate and approached the house the trees literally exploded owls which proved to be the "Short-ears" for which we had been looking. It was impossible to tell exactly how many there were, but ten or twelve is well within the mark They scattered, some disappearing from sight, while others alighted in the nearby orchard on the ground, in the trees or on the fence. During the succeeding summer a nest was found in the field which we had searched in vain in February which is the first definite breeding record for this species for Middlesex County.

The next 1933 record of importance concerns another owl, the Barn Owl (*Tyto alba pratincola*) which was found nesting at Strathroy on April 5th. Mr. A. A. Wood, to whom credit is due for this rare find, has already given an account of it in *The Canadian Field-Naturalist.* 47:143, October, 1933. Ontario nesting records of the Barn Owl are few and far between.

When we went out in the country on the morning of May 2nd we soon became aware of the fact that a very considerable migration had taken place during the night. Thirteen species were added to the Club list that day and although most of them were warblers and other small birds, two of the arrivals were ducks, a female Shoveller (*Spatula clypeata*) and a White-winged Scoter (*Melanitta deglandi*). These are two of our rarest ducks and, in the case of the Scoter, it is only the second time that it has been noted in spring.

The next species, the King Rail (*Rallus elegans elegans*) is also one that is very seldom seen. Mr. and Mrs. E. H. McKone were, therefore, very fortunate in finding one in Komoka swamp on May 7th. It was heard calling and subsequently gave them a most excellent view as it came up out of a ditch, leisurely crossed the road and disappeared into the weeds and shrubs on the other side. Other observers visited the place several times during the next few days but without success. This may very well have been due to inexperience with the ways of rails, as instead of shouting and making a noise to which the bird would without doubt have responded, they kept very, very quiet so as not to "scare" it, a good practice with most birds but a failure with rails.

We are just at, or perhaps a little beyond the northern limit of the range of the Orchard Oriole (*Icterus spurius*) and records of it are, therefore, very infrequent. Some of our Club members who have been studying birds 20 years or more have yet to see their first Middlesex specimen. Mr. W. E. Saunders seems to have all the luck with this species which is probably due to his excellent ear for bird music and his familiarity with their songs. Nearly all the recent records have been made by him, the latest having been on May 18th of the year under review when one was heard singing in his garden.

The next event of importance occurred at Long Point where a party had gone on May 28th to study waders. A thick fog along shore in the early morning ruined that part of the outing but a splendid view of an Eastern Mockingbird (*Mimus polyglottos polyglottos*) helped to even up the score. It was first observed sitting on a sign nailed to a telegraph post alongside the road. It flew as we were watching it but remained in the same general vicinity until all the party had an opportunity to make its acquaintance. Much to our disappointment the bird did not sing.

On July 29th, just as we had crossed Komoka bridge and were mounting the hill on the north side, we stopped the car to scan the river. At that moment two large white birds were noted flying overhead but by the time we had all piled out of the car and got our glasses focussed on the pair they were some distance away and the only view we could get was a rear one. They were of large size, slow wing beat and pure in colour except for the ends of the wings which were black. They were flying one behind the other and once they sailed for a moment or two, both sailing and flying being, however, in unison. Eventually they turned sharply to the right but by that time were too far away for us to make out anything more about them. A process of elimination led us to conclude they were White Pelicans (*Pelecanus erythrorhynchos*) which conclusion was given strength by the record of one at Toronto a few days later, August 6th.

The above occurrence, coupled with the presence of an American Egret (*Casmerodius albus egretta*) at West Lorne on June 4th, made us very much alert regarding large white birds so that we lost no time in investigating a newspaper report of 14 "white herons" at Port Stanley. We found 8 American Egrets there on August 1st, and from then until September 24th this species was present at different places in the district, along the river or at various ponds, often singly but sometimes several together. Once we had a splendid view of four near Komoka bridge in the top of a tall dead pine.

One of our trips included a visit to a pond near Aylmer and there in addition to Egrets we found two immature Little Blue Herons (*Florida caerulea caerulea*). They also remained for some weeks but so far as we know this is the only report of this species for our district.

During our surveys of the river in early August looking for the two species just mentioned, we found Black-crowned Night Herons (*Nycticorax nycticorax hoactli*) unusually common as was to be more or less expected. One afternoon we recorded eight or nine while walking from Kilworth to Komoka and on one occasion three or four were within sight at once. Both adult and immature birds were noted, the immature, of course, being much commoner.

The next species to be mentioned is the Greater Redpoll (*Acanthis linaria rostrata*) of which a specimen was taken by A. A. Wood near Strathroy on November 21st. Several were taken by Mr. Wood in March, 1926, the first record for the county. This, therefore, is the second time this species has been recorded.

Among the others which do not require extended reference is the Duck Hawk (*Falco peregrinus anatum*) which was noted near Komoka on March 26th. In 1930, 1932 and now again in 1933 a Duck Hawk has been seen flying over at almost the identical spot although not on exactly the same day, certainly a most interesting observation.

Eastern Goshawk (*Astur atricapillus atricapillus*) November 6th near Strathroy. This species is only seen once in about every three or four years.

Whistling Swan (*Cygnus columbianus*). Missed during spring migration but heard flying over on the night of November 9th.

On November 15th A. A. Wood, Strathroy, wrote "On November 10th I went out to the 'Lark and Longspur fields' at daylight. A flock of about 500 birds containing Longspurs, Horned Larks and Snow Buntings left the field flying south until out of sight. The birds remaining in the field were Hoyt's Horned Lark (*Otocoris alpestris hoyti*), Northern Horned (*Otocoris alpestris alpestris*) and Prairie Horned (*Otocoris alpestris praticola*) with a number of Lapland Longspurs (*Calcarius lapponicus lapponicus*)." Needless to say many of the other members of the Bird Club would like to have been along on this excursion.

The total list of birds observed in Middlesex County for the year was 195.

THE PINE MOUSE IN ELGIN COUNTY, ONTARIO

WITH NOTES ON TWO OTHER SPECIES

By PAUL F. ELSON

Department of Zoology, University of Western Ontario, London, Ontario

THE PINE MOUSE (*Pitymys pinetorum scalopsoides*) has to this time been recorded in Canada only in the region of London, Ontario. The writer is now able to offer a record from Elgin County, fifty miles southeast of the first location.

Mr. W. E. Saunders has given an account of the earlier records in "Mammals of Ontario". 1932. He tells us that the late Robert Elliot took this animal on several occasions a few miles north of London; and Mr. Saunders collected a specimen at Komoka in 1923.

Since the pine mouse is really a more southern form one might expect to find it in the Upper Austral region along the Lake Erie shore, as it has already been recorded from the Transition zone of London. In September, 1934, the writer had the privilege of setting a line of traps at Eden (7 miles south and east of Tillsonburg) with Mr. Saunders, in the hope of taking either the pine mouse or the smoky shrew (*Sorex fumeus*). Neither species was taken at this time, though in 1930 Mr. Saunders recorded *Sorex fumeus* from near Tillsonburg. And a long-tailed shrew taken at Eden in August, 1934, by the writer subsequently proved to be *Sorex fumeus* also.

For the past two years the writer has been taking Brewer's mole (*Parascalops breweri*) at the above mentioned location near Eden, in an endeavour to learn something of the life history of this interesting animal, which is met with quite frequently in the sandy soil of this region.

On November 24, 1935, while trapping for moles at the top of a small wooded ravine the writer noticed that the ground gave away underfoot—the usual sign of the mole. Closer examination showed however, in this case a rather roughly built nest of grass and leaves. This was contained in a more or less spherical excavation about one and a half inches below the surface of the soil, ten inches in diameter and eight inches in depth. On three sides tunnels entered from the soil. The nest was disturbed as little as possible and a mouse trap carefully set across one of the runways. It was hoped that this might prove to be a nest of Brewer's mole.

The next morning the trap had not sprung. It was decided to take photographs of the nest. The nest was then examined more closely. The three tunnels leading away were about one and a half inches in diameter; one came to the surface of the soil, under the carpet of leaves, within ten inches. The others extended somewhat farther. The nest itself was formed on the outside of dead oak and maple leaves. The centre was somewhat more carefully constructed of fine grass leaves, resembling the ordinary nest of *Microtus pennsylvanicus* but of more careless construction.

The top of the nest was removed and mouse-traps set at each entrance, as well as one in the centre of the nest. A mole trap was set on one of the longer tunnels. There was occasion to pass the spot within half an hour, and in one of the mouse traps was what appeared at first glace to be a rather fat young *Microtus*. Trap and animal were hung out of reach of possible foraging *Blarinas*. On returning in three quarters of an hour another mouse was

found still quivering in the nest having been struck on the head by one of the traps. While watching this animal the writer's attention was drawn to the unusually short tail, short fore legs, rather stocky build, and fine thick fur, particularly on fore legs and throat. Closer examination of the first specimen revealed the same rather unusual features. Both specimens were accordingly deposited in a tin can for safe keeping. On returning two hours later still a third specimen was found.. This was placed with the others. In the evening when preparing to make up the specimens many small mites were noticed leaving the carcasses, so all three animals, with the parasites, were placed in alcohol. The next morning a *Blarina* was found in the nest. It also harboured mites. One might suppose that this little animal had been investigating the possibilities of a mouse dinner. *Blarinas* were quite numerous, one having been eaten from a trap not twenty feet away on this same morning. (Mr. Saunders has also called the writer's attention to the abundance of these short-tailed shrews this past year, and their habit of eating trapped specimens.)

At a later date one of the specimens was made into a study skin and skull. Measurements are (1) L.126: T.25: H. F. 16, ♀; (2) L.126 T.26: H.F. 16 ♂; (3) L.126: T.26: H.F. 16 ♂. Nos. (1) and (2) are alcoholics. There are five plantar tubercles: the female shows four mammæ in the inguinal region. The fur is much finer and shorter than in the typical *Microtus* and has a chestnut tinge which extends unto the belly but is not as reddish in colour as that of the more southern pine mouse. The skull is noticeably wider, and flatter dorsally than in the typical *Microtus pennsylvanicus*.

Bailey (North American Fauna No. (7 - 1900) treating *Pitymys* as a subgenus gives the subgeneric characters as "Plantar tubercles five; mammæ 4, two pairs of inguinal; lateral glands on hips in adult males; ears very small; tail short; fur short, dense, glossy. *Skull* flat and wide with quadrate braincase; bullæ small; molars narrow. Upper m3 with 2 closed triangles, lower m2 with anterior pairs of triangles confluent, lower m3 with three transverse loops." He gives the measurements of the subspecies *scalopsoides* as L 125: T 20: H.F.16.3. G. S. Miller (1900) gives the length of tail at 22 millimetres. In the specimens described above the tail is somewhat longer. In No (3) the length of caudal vertebræ was carefully checked after skinning the animal. In the stomach of this individual were found grass stems and leaves well masticated. The sexual organs of all were quiescent. Thanks are due to Mr. A. H. Howell of the U. S. Biological Survey for confirming the writer's indentification of these animals. The study skin will be placed with the collection of the Department of Zoology at Western University. The two alcoholics will be sent to the Royal Ontario Museum at Toronto.

While this mouse is, so far as we know at present, rare in Ontario, one might be led to suspect that careful trapping, particularly in the Austral zone along the north shore of Lake Erie might reveal it as considerably more common than is at present believed.

In this connexion the writer once watched a dog dig out the nest of a small mammal from under the sod of an old orchard with an enthusiasm which would indicate the proximity of desirable prey. Examination of the nest revealed a large handful of dried grass leaves, and at a depth of ten inches a small tunnel leading away. The only indications of mole nests the writer has found have been under old stumps, trees, or some such sheltering object. It is suggested that this might have been another case of a pine mouse's nest. The incident occurred about 100 yards from the spot where these animals were taken.

SOME MEASUREMENTS AND OBSERVATIONS FROM BRONZED GRACKLES

By L. L. SNYDER

AN OPPORTUNITY to examine a considerable number of Bronzed Grackle specimens in the flesh was afforded a few years ago and a mass of data, of decidedly miscellaneous character, was obtained. The birds were received at the Royal Ontario Museum of Zoology as a single shipment from Mr. Jack Miner of Kingsville, Ontario. Mr. Miner had captured them on March 26, 1930, on his farm by means of a large, baited live-trap. The observations noted and the statistics gathered may be regarded as facts salvaged from perish-

able material as opportunity occurred, not as an orderly study conducted for a special purpose.

MEASUREMENTS

A concise summary of seven measurements from each of the two hundred and four specimens is given below*. The sex determinations are based on dissection examinations; the linear measurements are given in millimeters, and the weight in grams.

	Weight	*Length*	*Tail*	*Wing*	*Culmen*	*Tarsus*	*Middle Toe and Claw*
Average of 99 ♂'s	131.4	323.7	141.4	139.3	30.1	34.4	32.8
Mean variation from the average of 99 ♂'s	6.2	6.1	4.8	2.5	1.	1.5	1.2
Largest Individual ♂	140.	345.	158.	146.	32.	36.	35.
Composite maximum measurements from 99 ♂'s	151.	345.	158.	148.	34.	39.	36.
Smallest Individual ♂	105.	306.	133.	135.	30.	33.	30.
Composite minimum measurement from 99 ♂'s	91.	306.	124.	131.	28.	31.	30.
Average of 105 ♀'s	100.8	293.2	124.3	126.5	26.2	33.9	30.2
Mean variation from the average of 105 ♀'s	4.7	6.9	5.7	2.4	1.	1.	1.1
Largest individual ♀	104.	311.	132.	133.	27.	34.	32.
Composite maximum measurements from 105 ♀'s	118.	311.	134.	133.	29.	37.	33.
Smallest individual ♀	95.	276.	119.	122.	23.	32.	29.
Composite minimum measurements from from 105 ♀'s	87.	276.	112.	118.	23.	29.	26.

It will be noted from the above that the sexes of grackles are normally conspicuously differentiated in point of size: *i.e.*, males are larger than females. But in a large series of specimens, an occasional female exceeds an occasional male in most of its measurements. Further, a comparison of the composite minimum measurements of males with the composite maximum measurements of females shows that the latter sex is capable of exceeding males in all measurements though this has not been demonstrated with individual representatives.

VARIATION IN PRISMATIC COLOUR

The great variation in the colour produced by the refracted light from the feathers of the head, neck and upper breast of the ninety-nine male grackles was noted and three major distinctions were made; a red-purple group at one end of the series and a metallic green at the other. Between these was a variable blue group which was further divisible into two sub-groups according to the tendency to approach either the red-purple group or the metallic green group. The percentage of each group from the whole series of males, stated without fractions, is:

Red-Purple	*Variable Tending toward Red-Purple*	*Metallic Blue Tending toward Metallic Green*	*Metallic Green*
14%	26% + 62%	36%	24%

It is interesting to observe that the sequence of colours as arranged in the groups can be interpreted as following the sequence of colour

*To make clear the meaning of headings in the column on the left, the following is offered:

"Mean variation from the average". After the average measurement was determined for each of the seven features for both sexes, each individual measurement was compared with the average measurement of the corresponding feature and the amount of divergence noted. An average divergence, or the variation from the average, was then struck. This tends to show the usual or normal limits of variation of the species and sex as determined from the series in hand. For example, the average length of male grackles in the series was 323.7. The mean variation from this measurement was 6.1. Male grackles then may be regarded as varying normally in length from 317.6 to 329.8, a range of 12.2 mm.

"Largest individual". This indicates the single bird which was superior in size in the majority of its linear measurements.

"Composite measurements". These are not from a single individual but rather each figure is the extreme maximum and minimum for that feature.

in the spectrum. Since these colours are of prismatic origin, it would appear that they demonstrate some minute structural variations in the feathers of the head, neck and upper breast of the Bronzed Brackle of this region.

SEX RATIO AND SEASONAL CONDITION OF GONADS

An additional observation relative to the sexes and season seems worthy of note. Since there is reason to believe that no selective factor operated in the capture of these birds, the series would seem to represent a fair cross-section of grackles moving north into Ontario during late March. The sex ratio of these birds was 48.5% males and 51.5% females. Mr. Manly Miner informs me that it was the practice to leave six or eight birds in the trap to serve as decoys and that males were selected for this purpose. An approximately fifty-fifty sex ratio in this catch seems apparent.

No great development of the gonads was noted in sexing the specimens. Of the nine females preserved as specimens, the observations recorded at the time range from "ovary, 4 mm. long, 2 mm. wide, not conspicuously granular, flattish and kidney coloured" to "ovary, 11 mm. long, 5 mm. wide, granular and becoming clear". Of the eight males preserved, the remarks range from "testes, 2 mm. long, 1 mm. wide, colour dark", to "testes, 7 mm. long, 4 mm. wide, colour fairly clear".

BEAK ABNORMALITIES

Two of the specimens in the series, both males, are notable for their peculiar beaks. In one (R.O.M.Z. No. 30. 3.30.4) this member is rather heavy, but not extremely so (12 mm. in depth at the anterior end of nostril) and curves decidedly downward most pronouncedly along the culmen but also gently along the gonys. The superficial appearance of the beak suggests the beak outline of certain exotic cuckoos or coucals (*Centropus*). Further, the beak has a slight clockwise spiral twist from base to tip which is quite obvious when viewed dorsally along the line of the culmen. The culmen length is but slightly larger (approximately 2 mm.) than would be regarded as normal for a bird possessing its other linear measurements.

The other specimen (R.O.M.Z. No. 30. 3.30.15) has at some time met with an accident in which approximately six mm. of the tip has been broken from the lower mandible. The profile of the culmen of this specimen is, like the above, curved downward, especially toward the tip. The outline of the gonys is, however, straight from the base to the point where the member was broken off. If the broken tip of the lower mandible was in conformity with the downward curve of the upper mandible, it would indeed have been very abnormal in shape. It would appear, on the other hand, that the downward curve of the upper mandible has been increased since the break occurred, perhaps because of the absence of an occluding surface. The beak is normal in both depth and length.

EXTENSION OF RANGE OF Tamias striatus griseus MEARNS

By H. U. GREEN

ON SEPTEMBER 5th, 1935, while studying the terrain along the course of the Vermilion River, Manitoba, for evidence of beaver migration from the Riding Mountain National Park, I observed several specimens, evidently a family group, of the Gray Eastern Chipmunk, *Tamias striatus griseus* Mearns, in a hardwood stand near the town of Dauphin. The altitude was approximately 940 feet. Three specimens were collected: (No.M.294 ♀ T.L.250-T.V.80-H.F.29) (No. M.295, ♀ T.L 240-T.V.98-H.F.31) (No.M.296 ♂ T. L. 245-T.V.95-H.F. 33) Indentification was then definitely determined.

No further specimens were observed in this locality, and, with the exception of a single individual, (No. 289, ♂ T.L.243-T.V.99-H.F.29), collected on July 19th, 1935, about a mile away, *T. s. griseus* has not been previously seen in the Dauphin district although the area has been well trapped for small mammals during recent years.

On August 9th, 1933, I collected a specimen of *T. s. griseus*, (R.M.No 156, ♂), determined by Dr. R. M. Anderson, on the eastern escarpment of the Riding Mountain above Norgate at an altitude (since determined) of approximately 1400 feet, and a further specimen, (R.M.No.229, ♀), on the north shore of Clear Lake, Riding

Mountain National Park, on September 17, 1933, at an altitude (since determined) of about 2200 feet. These records were reported in *The Canadian Field-Naturalist* 48:50, 1934.

Anthony, *Field Book of North American Mammals,* 1928, gives the range of *T. s. griseus* as "west of the Great Lakes, in the upper Mississippi valley,". Seton (1909), I am authoritively informed, records *T. s. griseus* as "abundant in the woods to the south east part of the country (Manitoba) and west to Portage la Prairie (Manitoba)", and, further that "Stuart Criddle (1929) lists it as 'tolerably common' at Aweme, Manitoba.'"

The Norgate record, however, is not actually new, for I am advised that a specimen of *T. s. griseus,* determined by A. H. Howell, was collected at Riding Mountain, Manitoba, by Robert Adamson on July 9th, 1900. The village of Riding Mountain is only a few miles from Norgate. The Clear Lake record, though, establishes, tentatively, the known distribution of this form some 20 miles to the west of Norgate, and the Dauphin record extends its range 50 miles north west of Norgate and about 40 miles north of Clear Lake.

It would seem, in view of the fact that *T. s. griseus* has never been observed or collected between Dauphin and Clear Lake, an area constantly traversed by the writer, that a slow migration along the Manitoba escarpment is progressing towards the north.

FIFTY YEARS AFTER

By G. E. FAIRBAIRN

WHILE hunting for land shells on May 25th, 1936, on the escarpment on the west side of the city of Hull, Que., the writer came across a few dead specimens of *Polygyra multilineata.* Most of the specimens were in a good state of preservation; some of them certainly not more than two years dead.

It was felt that such a find justified a search for live specimens and accordingly, on May 29th, the locality was visited again and an intensive search made which yielded four live and several dead specimens, about ten feet from the top of the escarpment and one hundred feet from the Aylmer Road.

As the species is not native in the Ottawa District is is thought this record will be of interest to students of molluscan distribution. An attempt was made in 1886 to introduce the species, as recorded by Latchford (*Ottawa Field-Naturalist* 1: 107-108, 1887-88). Latchford says, in part: "It is well known that many land shells which occur in Western Ontario, some of them very beautiful, are not found in this vicinity. An attempt has been made to establish these species here. Through the kindness of M. G. W. Dean of Kent, Ohio, and Mr. Geo. J. Streator of Garrettsville in the same state, I was enabled to place in the woods at various points around Ottawa, and in my garden in the city, a number of living shells, including *M. thyroides, M. multilineata, Triodopsis tridentata, T. palliata, Patula solitaria, P. perspectiva, Zonites ligera* and *Stenotrema hirsutum.*

"I was unable to visit afterwards the localities outside the city in which the shells were placed, but of those which were under my eye at home I observed that *Zonites ligera, Patula solitaria* and *P. perspectiva* all died. The others lived. *M. multilineata* seemed to flourish best, and in November young shells four-tenths of an inch in diameter were found by the dozen in the corner in which five adult individuals had been placed in the month of June.

"The other species which lived, with the exception of *H. tridentata,* did not appear to multiply. I may say that the gentlemen who obtained the shells in Ohio were kind enough to furnish me with information as to the peculiar habitat of the different species, and I tried to establish each in a station suited to it. I was able to do this in the woods much better than at home, and it is not improbable that the majority of the shells thus disposed of may establish themselves here."

The specimens found this year may be descendants of the ones placed around Ottawa in the year 1886 by Mr. Latchford, as mentioned in the article quoted above.

The soil where the specimens were found is a light sandy loam and leaf mould. Lower down on the slope there are many slabs of shaly limestone. There is a second growth about ten feet high of maple, willow, blackberry and raspberry bushes along the escarpment. The upper part of the bank is fairly dry, becoming moist toward the bottom where

there are several small springs running over a flat rock that dips into the swamp. The escarpment is about nine hundred yards long, beginning at the Aylmer road and running north toward Fairy Lake.

The sizes of the specimens taken were as follows, in millimetres:

Altitude	Diameter	Greater Diameter
9.5	17.3	19.3 mm.
11.5	20.2	23.7
11.5	20.1	23.0
11.6	20.5	24.1
12.0	20.0	22.6

THE YELLOW RAIL IN SOUTHERN MANITOBA

By R. FRYER

THE FOLLOWING observations were made in the years 1933-34-35. The territories under observation were as follows; (1) The marshes at the east of the Red River, about five to seven miles north of Libau; (2) Willow Point, which is on the west side of Lake Winnipeg, two miles south of Gimli; (3) Grant's Lake which is 18 miles north-west of Winnipeg, Manitoba.

On the evening of June 24th, 1933, at 6.30, while paddling along a creek in the marshes north of Libau, Orland P. Gibson and I heard *tick-tuck, tick-tick-tick,* the sound coming from territory typical of the Short-billed Marsh Wren. Gibson thought it was a Yellow Rail, his statement being based solely upon the description given in *Birds of Western Canada.* Here we had discovered a possibility worth investigating.

We were in this territory for a full week, June 24-31, and every evening heard the ticking, but never before 6.30; on two occasions we were out until 1 a.m., and could still hear it. These notes came from seven different points; three individuals were heard at the same time; the seven different points represented seven different birds.

On June 27th, at 8 p.m., I heard the sound close by, while watching a Leconte's Sparrow. It was near an old hay stack bottom which was about 150 feet from me. As I approached the clearing a little brownish-yellow bird ran across, and a minute or two later the ticking was heard on the other side. After that I was fairly well convinced that we had heard and seen the rare Yellow Rail.

My next acquaintance with the ticking was a year later at the same spot. On June 29th, at 10:40 p.m., when less than 100 yards from the lodge, I heard it. The night was quite dark. I paced off the distance with steps of two and a half feet and found it to be a little more than half a mile. There were very few sounds and as I was favoured with a slight north-west wind, hearing conditions were ideal. The ticking continued until I was within 30 or 40 feet. From then on for about another 10 feet it ticked only after lengthy intervals and finally stopped. Upon my retreating about 50 feet, it commenced again with its former vigour, and while at this point I clocked the ticking for five minutes. The rhythm of *tick-tuck, tick-tick-tick* was perfect until the sixth minute, and the following were the number of sets per minute, (five notes per set); 53, 57, 63, 55, 58. Thus in five minutes it gave 286 sets or 1430 notes. On one occasion it ticked incessantly for 17 minutes, therefore, with an average of 57 sets per minute, this would be 969 sets or 4845 notes. These figures give some idea of the rapid ticking.

The vegetation in this territory was one and a half to two feet high and when I squatted with my head below the level of the grass and reeds the sound was deadened nearly 50 per cent.

On the afternoon of June 30th, I went back to the same place to inspect it in the daylight. I trampled down a large circular spot with the hope that if I heard the ticking in the daytime I could drive the ticker across. I then moved on about 150 or 200 feet and began a thorough search for nests, if any.

I had been at this for about half an hour when suddenly I heard the ticking apparently close to the open space. I ran toward it and was again rewarded with a glimpse of a little brownish-yellow bird. It ran so quickly that before I had time to think of field marks it had disappeared. This time the call was not repeated. I searched again for an hour and a half and found nothing but a swamped Bobolink's nest with four eggs and a Sora's nest with 13 eggs.

That evening Gibson came down to the lodge, and we paddled out along the creeks, but heard the ticking from only two points. This made a total of three birds for that district during

the three days we were there in 1934.

Our next trip to the Rail territory was from May 23-26, 1935. One bird was heard on May 23rd, at 10:30 p.m., and it ticked only a few times during a period of 20 minutes, with long intervals between each tick. We heard one along the bank of a creek at 10:45 a.m., on May 26th. This was the first time we had heard one in the forenoon.

On June 2nd, while at Willow Point, I heard two birds at 3 p.m. and again at 3:20. Each time it was for only a few seconds.

At Grant's Lake one was heard at 4:50 p.m., on June 9th, and, with others heard during the day, it was for only a few seconds. The territory here was different from that of the other localities, the growth being heavy coarse grass in five or six inches of water.

On June 16th, it was heard again at Willow Point. This territory is similar to that of Libau, a mixture of fine and coarse marsh grass, and the water is only two to four inches deep. It was heard three times between 5:30 and 6:00 p.m.

The time for our annual trip to Libeau was drawing near, so we planned to try and collect the "ticker" if possible. We left for the lodge on June 29th, Angus H. Shortt, Orland P. Gibson and I. That evening we were out until 8 to 9 p.m. just before sunset. The wind was very strong and we heard the bird but a few times, so we decided to wait until after dark and make a second try. By 10 p.m. the wind had dropped considerably, so we started out armed with two "410's" and three strong spotlights. We did not have any luck but learned that talking did not seeem to disturb it very much, the ticking being fairly continuous. The next day we set out a little before 11 p.m. and spent the next hour in testing the surroundings and planning our attack. Finally it was arranged that we should spread out in a semi-circle and cross-focus the light on the sound. We could not see the bird or the slightest movement in the grass, but we could follow its course easily by the incessant ticking sound. When I was about 150 feet away my beam seemed to drive it towards Shortt. It seemed to be only about 15 feet from him and in moving back to get a proper range he frightened it in the direction of Gibson, who was between the two of us. Shortt and I had our beams crossed as the sound receded from him. At last when it was some 40 feet from Shortt, and 90 to 100 feet from me, Gibson fired from a distance of about 30 feet. He ran forward while we held our beams on the spot, and it took him but a minute or so to find the bird. Finally we had satisfied ourselves as to the cause of the ticking, it was the Yellow Rail.

The specimen was in excellent condition, having been struck in the head with a single pellet. It was taken back to Winnipeg and has been mounted by Shortt, and is now on exhibition in the Manitoba Museum, Winnipeg Auditorium.

FEEDING HABITS OF BALD-HEADED EAGLE

By THEED PEARSE

THE BALD-HEADED EAGLE gets much of its food (certainly on the British Columbia coast) from the water, by picking it up with its talons as it swoops down but, in my experience of several years, I have never seen an Eagle actually settle on the water until the other day.

On the evening of the 25th May, 1935, at Elma Bay, near Courtenay, Vancouver Island, I was watching a Bald-headed Eagle that was evidently after some prey off shore. The bird was some 500 yards away and it was much too dark to see if it was a duck it was after, in fact it was so dark that when first seen I thought the bird must be a Horned Owl and so dark that the outline of the bird was almost lost when flying against any background. I have never seen an Eagle feeding so late.

The bird was making the regular swoop and, on reaching the water, striking at something with its talons; it did this two or three times and, on the next swoop, evidently connected with its prey and, in doing this, plunged into the water. The next thing was the Eagle flapping its wings on the surface of the water, trying to lift the catch in which it had its talons fixed. After attempting this unsuccessfully it looked as though the bird conceived the idea of struggling to shore with its prey and it attempted to progress by means of its wings, bringing them forward over the head and back. It continued doing this for quite an appreciable time but made no progress and both my companion and I came to the conclusion the bird was drown-

ing (as the result of being unable to disengage itself from its prey.) This thrashing of the water stopped and the Eagle then began to make for the shore at a steady pace; it was too dark to see its manner of propulsion beyond that the neck was being continuously extended forward and drawn back.

We watched the bird till it was lost to sight behind a point and, when we saw it again it was standing on the shore; it saw us and rose, flew round behind us to a favorite perch on a dead fir, some 50 feet up. The bird had not been much more than a dark object on the shore but as it flew round to its perch it passed quite near and was then, and when perched, clear against the sky and not 200 yards away. I was using 9 power prismatics and with these could not see that the plumage looked wet and the bird seemed quite unconcerned; however, by then, the light was very poor.

We estimated the distance from the shore to where the bird struck its prey to be, at least, 400 yards and that the time it took to reach land was ten minutes. From the pace it went, after freeing itself from the catch, it must have been using its feet for propulsion. The tide was coming in but would not have helped much as, here, the "set" tends to be along the shore line; the evening was quite calm with no wind. The Eagle reached the shore entirely by its own efforts, in fact, had it been at all rough it is doubtful if it could have made it. When progressing the bird looked to be resting easily on the water and I would suggest that it was holding itself up with the wings held away from the side and using its feet to do the propelling.

The next afternoon I had a further experience with, probably, the same bird. A Bald-headed Eagle was beating up and down the edge of the out-going tide, evidently looking for food (he had made a couple of swoops at some marine bird, likely to have been a Loon, which does not seem to have the same fear of an Eagle as do the Ducks); seeing something interesting he swooped to the surface but did not strike and continued on, soon returning to the same spot (just in front of where I was sitting) where he executed a most spectacular manoeuvre. The bird turned a somersault, then, with wings and tail fully spread, righted himself and swooped down to the water. It is difficult to describe the manoeuvre; it all took place in a second or so, but it rather suggested an aeroplane looping the loop and then turning into a side slip; at one time the whole undersurface was in view, as it turned on the "side-slip". I had the impression that the tail was very much a controlling factor.

As on the previous evening, the bird appeared to plunge into the sea and, when doing so, quite an amount of the bird must have been submerged, the bird keeping its wings loose from the body to prevent sinking. At first it rested on the water with the wings partly stretched out. It looked as though the strike had been futile, as the Eagle, then, quite unconcernedly, drew in its wings and rested on the water without a movement for two or three minutes, long enough to cause one to wonder if it was going to get up at all; it appeared to be sinking gradually. There was no movement until, with much flapping of the wings, it rose from the surface with the fish and flew to a nearby pile where it commenced to eat it in a quite unconcerned way and not at all as though hungry. After a few minutes it flew off with what remained, towards where it was nesting. The fish was, I am practically sure, a Bullhead about eight inches long (this species is plentiful); in carrying it the Eagle grasped the head, with the tail dangling behind in the manner of the Osprey.

During this whole episode this Eagle was never more than 250 yards away and, when in the water, less, and I had it in view with glasses the whole time. Again the sea was quite calm but the tide going out.

The distance from the edge of the out-going tide to where the bird struck and settled on the water was not far, 100 feet or so, and it is possible that when the bird rose from the water, the tide had sufficiently receded to enable it to touch the ground and so get the necessary impetus for flight; it did not, however, give the impression of doing more than rise from the water by means of its wings.

I had the nest of this bird under observation from time to time and was able to notice the growth of the young birds.

There are two Eagles's nests in the vicinity: one a bulky affair, in a solitary Fir; the other (the occupied one) much flatter, in the branches springing from the broken-off top of a Douglas Fir, not very tall; this nest looks much older. The area has been logged over (hence the solitary fir) though the other nest is in a clump of conifers that were left. The respective distances from the sea would be about half a mile and a quarter of a mile, and they would be about a quarter of a mile apart.

I made my first visit on 2nd June, actually intending to go to the bulky nest as this had been reported as occupied. An old bird first appeared when between the two sites and, from the unusually shrill call, I recognized it as the bird which had given the aquatic performances. She was soaring around the site of the second nest, hidden then in the trees; flying with her was a last year bird at which, every now and then, she would make a swoop, especially when it approached the clump of trees. The yearling going off, the old bird took up its stand on a dead stub nearer the first nest, anticipating as it turned out the return of its mate from this direction.

Shortly afterwards the other bird (which I call the male, the first bird I assumed, from its greater care of the young, to be the female) appeared carrying food and was vociferously welcomed, both birds flying together to the clump of trees. It took me a few minutes to get this nest into view, owing to the bad going, then I could see the female bird standing on the nest tearing at the food and swallowing portions. When she saw me she flew to a close-by tree, occasionally crying but never at all excited, even on my going below the nesting tree. On my moving away she flew to a dead tree close to the nest and remained there. The male occasionally called, perched 300 to 400 yards away, but the yearling did not appear again on this or on any subsequent visits. On this occasion it was only possible to make sure of there being one young bird, which lifted its head above the rim of the nest, flapped its wings and once stood up to evacuate; it looked about the size of a small barnyard hen. Though the nest looked to have a flattened top the cup was sufficiently deep to hide the old bird when brooding.

On the 1st and 2nd of July I was at the nest. Only one young bird was visible perched, immovable, on the edge of the nest. During the two days I spent 3 to 4 hours at the nest without any food being brought.

On July 7th two young birds were visible. One was sitting well out on the rim of the nest, the other behind. The parent brought a fish, going into the nest with it, and the second bird attacked it, flapping its wings, the other bird, on the outside, was indifferent. Later both birds resumed their side by side position on the rim.

15th July. One young bird was perched on a branch by the nest; when the parent brought food this one took no notice beyond crying once as she flew in, the other then came flapping in from a neighbouring tree. There was much crying and the parent bird remained in the nest with the latter young bird for some minutes before flying away. Later the young bird climbed out of the nest to a branch and wiped its beak, the other never moved. There was a considerable difference in the size, the bird that had fed being the larger, especially in the length of the tail.

21st July. No sign of young birds at the nest, but one in the look-out tree, 100 yards or so away, from its size and length of tail, I judged, to be the smaller.

28th July. Both young birds perched on piles on foreshore about three quarters of a mile away. No noticeable difference in size. After this date old and young left the nesting area but a young bird was back on 8th September. On each occasion of visiting the nest I looked for remains of food; the only thing I found was the tail of what had been a good sized flounder.

NOTES AND OBSERVATIONS

GOLDEN EAGLE AND RICHARDSON'S OWL IN BRANT COUNTY, ONTARIO.— In November 1935 I was privileged to see the eagle, mounted, in a hardware store, in Paris, Ontario. It had been mounted by my friend Dr. W. H. J. Gould and had been killed in the township of South Dumfries, just a few weeks before. The white-band across the tail which is wide and conspicuous in the juvenal, was quite narrow, showing that the bird was of a considerable age.

In the Doctor's office there was also a very small owl in a case with other birds, and only a second glace was required to determine that it was a Richardson, doubtless the rarest of owls in Ontario with the single exception of the Great Gray. The last occurrence that I remember in lower Ontario was some five years ago when Robert Lindsay captured one alive in the willows on Fisherman's Island at Toronto. Mr. Lindsay was as much surprised when told that he had brought this great rarity to the meeting of the Brodie Club as was Dr. Gould, who naturally concluded that his bird was a Saw-whet. One of this latter species was picked up dead on a London street about December 22, 1936.—W. E. SAUNDERS.

A YELLOW-BILLED CUCKOO IN THE OTTAWA DISTRICT.—On the rainy afternoon of the 25th of June, 1936, while I was making drawings and paintings from freshly collected birds, I heard the calling of a Yellow-billed Cuckoo (*Coccyzus americanus americanus*), and upon going outside and imitating its notes, I soon secured it. The Yellow-billed Cuckoo is a rare bird in Ottawa. A pair nested in Mr. E. F. G. White's garden in 1890 (see *Ottawa Naturalist* 5:40). Since then there has been no definite record of its occurrence in the district. The bird which I collected, a female, was secured twenty-two and a half miles north of Ottawa, at Lake Bernard, Quebec. It is now in the collection of Major Allan Brooks, of Okanagan Landing, British Columbia.—ARTHUR D. NELLES.

A HYBRID FLICKER AT OTTAWA. — On May 12, 1936, while sketching geese and ducks in the Experimental Farm wild fowl enclosure I noticed two flickers going through their courting antics in a clump of low bushes near by. When I approached nearer to them I observed with the aid of binoculars that one was a male hybrid flicker. When it turned toward me I saw that it had the pure red undertail surface of the Western Red-shafted form. In every other way it was the same as the Eastern Yellow-shafted form as far as I could see.

This is the most easterly record of the hybrid flicker in Canada. Two were taken in Toronto, Ont., one is in the collection of Mr. Atkinson, the other is in the collection of Mr. E. T. Seton.* —A. D. NELLES.

*(*Catalogue of Canadian Birds*, Macoun & Macoun.)

ALBINO BLACK DUCK.—On September 6th, 1935, while in search of water birds along the low shore of a bay near Nápanee, Ontario I saw two flocks of Black Ducks (*Anas rubripes*) and Blue-winged Teal (*Querquedula discors*) feeding near the shore. Almost at once I noticed an entirely white plumaged duck busy feeding with the Black Ducks. At first I thought it might be a domestic duck from a nearby farm, but realized it might be an albino as it was about the size of the other Black Ducks. To put the matter to a test, I decided to stand up and flush the ducks. The whole flock of Black Ducks, including the white one, and the Teal, rose directly from the water. The bird's entire plumage appeared pure white, but I did not note the colour of the bill or feet. The bird was seen again at the same feeding grounds on September 13th.—GEORGE SCOTT SMITH.

HOARY REDPOLLS AT KAMOURASKA, QUEBEC.—On December 23rd, 1935, I observed in the tamaracks near my house at Kamouraska, Quebec, a small flock of about a dozen Redpolls which seemed to me to be somewhat paler than the Common Redpoll, *Acanthis linaria linaria*.

I killed two of the birds, preserved them as specimens, and sent them to the National Museum of Canada, at Ottawa, for identification. Mr. P. A. Taverner, who kindly examined these two specimens, informed me that they both belonged to the form *Acanthis hornemanni exilipes* and that they were the only specimens of that form obtained, up to the present time, in eastern Canada, apart from some taken in the far north. Additional specimens of *A. h. exilipes*, three in all, were taken at Kamouraska by me on February 28th and March 10th, 1936. In these instances individuals of this form occurred in a flock of *A. l. linaria* and *A. l. rostrata*.

Of the five specimens collected, four were males and the fifth was so damaged that the sex could not be determined.

The Hoary Redpoll is rather difficult to recognize in a flock of Common Redpolls. It is quite possible that it frequently occurs in such flocks, but that insufficient investigation in the past is the reason why it has not hitherto been recognized by ornithologists in eastern Canada.

My most recent observation of the Hoary Redpoll was made on April 4th, 1936, when, in a flock of about two hundred Redpolls, I recognized several individuals of this pale species. — WILLIE LA BRIE.

THE WHITE PELICAN IN THE PROVINCE OF QUEBEC. — While I was yachting on the lower St. Lawrence River, during the third week of August, 1935, I saw two White Pelicans that had been shot at the entrance of the Portneuf River, County of Saguenay. There is no doubt whatsoever that they were real Pelicans but I am not sufficiently familiar with those birds to be sure whether these individuals were young ones or not. They seemed to me to weigh very little in view of their size, and their plumage did not seem to be in very good condition.

These birds had been killed a couple of days before I saw them. The man who shot them told me that he had killed the first one at quite a distance with a buck shot and that the other one flew a little distance away and again alighted in the water, where he allowed himself to be approached to within ordinary gunshot range, between 50 and 60 yards. — A. CHASE CASGRAIN, *Judge of the Superior Court of the Province of Quebec.*

OCCURRENCE OF THE WOOD THRUSH IN THE LAURENTIAN REGION JUST NORTH OF MONTREAL. — In view of the hitherto accepted distribution of the Wood Thrush (*Hylocichla mustelina*) in Canada, the following observations may be of interest. To the best of our knowledge, no recent observations have been made in this locality. The present data were obtained at Lake Manitou (1250 ft. a.s-l.,) in Terrebonne county, 70 miles north of Montreal, and at Lac Tremblant (750 ft. a.s-l.,) on the eastern boundary of Labelle county, 90 miles north of Montreal.

Observations had been made at both these points beginning in the late spring of 1933 and repeated in successive springs until 1936, when it was first realized that the species in question was not believed to occur in this locality.

In view of this fact, particular care was taken last spring to obtain more accurate data. The song was first heard at Tremblant at twilight on May 19th and the bird actually seen shortly after dawn on May 20th. The same bird was observed on seven successive mornings, and three other males were heard in full song within an area of some 400 yards square.

Similar observations were made at Manitou, beginning on May 27th. On June 5th, two breeding pairs were found nesting within fifty yards of each other. One of the nests was built in the branches of a small balsam at about 7 feet above ground and the other in the crotch of an alder at 9 feet above ground. Three eggs were found in one nest and four in the other; there was good reason to believe that these eggs had just been laid. Hatching began on June 18th and observation of fledging was discontinued on June 26th.

Owing to the distinctive field marks and the equally distinctive song of this species, it was deemed unnecessary to collect a specimen. The field marks were observed from every angle and in excellent light, and could actually be compared to and contrasted with those of the Hermit, Olive-backed and later of the Wilson's Thrush which were all seen in the same region.

A number of photographs were taken of the female bird near one of the nests, showing the light eye-ring and the conspicuous spotting of the breast and sides, though unfortunately they cannot show the marked tawny tinge of the head.

The song, of which some thirteen different variations were recorded, could not be confused with those of the other species in the same locality.

The measurements of a typical egg were 2.58 x 1.94 cm. or 1.02 x 0.76 inches. One of the eggs was kept and it, as well as one of the nests, is to be found in the Redpath Museum at McGill University, Montreal. — J. D. CLEGHORN AND F. R. TERROUX.

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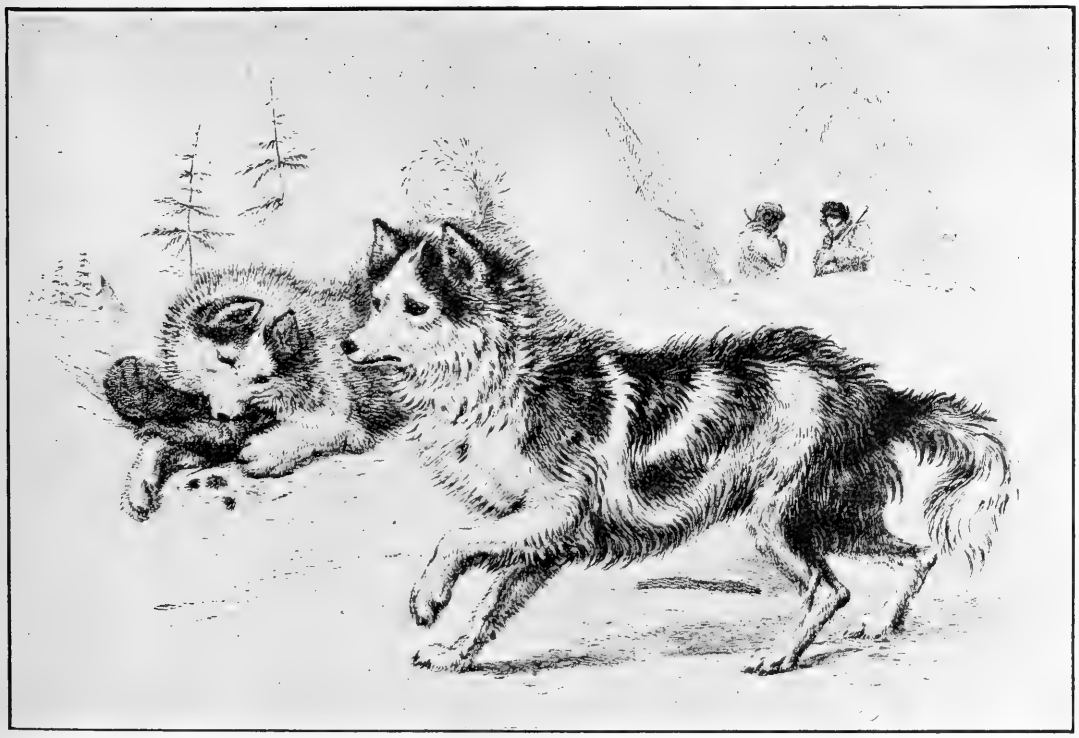
A HARE INDIAN DOG

By D. JENNESS

DOWN TO THE 17th century the Indians of Canada possessed several different breeds of dogs most of which had evolved perhaps on this continent. Two at least disappeared entirely before the close of the 19th century. Thus the historian of Martin Frobisher's voyage to Baffin Bay reported that the Eskimo of Frobisher Bay, on Baffin Island, raised two distinct breeds of dogs, a large one for drawing the sleds and a smaller one for eating; but later explorers noted only the larger breed, so that the smaller must have died out within a comparatively few years. More widely known, but also extinct, is the woolly-haired dog that was raised by the Indians of the Fraser River delta, who sheared it like a sheep, mixed its hair with the wool of the wild mountain goat and wove blankets from the combined strands. Vancouver described this variety in 1790, and as late as 1848 the celebrated Indian artist Paul Kane depicted a woman spinning wool in the background, and, in the foreground, a shorn dog; but since Kane's day no one has recorded the animal.

*Richardson, John. Fauna Boreali-Americana p. 78-80, London, 1829



Hare Indian Dog. (*Copy of illustration in Richardson, John,* Fauna Boreali Americana, *p. 78, London, 1829*)

Still a third breed was described by Sir John Richardson, who found it so common among the Hare Indians in the vicinity of Great Bear Lake that he named it Hare Indian dog. He describes it as follows:

"This variety of Dog is cultivated at present, so far as I know, only by the Hare Indians, and other tribes that frequent the borders of Great Bear Lake and the banks of the Mackenzie. It is used by them solely in the chase, being too small to be useful as a beast of burthen or draught.

"The Hare Indian Dog has a mild countenance, with, at times, an expression of demureness. It has a small head, slender muzzle; erect, thickish ears; somewhat oblique eyes; rather slender legs, and a broad hairy foot, with a bushy tail, which it usually carries curled over its right hip. It is covered with long hair, particularly about the shoulders, and at the roots of the hair, both on the body and tail, there is a thick wool. The hair on the top of the head is long, and on the posterior part of the cheek it is not only long, but being also directed backwards, it gives the animal, when the fur is in prime order, the appearance of having a ruff round the neck. Its face, muzzle, belly and legs, are of a pure white colour, and there is a white central line passing over the crown of the head and the occiput. The anterior surface of the ear is white, the posterior yellowish-gray or fawn-colour. The end of the nose, the eye-lashes, the roof of the mouth, and part of the gums, are black. There is a dark patch over the eye. On the back and sides there are larger patches of dark blackish-gray or lead-colour mixed with fawn-colour and white, not definite in form, but running into each other. The tail is bushy, white beneath and at the tip. The feet are covered with hair which almost conceals the claws. Some long hairs between the toes project over the soles, but there are naked callous protuberances at the root of the toes and on the soles, even in the winter time, as in all the wolves described in the preceding pages. The American foxes, on the contrary, have the whole of their soles densely covered with hair in the winter. Its ears are proportionably nearer each other than those of the Esquimaux dog.

The size of the Hare Indian Dog is inferior to that of the prairie wolf, but rather exceeds that of the red American fox. Its resemblance, however, to the former is so great, that on comparing live specimens, I could detect no marked difference in form, (except the smallness of its cranium,) nor in the fineness of the fur, and arrangement of its spots of colour. The length of the fur on the neck, back part of the cheeks, and top of the head, was the same in both species. It, in fact, bears the same relation to the prairie wolf that the Esquimaux Dog does to the great gray wolf. It is not, however, a breed that is cultivated in the districts frequented by the prairie wolf, being now confined to the northern tribes, who have been taught the use of fire-arms within a very few years. Before that weapon was introduced by the fur-traders, a dog, so well calculated by the lightness of its body and the breadth of its paws, for passing over the snow, must have been invaluable for running down game, and it is reasonable to conclude that it was then generally spread amongst the Indian tribes north of the Great Lakes.

The Hare Indian Dog is very playful, has an affectionate disposition, and is soon gained by kindness. It is not, however, very docile, and dislikes confinement of every kind. It is very fond of being caressed, rubs its back against the hand like a cat, and soon makes an acquaintance with a stranger. Like a wild animal, it is very mindful of an injury, nor does it, like a spaniel, crouch under the lash; but if it is conscious of having deserved punishment, it will hover round the tent of its master the whole day, without coming within his reach, even when he calls it. Its howl, when hurt or afraid, is that of the wolf; but when it sees any unusual object, it makes a singular attempt at barking, commencing by a kind of growl, which is not, however, unpleasant, and ending in a prolonged howl. Its voice is very much like that of a prairie wolf. The larger dogs, which we had for draught at Fort Franklin, and which were of the mongrel breed in common use at the fur-posts, used to pursue the Hare Indian Dogs for the purpose of devouring them; but the latter far outstripped them in speed, and easily made their escape. A young puppy, which I purchased from the Hare Indians, became greatly attached to me, and when about seven months old ran on the snow by the side of my sledge for nine hundred miles, without suffering from fatigue. During this march it frequently, of its own accord, carried a small twig or one of my mittens for a mile or two; but although very gentle in its manners, it shewed little aptitude in learning any of the arts which the Newfoundland dogs so speedily acquire, of fetching and carrying when ordered. This Dog was killed and eaten by an Indian, on the Saskatchewan, who pretended that he mistook it for a fox."

This Hare Indian dog was thought to have disappeared soon after the middle of the 19th century. In 1915, however, James Teit, when investigating the Tahltan Indians of the Stikine River for the National Museum of Canada, reported the existence there of a small variety of native dog that was locally known as the "Tahltan Bear Dog", because it was particularly used for hunting black bears. All the animals he had seen or heard of were black or dark grey; some were entirely black with the exception of a few grey hairs in the body coat, white patches on the breast, muzzle, and sometimes the feet, and white again underneath the belly and flanks. With extreme age they took on a markedly grey phase of colour all over the body.

THE "TAHLTAN BEAR DOG"

Photo by James Teit, 1915

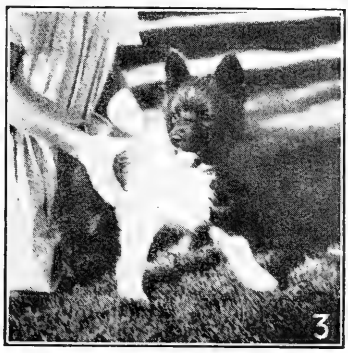


Photo by the owner, 1934

A Pup belonging to W. G. Crisp

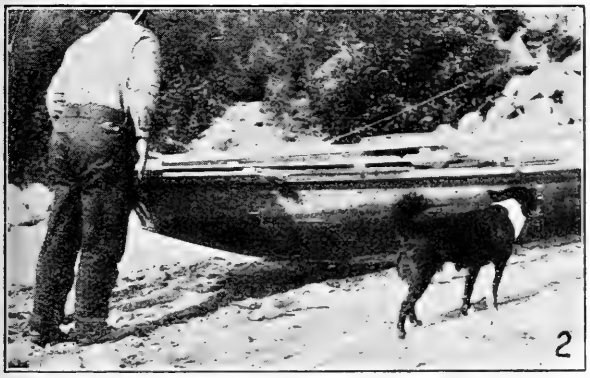


Photo by J. Frank Callbreath, 1928

Photo by Dr. Bott, 1931

Dr. Leo P. Bott's dog, now on exhibition in the National Museum of Canada

In 1928, Mr. Fenley Hunter, of New York, who had spent the summer in the Cassiar district of northern British Columbia, reported that two or three of these "bear dogs" still survived, and secured for the National Museum of Canada the following description of them by J. Frank Callbreath of Telegraph Creek:

> "It is a small slender dog about the size of a fox, but perhaps heavier. The head is small with a sharp muzzle, the ears erect and thickish, the eyes very sharp and bright. The tail is bushy and always carried curled over the back, in most cases squarely over the centre of the back, but sometimes curled to one side. The feet are sharp like those of a fox and well haired. While some animals are pure black, the majority have a pure white ring around the neck, a few white hairs on the feet and sometimes a white patch on the belly; there is no brown or off-coloured hair at all. The animal barks a great deal; its note does not at all resemble a wolf's, but rather the sharp yap-yapping of a fox.
>
> It was found in numbers among the Tahltan Indians about 30 years ago, when the coming of the .44 calibre rifle put it out of business. Previously it was almost unknown for an Indian to get a bear without many shots. There were a few bear dogs among the Bear Lake branch of the Tahltan tribe, a few among the Stick Tarkos in early days, and a number among the Teslin and Tagish Lake Indians, whence they came originally.
>
> There is, of course, no complete history of the bear dog, but I have been told by old Indians years ago that it came from the north, originally from Russia.
>
> It was not a success in the Arctic or with the grizzly bear, which is very quick in its

movements. But among the black bear it was simply perfect. Several of these little devils would hold a black bear while the Indian reloaded his flint-lock gun for another shot. In the spring the Indians would turn them loose and they would smell out the dens of the bears before they came out. In early days there were no moose here. After Christmas, on their return from the sheep and caribou mountains where they had been trapping foxes, the Indians lived on dog salmon and dried meat. Until the bear came out they hunted either beaver or bear and lived on the meat until June, when the salmon run starts. Their dogs, in addition to being valuable for bear, were splendid for grouse and porcupine; for there were no coyotes in the country 40 years ago and grouse and porcupine were plentiful. Thus, with the assistance of these dogs, the Indians were able to live off the country as they travelled. Every family had a flock of them. As near as I can learn the Tahltans were the only tribe that went in heavy for these dogs. A branch of the tribe living around Bear Lake, about 300 miles south-east of here, had a few, always mixed and not pure breeds. The interior part of the Tarko tribe known as the Stick Tarkos, including the Indians on Teslin and Tagish lakes, also had these dogs, but they are almost a thing of the past now.

During the past thirty years, I have shipped many to different places in the U.S.A., several of them to New York City. All died; none lived more than a year. Apparently they cannot stand the coast climate.

The picture I attach is of a most perfect specimen. I had the little fellow until he was 18 years old. It was a strictly one-man dog, a surly, snappy little fellow who might bite a stranger, but to me was the most loyal, affectionate little fellow you could imagine.

After my first boy Roy was four years old the dog had a tough time. Roy mauled him, rolled on him; the dog would snarl and show his teeth something fearful, but not once did he bite the child. When it could stand it no longer it would squeal like a pig and run away. As Roy outgrew this they got to be great pals, would play and sleep together. Then along came Charlie and the dog had another bad spell. I have often seen it and the baby curled up together sleeping; when the baby woke up and got his arms free Mr. Dog woke up also and slid off the bed; it knew what was coming."

In 1931 Mr. W. G. Crisp, the Hudson's Bay Company's factor at Dease Lake Post, obtained from the Indians a female "bear dog", three months old, pure white with black markings, and with a short bushy tail that it generally carried erect but never curled. It mated in 1934 with another "bear dog", dug a hole in the side of a hill after the manner of a fox or prairie wolf, and gave birth to four pups, two of which had the same colour and markings as the mother. The third bore the same markings also, but instead of being white was bluish-grey; while the fourth, like its father, was a glossy black, with white feet, one white shoulder, and a white streak between the eyes. On moving a few weeks later to Kitwanga, on the Skeena River, Mr. Crisp took the mother dog with him, and watched it play with a tame prairie wolf owned by some neighbours. The dog and the wolf seemed to him in their actions and bearing very much alike.

In the same year, 1931, Dr. Leo P. Bott, Jr., a dentist of Little Rock, Arkansas, also procured a live "bear dog" from Telegraph Creek, on the Stikine River. When some one poisoned the animal a few months later, he engaged a local taxidermist to mount the skin and presented it to the National Museum of Canada, where it has now been remounted and placed on exhibition in one of the halls.

It seems safe to conclude then that on the Stikine River we still have a few surviving representatives of an aboriginal American dog, probably descended, as Sir John Richardson believed, from the prairie wolf. Professor Glover M. Allen, of Harvard University, concurs in this opinion. After reading most of the above notes, and examining two photographs of the specimen in the National Museum of Canada, he kindly made the following comments:

> "I think that there can be little doubt that this Bear Dog represents the same breed as the Hare Indian Dog described by Sir John Richardson so long ago. So far as I know there has been no formal record of the breed within recent years, so that it would be worth while to put your facts on record. Since writing my paper on the dogs in 1920 [G. M. Allen, "Dogs of the American Aborigines"", Bull. Mus. Comp. Zool, Vol. 58, No. 9,] I have succeeded in obtaining a nearly complete skeleton of one of these dogs, together with a photograph of it in life. I came into possession of the skeleton the spring after the little animal died, and the bones were dug up after the winter was over. My photograph shows a much blacker dog than yours, with a white chest and collar and the rest mostly black. The erect, sharp ears are rather characteristic of native breeds, as well as the fine muzzle and other traits. I have no doubt that these are aboriginal dogs. The skull of our specimen I have compared with that of the small Indian dog of which we have skeletal material from "pre-basket-maker" culture and it is very different, less heavy of bone, somewhat smaller in dimensions, but the teeth are the same size. In the Bear Dog, further, the muzzle is much shorter in its bones, resulting in a crowding of the upper pre-molars, throwing them out of line."

A DECADE OF PROGRESS IN THE BIRD SANCTUARIES OF THE NORTH SHORE OF THE GULF OF ST. LAWRENCE

By HARRISON F. LEWIS*

THE TEN sanctuaries for sea birds established by the Government of Canada in 1925 among the archipelagoes that border the north shore of the Gulf of St. Lawrence have been maintained under the jurisdiction of the Dominion's Department of the Interior for a full decade. A review of the results accomplished during that time by reservation and protection of those selected areas may be not without interest for those to whom conservation of wild life is a matter of concern.

A description of these sanctuaries was published in *The Canadian Field-Naturalist* for November, 1925, page 177. Censuses of the non-passerine birds breeding in the sanctuaries have been made every five years, in 1925, 1930. and 1935. The results of the first census were published with the above-mentioned description of the sanctuary areas and the results of the second census were published and compared with the results of the first census in *The Canadian Field-Naturalist* for April, 1931, page 73. In both of these papers it was pointed out that the census figures reported were as accurate as it was possible to make them under the circumstances existing in the several sanctuaries when the census work was done. Some of the census figures are the results of careful counts of nests or their equivalents for census purposes and are, practically speaking, entirely accurate, but for some species of birds in some areas precise counts are rendered impossible by local conditions. In such cases it has been the practice to carry a system of precise counting as far as possible and to obtain the final figures by supplementing such counting with conservative estimates, based on the best information available, viewed in the light of experience. Similar methods were used in taking the census of breeding birds in these sanctuaries in 1935, although it should be remarked that, with increased experience, it has been found possible to increase accuracy with each succeeding census. In all three censuses a large part of the actual field work was done by the writer and the rest of it was done under his supervision.

The results of the census taken in these sanctuaries in 1935 are shown in Table I. Comparison of these results with those obtained in 1925 and 1930 is made in Tables II and III. Those interested in making more detailed comparisons may do so by consulting the original data published in the two papers referred to above.

The progress made in increasing the populations of breeding birds varies in the individual sanctuaries, as is to be expected. Many factors, such as the species of birds involved, the shelter, food, and nesting sites available, the character and continuity of the warden service, the extent of the sanctuary and its distance from large human populations or established routes of human travel, the weather experienced during the breeding season, occasional invasions by foxes, weasels, or other serious predators, and the conditions encountered by the sanctuary's bird population when, outside of the breeding season, they are in other parts of their range, have observable effects tending to cause increase or decrease in the numbers of birds that breed in the several sanctuaries. The resident part-time wardens of these sanctuaries are, generally speaking, deserving of praise for their efforts and for the results that they have been instrumental in obtaining.

Special factors affecting the breeding bird population of Cape Whittle Bird Sanctuary were explained in the published report on the census of 1930. When that census was made it was hoped that this sanctuary would regain much of its former abundance of bird life, but the census of 1935 shows a continued and pronounced decline in this area.

The exceptionally large proportional increase shown in the case of St. Augustine Bird Sanctuary is a very real one, resulting from the application of very enthusiastic and efficient protective service to an area which is naturally well suited to the birds' needs but which had been severely harried for many years prior to the establishment of the sanctuary.

For the ten sanctuaries taken as a whole the increase in numbers of breeding birds from 1930 to 1935 is 11,014, or 11%, as compared

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TABLE I

CENSUS IN THE BIRD SANCTUARIES ALONG THE NORTH SHORE OF THE GULF OF ST. LAWRENCE 1935.

BIRDS	Sanctuaries										Total
	Birch Islands	Bet-chouane	Watshi-show	Fog Island	Wolf Bay	Cape Whittle	St. Mary Islands	Mecat-tina	St. Aug-ustine	Bradore Bay	
Red-throated Loon				8	4		12	70	12		106
European Cormorant							60				60
Double-crested Cormorant			294	484	390						1,168
Black Duck	2		10					8	28		48
Green-winged Teal			4								4
American Eider	1,600	744	2,400	1,800	1,000	30	1,210	1,200	1,206		11,190
Red-breasted Merganser			12					4			16
American Rough-legged Hawk					2			2	2		6
Semipalmated Plover				6			4	8	18	4	40
Spotted Sandpiper	2	10	50		8	10	24	12	18	4	138
Great Black-backed Gull	6	8	300	180	194	26	548	220	286		1,768
Herring Gull	550	240	200	232	360	12	804	870	234		3,502
Ring-billed Gull					30				314		344
Atlantic Kittiwake		6									6
Common Tern	350		500				8				858
Arctic Tern				8	52						60
Caspian Tern				84							84
Razor-billed Auk		200	14	20	2,290	134	3,238	74		1,650	7,620
Atlantic Murre				4,000	1,840		6,338			30	12,208
Black Guillemot	4		14	84	10		196	400	128		836
Atlantic Puffin		600			5,134		3,762			62,418	71,914
Short-eared Owl							2				2
Total	2,514	1,808	3,798	6,906	11,314	212	16,206	2,868	2,246	64,106	111,978

to an increase of 16,130, or 19%, in the period between 1925 and 1930. The diminution in the rate of increase in the second five-year period, as compared with the first, is due almost entirely to a decrease of 6,868 in the population of Razor-billed Auks in the second period. Had this species maintained during the second period the same rate of increase that it showed during the first period, the entire population of breeding non-passerine birds in the sanctuaries would have shown an increase of 23% in the second period, instead of an increase of 11%.

Mention should be made of the fact that the figures in the column headed "Per cent gain or loss since 1925", in Table III, are slightly inaccurate because the census of 1925 did not take Semipalmated Plovers and Spotted Sandpipers into account, while the censuses of 1930 and 1935 did include these species, and therefore the census totals for 1925 are not strictly comparable with the totals obtained in the later censuses. So small, however, are the total numbers of these two shore-birds nesting in the sanctuaries that this discrepancy is of no practical consequence in the final results.

The two outstanding and important changes shown by the census of 1935, when compared with its predecessors, are an increase of 3,004, or 37%, in the population of the American Eider (*Somateria mollissima dresseri*) and a decrease of 6,868, or 47%, in the population of the Razor-billed Auk (*Alca torda*).

There is no doubting the reality of the increase in the numbers of the valuable American Eider, which is a species whose protection was given special attention in the adoption and administration of The Migratory Birds Treaty, for statistics obtained from the recently-

TABLE II

THREE QUINQUENNIAL CENSUSES IN THE BIRD SANCTUARIES ALONG THE NORTH SHORE OF THE GULF OF ST. LAWRENCE.

BIRDS	1925	1930	1935	Gain or loss since 1930	Per cent gain or loss since 1930
Red-throated Loon	24	26	106	+80	+308%
European Cormorant	—	—	60	+60	∞
Double-crested Cormorant	1,364	1,086	1,168	+82	8%
Black Duck	6	—	48	+48	∞
Green-winged Teal	2	2	4	+2	+100%
American Eider	6,450	8,186	11,190	+3,004	+37%
Red-breasted Merganser	—	32	16	—16	—50%
American Rough-legged Hawk	—	—	6	+6	∞
Semipalmated Plover	No record	40	40	—	—
Spotted Sandpiper	No record	88	138	+50	+57%
Great Black-backed Gull	968	1,302	1,768	+466	+36%
Herring Gull	1,020	2,642	3,502	+860	+33%
Ring-billed Gull	270	376	344	—32	—9%
Atlantic Kittiwake	—	6	6	—	—
Common Tern	756	1,190	858	—332	—28%
Arctic Tern	96	50	60	+10	+20%
Caspian Tern	60	90	84	—6	—7%
Razor-billed Auk	10,580	14,488,	7,620	—6,868	—47%
Atlantic Murre	7,240	8,048	12,208	+4,160	+52%
Black Guillemot	320	750	836	+86	+11%
Atlantic Puffin	55,550	62,562	71,914	+9,352	+15%
Short-eared Owl	—	—	2	+2	∞
Total	84,706	100,964	111,978	+11,014	+11%

TABLE III

THREE QUINQUENNIAL CENSUSES IN THE BIRD SANCTUARIES ALONG THE NORTH SHORE OF THE GULF OF ST. LAWRENCE.

Sanctuaries	1925	1930	1935	Gain or loss since 1930	Per cent gain or loss since 1930	Per cent gain or loss since 1925
Birch Islands	692	2,004	2,514	+510	+25%	+263%
Betchouane	1364	2,424	1,808	—616	—25%	+33%
Watshishow	4,880	4,972	3,798	—1,174	—24%	—22%
Fog Island	1,794	4,668	6,906	+2,238	+48%	+285%
Wolf Bay	6,068	14,114	11,314	—2,800	—20%	+86%
Cape Whittle	3,978	1,082	212	—870	—80%	—95%
St.Mary Islands	9.340	11,788	16,206	+4,418	+37%	+74%
Mecattina	962	1.282	2,868	+1,586	+124%	+198%
St.Augustine	328	820	2,246	+1,426	+174%	+585%
Bradore Bay	55,300	57,810	64,106	+6,296	+11%	+16%
Total	84,706	100,964	111,978	+11,014	+11%	+ 32%

established eiderdown industry indicate a general increase of this species along the north shore of the Gulf of St. Lawrence.

The abrupt and unmistakable decrease during the past five years, in the numbers of Razor-billed Auks breeding in this series of bird sanctuaries, cannot as yet be explained with certainty. Between 1925 and 1930 the reports show an increase of 3,908, or 37%, in the numbers of this species, yet in the following five-year period its numbers declined nearly 50%. The fact that the Razor-billed Auk population decreased in every sanctuary of this series in which this species is found, except Fog Island Bird Sanctuary, where a small population of 20 remained stationary, and Cape Whittle Bird Sanctuary, where, in another small population, there was an increase of 14 Auks, indicates that the cause of the serious reduction in the numbers of this species is not confined to any particular sanctuary or to any limited part of the breeding range. When we take into account the fact that the Atlantic Murre (*Uria aalge aalge*), a bird which often breeds in company with the Razor-billed Auk and which resembles that species in many of its habits, has shown an increase of 4,160, or 52%, in its numbers in these sanctuaries during the same period in which the Auk population has decreased by 47%, there is reasonable ground for thinking that this decrease in the numbers of Razor-billed Auks is not due to any factor operative in the bird sanctuaries. It is a possibility that the representatives of these two species that breed close to each other in these sanctuaries may, in general, winter in distinct areas and that some unfavourable condition on the wintering-area of the Razor-billed Auk may be responsible for the sudden marked decrease in the numbers of that species. A wintering-area for the Auks on or near the principal trans-Atlantic steamship lanes, with consequent heavy mortality from fuel oil pollution, is one possibility. The situation relating to the Razor-billed Auk will be given close attention.

The apparently large increase in the numbers of breeding Red-throated Loons (*Gavia stellata*) in the past five years is actually due in large part to the discovery in Mecattina Bird Sanctuary, during the taking of the census in 1935, of a number of breeding pairs of this species that had previously been overlooked.

The development, in St. Mary Island Bird Sanctuary, of a colony of European Cormorants (*Phalacrocorax carbo carbo*), which, after an abortive attempt at nesting in 1930, first succeeded in raising young there in 1931, has been traced in *The Canadian Field-Naturalist*, vol. 48, no. 6, September, 1934, page 100.

Changes in the numbers of Black Ducks (*Anas rubripes* subsp.?), Green-winged Teal (*Nettion carolinense*), and Red-breasted Mergansers (*Mergus serrator*) nesting in these sanctuaries, as shown by the census reports, are believed to be without special significance. These non-colonial species are scattered in the nesting season over large areas on the north shore of the Gulf of St. Lawrence, including some of the coastal islands as well as the mainland, and the number of each of them that may nest on the sanctuary islands fluctuates from year to year and is governed by factors so complex and so little known that it may be regarded as a matter of chance.

The Atlantic Kittiwakes (*Rissa tridactyla tridactyla*) shown in the report form a small colony of three pairs nesting in Betchouane Bird Sanctuary.

The decrease of 28% in the numbers of Common Terns (*Sterna hirundo hirundo*) shown in the report is not believed to indicate a general decrease in the numbers of this species nesting along the north shore of the Gulf of St. Lawrence. With an abundance of suitable nesting sites available in this region, breeding colonies of this species often change their nesting-grounds from year to year in what seems to be a capricious manner. It is thought that such changes are responsible for the reduced number of these birds found in the sanctuary areas in 1935.

Sixty Arctic Terns (*Sterna paradisaea*), which were nesting in two small homogeneous groups, are included in the census report for 1935, but it is probable that a small additional number of individuals of this species nested as usual in the large colonies of Common Terns, where ordinarily they can de detected only by careful and prolonged observation. They were sought in such places in 1935, but none where identified in the limited time available for this search.

The only colony of Caspian Terns (*Hydroprogne caspia imperator*) in these sanctuaries, which is situated on Fog Island, shows a slight decrease of 6 individuals when its population in 1935 is compared with that recorded in 1930. This colony fluctuates in size and contained at least 49 occupied nests in 1932.

The Atlantic Puffin (*Fratercula arctica arctica*), with 71,914 breeding individuals in 1935,

(*National Parks Bureau Photo*)

Atlantic Puffins are among the nesting birds that are becoming more abundant in Canadian bird sanctuaries along the north shore of the Gulf of St. Lawrence.

continues to be the predominant species in this series of sanctuaries, considered as a whole. Yet this predominance is hardly realized by the casual visitor to these reserved areas, for Puffins nest in only four of the ten sanctuaries and form a majority of the avian population in Bradore Bay Bird Sanctuary only. In this sanctuary, however, they are remarkably abundant and are increasing in numbers, as the figures show.

Bradore Bay Bird Sanctuary contains but two islands, namely, Greenly Island and Perroquet Island. The former is the larger of the two and probably had the greater bird population four hundred and one years ago, when the great French explorer, Jacques Cartier, called it the "island of birds" and described unmistakably the Puffins that nested there. Today, however, Greenly Island is inhabited by man and its suitability as a nesting place for seabirds is much reduced, so that it is now the home of only some 3,000 Puffins, whereas Perroquet Island, with a total area of about 41 acres, is inhabited by more than 59,000 of them. In the census of 1935, as in the two previous censuses under consideration, the number of Puffins nesting on Perroquet Island was chiefly determined by dividing the island into small lots and counting carefully the number of occupied Puffin burrows on these lots. In 1935 this task, which occupied five men for an entire day, showed a total of 29,209 burrows, representing at least 58,418 breeding Puffins. There are also some Puffins on this island that nest with the Razor-billed Auks and Atlantic Murres, under and among large boulders, where their homes are not countable with precision. These were conservatively estimated to number at least 1,000, and the total adult Puffin population of Perroquet Island, in Bradore Bay, was thus set at not less than 59,418.

FURTHER NOTES ON WILLIAM COUPER

By JAMES L. BAILLIE, JR.

IN *The Canadian Field-Naturalist*, November, 1929, the writer published an account of William Couper, early Canadian naturalist, and the present article is intended to place on record such additional information concerning Couper as has come to hand since its publication.

TORONTO (1842-1859)

Although Couper is known to have been resident at Toronto between the above dates, nothing had been forthcoming to indicate that he visited any other parts of Canada during that period. In the Toronto *Leader* for February 13, 1856, however, it is stated that he visited Montreal in October, 1855, and it is conceivable that he then made the acquaintance of Montreal naturalists, with whom he corresponded and became, a decade or two later, associated.

In the same issue of the *Leader* it is stated that (in January, 1856) he was a compositor in the printing establishment of H. Rowsell.

His interest in entomology during that period, was evident from his article[1] entitled *Description of the Canadian Wheat Insect*, which was written October 7, 1856.

His occupation in 1857 is given[2] as "printer and entomologist" and his address "Queen, near Ontario Street".

Couper collected insects assiduously at Toronto and we find the following mention of his collection by Dr. J. W. Dawson, in his presidential report for 1857 to the Natural History Society of Montreal[3] "Mr. Couper, of Toronto, has collected and identified several hundreds of species of Coleoptera, and his collection is now in the McGill College".

In 1858 Couper advertised[4] that he was prepared to execute orders at Toronto for the preservation of Natural History specimens and offered to supply museums with skins and eggs of Canadian birds. Under his name in the advertisement appear the words "Successor to the late George Hadgraft, Naturalist". A small sum of money having been made available for the purpose in 1853, Hadgraft had been commissioned by University College, Toronto, to prepare an exhibit of birds for their Museum in 1854, 1855, 1856 and 1857. Regarding Hadgraft, the Rev. William Hincks, first Professor of Natural History at the College, said, "a naturalist from London who is eminently skilled in the preparation of specimens..."

Couper (as well as Samuel Herring and S. W. Passmore) continued to mount birds in 1859 for the University College Museum after Hadgraft's death, according to Prof. Hinck's manuscript catalogue to the collection, written in 1865 and now preserved in the library of the Royal Ontario Museum of Zoology.

QUEBEC (1859-1868)

In December, 1859, Couper's address was 75 St. Paul St., Quebec.[5] His trip along the north shore of the Gulf of St. Lawrence in the summer of 1867 (May 29 to July 30) has been reported on by him in his *Investigations of a Naturalist between Mingan and Watchicouti, Labrador* (fourteen page pamphlet, Quebes, 1868), a copy of which is in the possession of the writer. This important pamphlet did not come to the writer's attention until after his previous account of Couper had been published. The purpose of the trip was stated to be to study the birds of the coast and to ascertain the accuracy of Audubon's observations many years before, and although considerable observing and collecting was evidently done on the birds, it soon becomes apparent, in a perusal of the pamphlet, that entomology and matters pertaining to fish were equally well treated. Eighteen species of birds are discussed, as well as notes on certain insects and mammals. The pamphlet should be read by all persons interested in that fascinating coast and its human and wild inhabitants of seventy years ago.

In 1868 Couper was Vice-President of the Quebec Branch of the Entomological Society of Canada. During his nine year's residence there ornithology, too, must have been one of his chief interests. At any rate, Brewster[6] records specimens of Holboell's Redpolls secured by Couper at Quebec, Vennor[7] speaks of a Gyrfalcon in the Smithsonian Institution collection, which had been collected at St. Foy, Quebec by Couper in 1860, LeMoine[8] speaks of a Golden Eagle in his collection, which had been prepared by Couper, LeMoine[9] in his list of the birds of Quebec city prefixes 110 species of birds with asterisks "noted by and inserted

on the authority of Wm. Couper, Zoological Artist, Quebec", E. A. Samuel [10] includes 153 species as noted in Quebec by Couper, and Dionne[11] cites Couper as authority for the inclusion of nine species in his list of Quebec birds.

OTTAWA (1868-1871)

A letter from Chief Justice F. R. Latchford, dated December 18, 1930, informs me that he knew Couper during Couper's short residence in Ottawa and that he lived near the Latchford home in the west end of Ottawa, more precisely on Albert Street (now about No. 558) opposite the south end of Hill Street. The Chief Justice states that, even now, more than sixty years afterwards, he well remembers the comeliness of one of Couper's daughters! This was our first intimation that Couper's family included a daughter and likewise our first knowledge of his place of residence in Ottawa. On September 22, 1869, Couper was elected to the Council of the Entomological Society of Canada[12]. An advertisement by Couper, in the *Ottawa* Times of February 24, 1869, (reproduced in the *Ottawa Evening Citizen* of May 30, 1936,) gives his address as Clarence Street, near Dalhousie, a locality quite distant from the address at which Justice Latchford knew him. Couper advertised oological specimens for sale, a study to which, he states, he has devoted upwards of twelve years.

Two publications issued in 1876 bear evidence of Couper's continued interest in birds during this period, namely, *Forest and Stream*[13], in which apears an article by him commenting on the breeding of Nighthawks on the flat gravel roofs of houses in Montreal, and Vennor's *Our Birds of Prey's*[14], plate X in which shows an adult Red-tailed Hawk which had been mounted by Couper.

His interest in animals other than birds is shown by a specimen of Jefferson's Salamander in the collection of the Royal Ontario Museum of Zoology (No. 1471) which had been secured by him at Montreal in 1883, and received by the Museum of the University of Toronto in the Dr. J. H. Garnier collection in 1891. In July, 1883, Doctor William Brodie and J. E. White, of the Natural History Society of Toronto, acknowledge thanks to Couper for assistance received from him in the preparation of their *Check-list of the Insects of the Dominion of Canada.*

Couper's *Canadian Sportsman and Naturalist* (1881-83) received the commendation of several naturalist editors, among whom was Joseph M. Wade, editor of the then-thriving *Ornithologist and Oologist,,* who says[15] of it "It is well worth the attention of all sportsmen and those interested in natural history; subscription $1. per volume."

NEW YORK STATE (1884-1886?)

Our search has failed to reveal any personal facts about Couper subsequent to his residence at 517 Fifth Avenue, Lansingburg, New York, in 1886[16]. Three articles attributed to him apparently appeared in *Shooting and Fishing,* published in Boston, Mass., for 1890[17], on the food of the Woodcock. These articles, which appeared in the issues for April 3, May 8, and June 12, 1890, were cited in the *Auk,* 1893 but have not been seen by the writer. They suggest, at least, that Couper lived until 1890, or thereabouts.

Two invertebrates apparently named after Couper are *Anodonta couperiana* Lea (a mollusc) and *Euceros couperi* Cresson (an Ichneumon.)

Mr. Albert Winn, of the Peter Redpath Museum, Montreal, has told me that they have a considerable number of moths taken by Couper at Burlington, Vermont, without any indication of the year when they were taken and the writer has considered the possibility that there may be a connection between this fact and the statement[18] by "Stanstead" of Montreal, a frequent contributor to *Forest and Stream,* that he ("Stanstead") spent his boyhood at Sheldon, Vermont! Perhaps Couper and "Stanstead" were one and the same person and he did come from Vermont to Toronto in 1842 and not from England as I have already recorded on the authority of the late Rev. C. J. S. Bethune, who knew Couper at Toronto in the 'fifties'.

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6. *Bull. Nuttall Orn. Club,* No. 8 p. 97.
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8. *Ornithologie du Canada* 1861, p. 20.
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14. *loc. cit.,* p. 48.
15. *Orn. and Col.* Vol. 6, 1881 p. 5.
16. *Can. Field-Nat.,* Vol. 43, 1929, p. 176.
17. *Auk,* Vol. 10, 1893 pp. 292-3.
18. *Forest and Stream,* Vol. 10 p. 117.

THE SLUG Arion circumscriptus IN CANADA

By A. LA ROCQUE

IN A PREVIOUS note (1) the writer recorded the presence of this slug in the Ottawa region. Since then many specimens have been collected which greatly extend its known range in Canada; the National Museum now possesses material from the following localities:

Nova Scotia: Morden and Berwick, Kings County.

Quebec: Ste Anne de Bellevue, Jacques Cartier Co.; Trois Pistoles, Temiscouata Co.; Montmagny, Montmagny Co.; Val Tetreau, Meach Lake, Wright Co.

Ontario: Ottawa, Manotick, Carleton Co.; Spencerville, Grenville Co.; Perth, Lanark Co., and Toronto.

The Nova Scotia specimens were collected by Mr. H. J. Griffiths of the Institute of Parasitology, Macdonald College, the Toronto specimens by Mr. J. G. Oughton and the others by the writer.

In order to ascertain the approximate limits of distribution of the species, a careful search was made in the Ottawa region, north of Meach Lake. Farm Point, Wakefield and Alcove yielded no specimens of *Arion circumscriptus* in October, 1936, although *Deroceras agreste* and *D. campestre* were abundant and active at the time. The writer feels sure that had *Arion* been present it would have been found in company with the other two slugs. It may be said therefore that Meach Lake is the present northernmost point to which the species has spread and it will be interesting in future years to find out how far north it will go. Opportunities for dispersal are not lacking since every potted plant and shrub brought up the Gatineau by cottage owners is a potential carrier.

Until a few years ago only two Canadian records had been published, one for Prince Edward Island (2) and the other for Toronto (3). In 1917 Walker (4) stated that the species was "thoroughly naturalized" in the Toronto district but it seemed that these two records were isolated local ones which were not likely to cause any great damage. Its presence in the Ottawa region seemed to be another case of the same nature. Now, however, in the light of the above records, we must realize that this species is not only thriving in isolated spots but rapidly spreading all over Canada and perhaps the United States. This invasion has been going on rapidly but apparently unnoticed. There is one instance where appearance of the species can be placed within a few years. Cockerell (5) states that it was not present at Niagara Falls in 1887 but was found there in 1904. Again, its does not appear on the 1890 list and it is hard to imagine that such a conspicuous species could have escaped the sharp eyes of our local collectors. Also, had it been present around Montreal in the 1860's Whiteaves would undoubtedly have noticed it, since he knew it in England. The spread of the species, therefore, dates from the nineties of last century or the early 1900's. There is no doubt that it can withstand the cold of our winters, our spring floods and occasional dry summers. It seems to prefer the vicinity of dwellings, where it is exceedingly abundant even more so than *Deroceras agreste*.

The writer would be glad to examine specimens of slugs from various parts of Canada which might throw some light on the distribution of this and other species.

1. *Can. Field-Nat.* 50:148, December 1936.

2. Vanatta, E. G., *Proc. Phila. Acad. Nat. Sci.* 1914, p. 223.

3. *Nat. Hist. Tor. Region*, p. 290.

4. *Ott. Nat.* 31:41, June-July, 1917.

5. *Nautilus* 18:91, Dec. 1904.

NOTES AND OBSERVATIONS

AN ALBINO MEADOWLARK. — On the 6th of July, 1936, William Colby, a farmer living near Unity, Saskatchewan, telephoned to me to say that when he was cutting hay he saw a meadowlark's [*Sturnella neglecta*] nest in the way of his mower and that he had carefully moved the nest to the some bushes close by. The nest contained six well-grown young meadowlarks, all normal, and one well-grown young lark which was pure white except for a small amount of yellow on the breast; the eyes were pink and the legs whitish pink. His boy, he said, had picked up the white lark and they had examined it together. I went out to his place late in the afternoon, but unfortunately there were only four larks left at the nest. The larger ones, including the white lark, had wandered away, which they were apparently big enough to do, as in handling one of those left we found that it could fly a short distance. We made a careful search round about but failed to find any more than the four larks at the nest, except one which had seemingly been trampled on by a cow and killed, some little distance from the nest. — S. HUMPHRY.

THE AMERICAN EIDER ON THE NIAGARA RIVER. — On November 25, 1936, a fine specimen of a young male American Eider (*Somateria mollissima dresseri*) was brought to me, in the flesh, by city police officer M. Jones, and Mr. H. M. Meades.

Information was obtained to the effect that the bird was one of three similarly plumaged ducks seen off Navy Island on the Canadian side of the Niagara River a few days earlier, on November 21st. This information was subsequently confirmed by the hunter who actually took the specimen, Mr. W. G. Anderson, who states that the trio f om which he shot the bird in question was found off the south end of Navy Island about midway in the channel between that island and the Canadian shore mainland. Mr. Anderson further states that the birds seemed slow in rising from the water and that, although he is well acquainted with the more usual river duck, he had no idea of the indentity of these particular bi ds.

The Eiders had apparently been recently feeding on crawfish for one of these crustaceans was stated to have been squeezed out of the crop of the dead bird shortly after it was shot.

Ornithological records are indebted to Mr. H. M. Meades who, although not recognizing the species, nevertheless sensed the possible interest of the specimen and very properly saw that it was saved from destruction and delivered into my hands.

The taking of this young male American Eider on the Canadian side of the Niagara River apparently constitutes the first definite record for Ontario. The bird was forwarded in the flesh to Mr. P. A. Taverner who verified my identification and had it made up into a skin for the National Museum, in which collection it is now specimen No. 27502.

In further reference to Eider ducks on the Niagara River, it is perhaps interesting to mention here that in the mimeographed journal of the Buffalo Ornithological Society, "The Prothonotary" for December 1936, there is an introductory note, apparently based on observations made by James Savage on December 6th, stating that "The presence of a few King Eiders (possible some are American Eiders) in Buffalo Harbor was of especial interest". This note by the Buffalo Ornithological Society, or rather that portion of their note which appears in brackets, takes on added significance and interest in view of our substantiated record from the Canadian side of the Niagara River on November 21, 1936.

E. H. Eaton, in his *Birds of New York*, 1, p. 219, 1910, mentions the American Eider in his list of records as being included in Bergtold's Buffalo, N.Y., list as a rare winter visitant; but there would appear to be no other mention in literature of this particular species in the Niagara River area. — R. W. SHEPPARD.

OBSERVATIONS ON THE FOOD HABITS OF THE SNOWY OWL. — The following account concerns a Snowy Owl which was held in captivity for a period slightly longer than four months.

The specimen was brought into Meaford, Ontario, on December 20, 1935, by a farmer whose

identity has not yet been learned. It was given to a merchant who in turn gave it to the writer of this article.

The bird was turned loose in a garage with the windows protected by burlap. Otherwise the bird would have injured itself against the glass. A pile of straw served as a perch.

From almost the first day of its captivity the bird took food. This was given at first from the point of a short stick but later from the hand.

The bulk of the food was beef strips about two inches long and an inch wide. It would not eat these if they were left on its perch.

With the melting of the snow other food became available. This included Meadow Mice, White-footed Mice, Common House Mice, Brown Rats and Blackbirds.

When eating Field Mice or smaller creatures, the owl crushed the vertebrae just behind the skull, then shifted the mouse till it had the head in its beak and immediately crushed the skull. The mouse was then swallowed whole.

On February 25, at 6 p.m. the owl ate four full grown Field Mice (*Microtus*) and later in the evening, two more *Microtus* and three full-grown house mice. At twelve noon on February 26, the pellet was disgorged. This was six inches in length and averaged an inch in diameter.

This owl had been shot through the tip of one wing. When it had become somewhat accustomed to its surroundings, help was called in and the wing bandaged. Two days later the bandage was gone and could not be found. Later in the week it re-appeared in the form of a pellet. How the bird removed it is still a mystery.

A rat left on the perch was eaten. First the head was torn off, then the body torn apart and devoured.

On April 21, 1936, the owl was given to W. Linn who will keep it in his barn at Mountain Lake. Mr. Linn has fed it on Grackles but they must be plucked before it will eat them. In one case the head of the grackle was torn off and swallowed without being crushed as in the case of the mice.

Other birds and mammals which are usually considered as pests will be tried as food and the results noted.

In one week the owl would eat two pounds of beef. In a period of four days it ate between thirty and thirty-five Meadow Mice. Living an active life, it seems reasonable to suppose that a Snowy Owl would destroy the equivalent of three thousand to five thousand Field Mice per year. — L. H. BEAMER.

SPRING RIVALRY OF BIRDS. (*A neglected paper*).—The theory of territory in bird life as set forth by Howard (1) is now widely accepted by ornithologists. Margaret Nice (2) in her review of the development of the theory, gives full credit to Howard, but shows that the main points of the hypothesis had been set forth at earlier periods by Maumann (3), Altum (4) and others.

A paper that seems to have been generally overlooked was published by C. B. Moffat (5) in the *Irish Naturalist* of June 1903. I venture to call attention to it here, and to give a few quotations from which the nature of the argument may be judged.

"Birds may, or may not, realise the importance of protecting their future families against the ills of congestion; but they certainly seem to have an instinctive feeling that the patch of ground on which a pair is nesting belongs to that pair, and that no other pair of the same species of bird has any right to attempt to nest upon it. And, as land is a limited commodity, the cock birds in spring have to fight one another to settle the question, which shall possess a particular plot."

". . . Have we not here some ground afforded us for suspecting that the bright plumage may have been originally evolved as war paint? In other words, as a sort of 'warning colouration' to rival males, rather than attractive colouration to dazzle the females? . . . If the cock bird shared the dull plumage of the hen, the signal would be less useful in two respects: it would not be seen so far, to begin with, nor would is show—when it was seen—that the bird belonged to the fighting sex, and was of full age to maintain his right".

The paper gives numerous observations by the author and others, including two cases of "shadow-boxing" with a discussion of their significance; territorial rivaly between different species, and between communities such as rookeries, as well as competition within the rookery; rapid re-mating of widowed birds, proving the existence of a reserve of nonbreed-

ers; and a census of migrating swifts, from which it appears that mortality during migration is of little significance, and that "prudential restraints on the marriage of birds" are an important factor in keeping their number permanent.

The author's observational basis, though not contemptible, is of course dwarfed by the monumental work of Howard: it is no detraction from the latter to point out that before his work began his conclusions had been reached by Moffat, who set them forth in lucid and pleasing language, but buried them in an obscure publication.

1. HOWARD, H. E. 1920. Territory in Bird Life. London. 308 pp.
2. NICE, Margaret H. 1933. The Theory of Territorialism and its Development.
3. NAUMANN, J. F. 1820. Naturgeschichte des Vogels Deutschlands, Bd. 1. Leipzig.
4. ALTUM, Bernard. 1868. Der Vogel und sein Leben. Münster. 168 pp.
5. MOFFAT, C. B. 1903. The Spring Rivalry of Birds. Irish Naturalist. XII. pp. 152-166.

—E. G. McDOUGALL.

*The essential evidence of the territorial guardianship of the male bird is presented by H. Mousley in *The Singing Tree or how near to the Nest do the Male Birds sing?* in *The Auk*, 36: 339-348, 1919, though without developing the theory to its ultimate conclusion.—*Ornith. Ed.*

REVIEWS

FLUCTUATIONS IN NUMBERS OF RUFFED GROUSE, *Bonasa umbellus (Linne) with special reference to Ontario. By C. H. Douglas Clarke. University of Toronto Studies, Biological series No. 41, pp. 108, several maps. University Press, Toronto,* 1936.

Of late years the interest of students has been directed towards the periodic variations in density of wild-life populations. It is evident that in many cases these fluctuations are too regularly recurrent to be the result of adventitious conditions and there has been considerable investigation to discover the laws and causes of the phenomenon. This paper is the result of three years' intensive study of the problem in relation to Ruffed Grouse in various areas in Ontario. Experience has not been long enough for unquestionably final decision upon the critical phases of the question, not even one complete cycle having been studied through, but a large amount of data has been gathered and considerable progress made towards the objective.

The cyclical nature of the accelerated increase in population over a series of years followed by a sudden c ash and extraordinary disapearance of numbers followed by repetition of the process is well demonstrated by history and observation. The period of the cycle is between nine and ten years kept with remarkable regularity. Though extending over the whole range of the species and involving some of its allies, it is not synchronized in phase throughout the country, even throughout the province, some localities being as much as half a cycle out of step. It thus does not seem that general meteorological or astronomical factors are determining causative agencies. Given favourable ecological conditions, the gradual building up of population over a series of years to saturation point does not cause surprise, but the sudden crash at the climax with an epidemic of mortality when all seems favourable is in need of explanation. The mortality seems chiefly to affect chicks, occurs in midsummer, and prevents the survival of more than a fraction of the normal hatch. How far the adults are involved is not as yet certain. Various disease parasites have been found in association at this time but most of them are allowed only contributary importance in the disaster. One, however, a protozoan blood parasite, *Leucocytozoon bonanasae*, described and named by the author in 1935, is regarded as a more responsible organism than the others and the possible, if not the probable, immediate cause of the wholesale dying off. It is to be noted that a similar *Leucocytozoon*, carried by that pest the Black Fly, has been postulated as having a fatal effect upon young ducks. The similarity of the two cases is suggestive. Granting, as seems probable, that Dr. Clarke is correct in his designation of the immediately fatal organism there remains to be explained the cause and method by which it regularly occurs in epidemic virility with long and definite periods of innocuousness between. When we consider how difficult it has been to understand the etiology of many human diseases when we have cases under full observation and control, we may realize that it may take experience through several or many grouse cycles to master the problem.

In process of, and pertaining to, his investigations, Dr. Clarke has embodied in this report much ecology and life history of the Ruffed Grouse that may be of great value in lines outside the direct objectives of this particular research. — P. A. T.

THE DISTRIBUTION OF BREEDING BIRDS IN ONTARIO, *Part* I, *By J. L. Baillie and P. Harrington. pp.* 50, *one map. Contribution No.* 8, *Royal Ontario Museum of Zoology. Reprinted from Transactions of the Royal Canadian Institute, Vol.* 21, *Part* 1, 1936. *University of Toronto Press,* 1936.

The above title expresses the scope and bearing of the paper. It summarizes all the definitely established breeding records of the province following the order of the 1931 A.O.U. Check-List from the Loons through the Owls. It is to be assumed that the remainder of the list will follow in a subsequent publication. It is the result of a number of years' investigation of the subject by the Royal Ontario Museum of Zoology and is probably one of the most reliably accurate lists of the kind available. The value of such a carefully compiled and assembled list is not only to summarize and validate present evidences but to throw into visible relief what is lacking in the same to suggest profitable effort. The second and completing part of this paper will be looked for with interest. — P. A. T.

FIELD NOTES, *Vol.* 1, *No.* 4, *October* 10, 1936, *price* 10 *cents. A mimeographed quarterly issued by the Junior Field-Naturalists Association (of British Columbia) Editor, Ann Clemens, Nanaimo, British Columbia.*

This is quite a professional-looking little journal and evidently the work of a junior organization from the drawn cover to the typing of the text. The contents are surprisingly good and show that the young folks are familiar with good natural history and editorial practice. They include a list of associated members; some short notes; a paper on Nesting Notes of the District about Vernon for 1936 (over a hundred nests noted) by C. David Fowle (a suggestive name for a budding ornithologist); a list of The Higher Animals of the Cowichan District (concluded) by David A. Munro; Notes by John R. Quirk; an account of some faunal aspects of The Forbidden Plateau by Ann M. Clemens; Financial Report and the Regulations of the Association. When the young idea can carry out a scheme like this it speaks well for the nature study of the future. — P. A. T.

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The Canadian Field-Naturalist

VOL. LI OTTAWA, CANADA, MAY, 1937 No. 5

THE SNOWSHOE RABBIT ENQUIRY 1935-36.

By DENNIS H. CHITTY and CHARLES ELTON

1. GENERAL INTRODUCTION.

THE SNOWSHOE RABBIT ENQUIRY was initiated in 1931 by the National Parks Branch (now Bureau) at Ottawa, in order to obtain an index of annual movements in the cycle, of approximately ten years, which affects wild life in the Northern forests; and whose important influence on the supply of fur-bearing and game animals has long been recognized. In the last two years the enquiry has been extended to cover regions outside Canada. The present report, based on mapping carried out in the Bureau of Animal Population, Oxford University, is divided into two sections: Canada and Newfoundland; and United States and Alaska. Between them they cover a large part of the range of the various snowshoe rabbit species in North America.

2. CANADA AND NEWFOUNDLAND

(D. H. C.)

INTRODUCTION.

With this, the fifth annual report of the abundance of the Snowshoe Rabbit or Varying Hare (*Lepus americanus*), the ten-year cycle has been followed through half its course. Full details of the methods employed in this enquiry are to be found in *The Canadian Field-Naturalist*, 47:63-69, 84-86, 1933; 48:73-78, 1934; 49:79-85, 1935; and 50:71-81, 1936. It is hoped that the four previous series of maps will be compared with the 1935-36 results, as some striking contrasts are to be found. For example the 1932-33 maps, based on reports just about the peak, show conditions almost exactly the reverse of the present.

Maps are compiled from the records of a large number of observers throughout the Dominion, who fill in a form each year. Opinions of the abundance of the snowshoe rabbit population in an area are stated in terms of *increase*, *decrease* or *no change;* abundance being compared over two consecutive years ending May 31st. Notes on habitats, epidemics, predators, numbers in past years, etc., are also supplied.

Material for this section of the paper has been obtained from the following sources:—

1. 438 reports from observers through the National Parks Bureau of the Department of Mines and Resources, Ottawa. We are indebted to former Commissioner, Mr. J. B. Harkin, Controller F. H. H. Williamson, and to the following whose services made this result possible: the Royal Canadian Mounted Police; the Game Officers of the Provinces of Canada; Honorary Game Officers and Holders of Scientific Permits under the Migratory Birds Convention Act; Taxidermists; Superintendents and Wardens of the National Parks, and other observers throughout Canada.
2. The annual zoological reports from the Hudson's Bay Company, of which 127 contained information included in the present paper. We have to thank the Governor, Mr. P. Ashley Cooper, and the Committee of the Company for permission to use these reports and the Fur Trade Commissioner in Winnipeg, Mr. Ralph Parsons, for arranging the enquiry.
3. 30 reports from officials of the Biological Board of Canada engaged on fishery work in the Maritime Provinces. We have to thank Dr. A. G. Huntsman for his care in securing these returns.
4. A report from Anticosti sent by Mr. C. R. Townsend, Factor of the Consolidated Paper Corporation Ltd., at Port Menier, Anticosti.
5. A report from Mr. Gower Rabbitts, in charge of the Game and Inland Fisheries, Department of Natural Resources, Newfoundland.

The Canadian data thus consist of 596 reports, the main features of which are discussed here. The details may be consulted on either side of the Atlantic by those wishing to pursue the study further. The original National Parks Bureau questionnaire replies, together with duplicates of the provincial and final maps are filed each year with the National Parks Bureau at Ottawa. All the original maps and duplicates of the replies are deposited in the Bureau of Animal Population, Oxford.

We have once again to thank Mrs. Jane Baden-Powell for copying the last set of provincial maps and for undertaking the same task for the present year. To Mr. Hoyes Lloyd, of the National Parks Bureau, we owe very sincere thanks for his continued interest and advice.

METHODS.

Although this year the preparation of the results has been transferred to a different worker, no difficulty has been found in carrying out the technique in the same impersonal manner as has been the aim in previous years.

The Hudson's Bay Company reports have been mapped by C. E. as areas of 50 miles radius (*i.e.* 100 miles diameter) and transferred by D. H. C. to the final map. Otherwise procedure has been as follows:—

(a) Mapping on large-scale provincial maps of the areas covered by observers during the 12 months ending 31st May, 1936.

(b) Estimation of the relative areas over which opinions are unanimous and conflicting upon the state of snowshoe rabbit abundance compared with the previous 12 months.

(c) Formulation of general conclusions.

Mapping.—The majority of reports define the areas exactly (*e.g.* by townships, counties, areas of given radius, etc.) Others, less definite, are mapped in various conventional ways which aim to be conservative in allotment of size. Some reports cannot be used because they refer to purely local features or to divisions of land for which no map is available. Others have to be omitted or mentioned in the text only, because they cover too large an area and would unduly weight the general opinion of one observer against those of a number of people with more precise knowledge of local conditions. Areas over 100 miles in length are nearly always omitted except in the North West Territories. *A sketch-map included with the reply would both increase the accuracy of the mapping and greatly reduce the time now spent in trying to locate such features as small creeks and lakes, roads, hillsides and contour lines.* Parts of a county or province described as "central", "front", "east", "S.W. corner", etc., could also be more accurately defined on a sketch-map.

Estimation of areas.—This involves tranference of the mapped replies to a grid of squares with 30 mile sides covering the whole Dominion. Each square is filled in whether overlapped entirely or in part only by the areas covered by observers. This causes an approximate doubling of the areas actually reported upon and as a consequence there is apparent a greater conflict of opinions than is really the case. Exaggeration of the original areas is random and is held not to affect the proportion in each category. Areas are expressed as percentages of total area involved, between limits determined by the extent to which opinions vary. Besides the apparent conflict of opinion already mentioned there is a certain amount of actual disagreement, in addition to real differences in snowshoe rabbit abundance within the 30 mile square units of country.

Validity of conclusions.—It cannot be too strongly emphasised that this enquiry makes no attempt to give information that can be applied to small units of country. The validity of the present questionnaire system depends upon obtaining a sufficient number of replies to override the effects of a certain percentage of inaccuracies. While some misleading replies are inevitably included, it should be remembered that most observers are men who spend a great deal of their time in the field and that a statistical treatment of their opinions forms one of the best indications of general trends that is at present possible. Examination of a large number of replies shows convincingly that the broad conclusions reached are founded upon a great number of very careful observations. Many people take the trouble to collect opinions from trappers, Indians and other residents of surrounding districts. (For example Mr. Will Robinson of Terrace, British Columbia, this year sent in 4 separate reports besides his own). Other observers notice the relative abundance as seen from the train on successive years. This gives an excellent random sample over a large area.

RESULTS.

The state of the Snowshoe Rabbit population in Canada is shown in Table 1 and the accompanying maps (Figs. 1, 2, 3).

The 1935-36 results for Canada as a whole indicate a further decline. In the last report figures from the previous four enquiries were condensed into the form of two curves showing percentage increase and decrease by area. The steep downward trend of the "increase" curve in 1933-34 and 1934-35 has been maintained by a drop from 27-44% (1934-35) to 11-26%. Similarly the "decrease" curve has risen from 43-64% to 59-78%. In the majority of places a decrease to great scarcity has taken place, though here and there continued abundance is reported. In some areas the rabbit population had previously been reduced to a low ebb at which it has remained; in others there are instances of marked local variations in density. It is obvious, therefore, that conclusions as to general trends of population changes cannot be held to apply to small sections of the country. Differences in opinion are not unlikely to be more common in the next year or two as changes in numbers at times of extreme scarcity or abundance are less easy to observe than when populations are going sharply up or down.

In the last report increase was still noted in the North West (Yukon, North West Territories, and Northern British Columbia), while a steep decline had set in over the Middle West and East of Canada. The present situation will now be reviewed with the help of extracts from some of the many excellent replies received.

TABLE 1

State of the Snowshoe Rabbit population in Canada, 1931-36 (numbers of squares).

	Total	Increase	% Increase	Decrease	% Decrease	No Change	% No Change	Epidemic	% Epidemic
Yukon	52	24	37-46	23	33-44	11	19-21	4	8
North West Territories.	157	31	10-20	141	74-90	9	0-6	21	13
British Columbia..	271	114	27-42	113	26-42	116	28-43	24	9
Alberta	198	70	15-35	145	44-73	58	7-29	4	2
Saskatchewan	155	46	6-30	134	52-86	46	5-30	12	8
Manitoba ...	193	24	3-12	175	62-91	49	6-25	31	16
Ontario.....	339	65	6-19	298	74-88	31	5-9	21	6
Quebec &.... Labrador	299	27	5-9	280	88-94	13	0-4	134	45
New Brunswick.	34	7	6-20	24	41-71	17	18-50	2	6
Nova Scotia .	41	36	10-88	32	0-78	23	7-56	2	5
Total (1935-36)	1739	444	11-26	1365	59-78	373	8-21	255	15
" (1931-32)	617	586	85-92	42	3-7	59	5-10	6 records	
" (1932-33)	1667	1508	82-90	159	4-10	189	4-11	271	16
" (1933-34)	1524	1083	52-71	470	17-31	335	8-22	290	19
" (1934-35)	1548	679	27-44	988	43-64	257	6-17	340	22

Fig. 1. *State of the snowshoe rabbit population in* 1935-36. *Dotted areas are groups of squares overlapped by areas of obscrvers reporting relative INCREASE in* 1935-36 *over* 1934-35. *For Alaska, Anticosti and Newfoundland see text. Larger black dots are Hudson's Bay Company posts, etc.* (1927 *map.*). *Broken lines in Canada show main vegetation zones. Broken lines in United States show approximate limits of snowshoe rabbit species. Thick black lines are Province or State boundaries.*

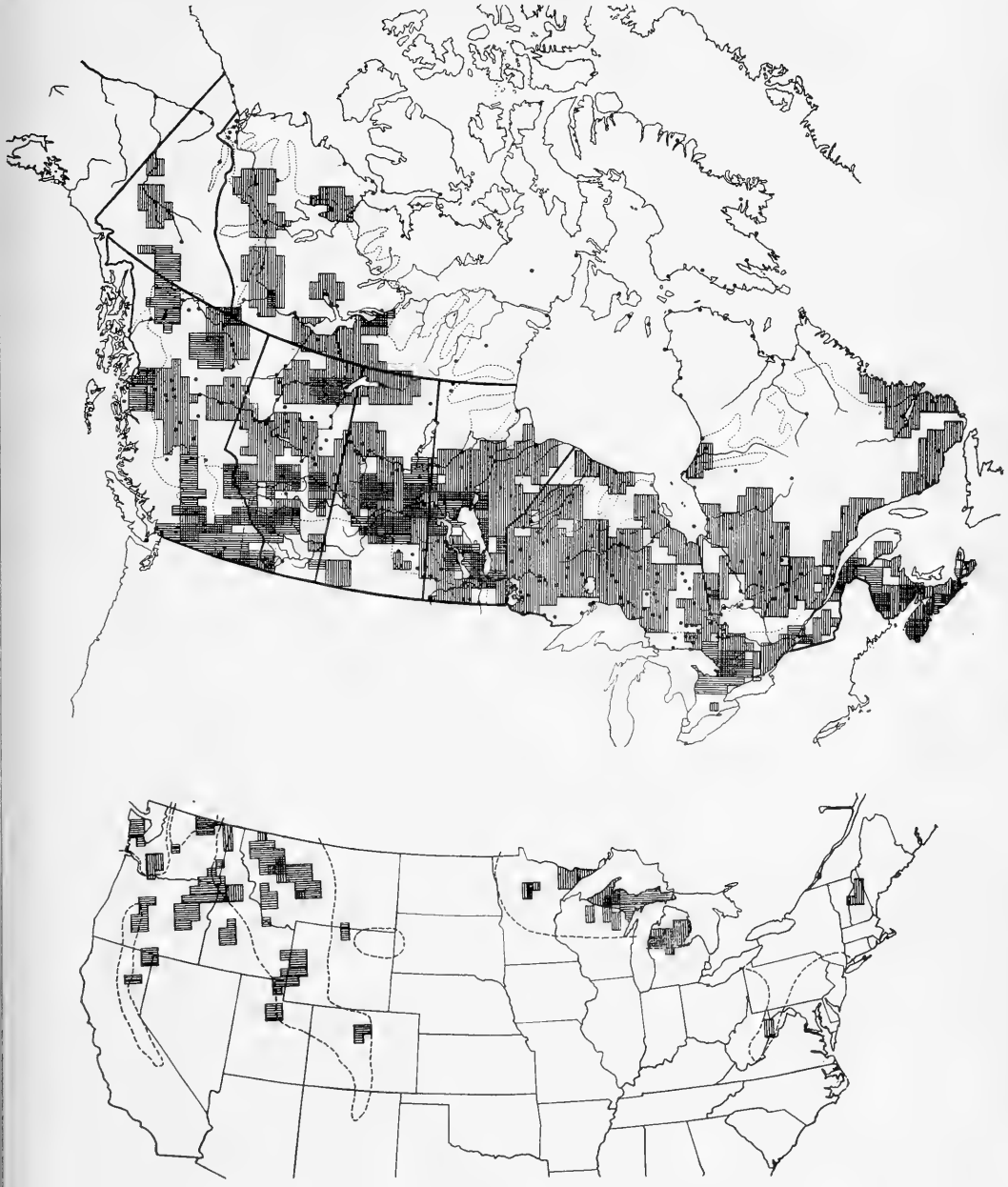

Fig 2. State of the snowshoe rabbit population in 1935-36. *Vertical hatched areas, are groups of squares overlapped by areas of observers reporting relative DECREASE in* 1935-36 *over* 1934-35. *Horizontally hatched areas, NO CHANGE. Large black dots are Hudson's Bay Company posts, etc.* (1927 *map*). *Broken lines in Canada show main vegetation zones. Broken lines in the United States show approximate limits of snowshoe rabbit species. Thick black lines are Province or State boundaries.*

(a) YUKON, NORTH WEST TERRITORIES AND BRITISH COLUMBIA.

Increase was reported from 57-75% of the area covered in 1934-35, as opposed to 16-32% in the rest of Canada. The former of these two figures has now dropped to 35-22%. In the Yukon decrease has been by no means universal, but it is likely that the peak of abundance will have been passed in 1936-37. In the North West Territories the peak appears to be over as the percentage by area reporting decrease has jumped to 74-90%, from 10-22% in 1934-35. In British Columbia the area of decrease has spread north to the boundary from a previous limit about the 57th parallel.

Fort Rae. N.W.T. (west 40, east 50, north 60 miles. L. Basler, R.C.M.P):

"Less abundant, sudden decrease noted. Trappers and Indians report decrease since December 1935, but attribute the change to no specific cause . . . "

Wood Buffalo Park,. (M. J. Dempsey, Park Warden):

"Have only seen 6 rabbits all winter—less abundant. Have examined only 2 rabbits killed by an Indian in November . . . the specimens were very thin, the flesh spotty along the back and what appeared to be boils under the skin."

Fort Simpson, N.W.T., (L. Hunt, H. B. Co. post manager):

"Less abundant in certain restricted areas, but on the whole becoming more scarce."

(b) ALBERTA, SASKATCHEWAN AND MANITOBA.

Decrease, particularly in the north, appears to have continued; but some areas report recovery, in most cases very slight. There has been a significant drop in the number of reports of epidemics.

Along C.N. Rly., Edmonton to Jasper, and S.E. half of Jasper Park. (E. McDonald, Warden):

"Edmonton—Edson, good deal fewer than last year; Edson-Entrance very few, last year numerous. Brule-Jasper very little difference, possibly a few less. S.E. half of Jasper Park, little difference from last year, possibly fewer."

Lac la Biche, Alta. (North 150, South 60, West 100, East 60 miles. C. E. Mills):

"Less abundant; fairly rapid decrease in the months of January, February and March. Rabbits were thin and weak, appearing dazed . . . Very few great horned owls seen. A slight increase in lynx and coyote but fur has been very scarce this winter. The scarcity may be attributed in part to the scarcity of rabbits. A little fur was taken in November and December but the following months were almost entirely barren . . . "

Tps. 52-56, Rges. 26-28 W-2nd M. & 1-4 W.-3rd M., Saskatchewan. (D. R. Pitts, Field Officer, Dept. Natural Resources).

"Slightly more abundant. No epidemic in this district, as they appeared to be at their scarcest: the epidemic seemed to strike here last year."

Tps. 42-47, Rges. 9-13 W-2nd M. Saskatchewan (M. H Horwill, Field Officer):

"Less since November 1935; nearly extinct by May 31st, 1936. Epidemic noticed mostly in January and February; rabbits found lying dead and dying through bush."

The Pas, Herb Lake, Granville Lake, Pukatawagan, Sherridon and *Cranberry Portage Districts, Manitoba.* (A. Howells, R.C.M.P.)

"Very scarce. Sudden decrease in April and May, 1936. Symptoms: Disease of the liver—spots and pimples . . . appear to have a stroke and die almost immediately. Previously noticed on one or two occasions: around March and April, 1935, in the Herb Lake District especially. Symptoms: mucous discharge from mouth, spots on liver; rabbits would run a short distance then drop over dead."

North of Assiniboine River in the West half of the Municipality of South Cypress, Aweme, Manitoba. (Stuart Criddle):

"Decidedly less abundant. No epidemic; the decline was very steady throughout the year."

All bush country in Northern Manitoba. (No name).

"Only saw rabbits in one place last winter—on the Grassy River in young birch and Jackpine cuttings. Not much difference from last year—very scarce during both years. No epidemic noticed; I believe it occurred during the late summer of 1934. I saw several dead animals covered with wood ticks, others with tumors and blisters around front legs and neck. In the last two winters one could travel for miles through bush country without seeing a rabbit track."

Pukatawagan, Manitoba (A. Millar, H. B. Co., post manager):

"More in places, . . . rabbits showing small gain."

(c) ONTARIO AND QUEBEC.

Decrease well marked in the North, with epidemics continuing to be particularly common in Quebec. Further South, in Ontario especially, no change and recovery are reported from a few places.

Kenora District, Ontario, (taking in Shoal Lake, Northern part of the Lake of the Woods, Winnipeg River, Lac Seul, Red Lake, Narrow Lake and Pickle Crow districts, Fort Hope, Lansdowne House, Weibikwei Lake and Sioux Lookout. E. Stanley, R.C.M.P.):

"No difference in abundance from that of last year; rabbits caught show no sign of disease. Snowshoe Rabbits were very abundant in this district in 1932 and 1933. Since last mentioned year rabbits have become less in number until during the past winter they appeared almost extinct. However, several have been seen of late and it is felt that they may be starting on their cycle of abundance once again."

S.E. portion of Lanark County and Grenville County Ontario, (I.J. Lyons):

"Small increase noticed this year; sudden decrease during winter of 1934-35."

Counties Glengarry, Stormont, Dundas; Augusta and Edwardsburg. Tps. in Grenville, Ontario. (R. Baker):

"Less abundant: in fact they are very scarce. I saw less snowshoe rabbits this past year than for some time. Did not notice any epidemic; they just seemed to disappear and I did not see any sick or dead."

The Coastline of James Bay (from Fort George, Quebec. South to inter-provincial boundary, thence North in Ontario to the Weenusk River in Hudson's Bay. L.W. Hopkins, R.C.M.P.):

"The snowshoe rabbits were decidedly less abundant than last year. A number of cases of growths, presumably cysts, have been reported but none of these were brought in for inspection. It is therefore impossible to state the reason for the decrease in their numbers. These conditions were reported by Indians in August, October, January, March and April. The exact dates are not known. The Indians described these growths as red lumps, filled with water, and containing what appeared to be white eggs. Patches of yellow pus on the lungs and livers were also reported."

Mistassini, Quebec. (W. Jefferys, H. B. Co. post manager):

"Rabbits have almost disappeared from most sections, but in a few places they are still plentiful. In such places lynx are abundant."

(d) NOVA SCOTIA AND NEW BRUNSWICK.

Here there is considerable conflict of opinion, in part, no doubt, the effect of great variety in type of country and amount of settlement. While a good deal of New Brunswick has partaken in a continued decrease, on the borders of Maine this seems to have been checked and some recovery is apparent and is confirmed by the United States results. Increase of a vary patchy nature seems to be in progress in Nova Scotia.

The southern part of Carleton County, New Brunswick. (covering 50 sq. miles. J. P. McGuire, Warden):

"They were less abundant this year than last year, but I noted they are improving quite fast now."

Annapolis County, Nova Scotia (W. C. L. Dargie, Dept. of Lands and Forests, Nova Scotia):

"I have delayed my reply . . . in order to get the opinion of others throughout the county who are familiar with our wild life. I find a great diversity of ideas in regard to the prevalence or scarcity of the rabbit in this county and also as to what is responsible for their periodical disappearance . . . I came in contact with much conflicting data and I find it extremely difficult to give definite and satisfactory information:—generally speaking for the whole county more plentiful."

(e) ANTICOSTI (C.R. Townsend, letter, 11 March, 1936):

"Rabbits are still plentiful but I was much interested to learn . . . . . that they are at present exceedingly scarce on the North Shore of the Gulf."

(f) NEWFOUNDLAND (Gower Rabbitts, letter, 20 April, 1936):

". . . the Game Supervisors all . . . confirmed their previous reports that rabbits are plentiful still on most sections of the country, except where hunting, canning and sale have been done on a fairly large scale. Reports of reduction of rabbits by disease have come from two small sections only."

3. UNITED STATES AND ALASKA (C.E.)

UNITED STATES.

The U.S. Bureau of Biological Survey again cooperated in the enquiry by sending questionaires out to Game Protectors and other agents in those states where snowshoe rabbits occur. We owe thanks to the former Chief, Dr. J. N. Darling; the present Chief, Dr. Ira N. Gabrielson; the Chief of the Division of Wildlife Research, Dr. W. B. Bell; and to Dr. H. H. T. Jackson of the Section of Wildlife Surveys, who handled the enquiry. A particularly large number of well-arranged replies came from the Michigan State Department of Conservation. Questionnaires were also sent, through courtesy of the U.S. Forest Service, to a number of National Forests. For this assistance we have to thank Mr. C. E. Rachford, formerly acting Chief; and Mr. C. M. Granger, the acting Chief of the Service. Altogether 97 replies dealing with the United States were received, nearly all of which contained information of high grade value. Most of them were accompanied by marked maps or sketch maps of the observer's areas, or of the exact locations of snowshoe rabbits. This feature enabled mapping to be done with considerable speed and accuracy, and it greatly reduced errors due to uncertainty about boundaries. Copies of the questionnaire replies are on file with the Survey at Washington, and at Oxford.

TABLE 2.

State of the Snowshoe Rabbit Population in the United States, 1934-36.
(Number of squares)

	No. of observers	Total no. of squares	Increase	% Increase	Decrease	% Decrease	No change	% No change	Epidemic	% Epidemic
Maine	2	40	40		0		0		0	
New Hampshire	3	7	3-6		1-4		0		0	
Vermont	1	6	6		0		0		0	
West Virginia	1	2	0		2		0		0	
Michigan	18	51	10-23		12-25		13-21		2	
Wisconsin	2	6	0		6		0		0	
Minnesota	2	14	0		14		0		3	
Total (*L. americanus*)	29	126	59-75	**47-60**	35-51	**28-40**	13-21	**10-17**	5	**4**
Total 1934-35	6	40	2	**5**	38	**95**	0	**0**	5	**13**
Washington	9	29	7		7		15		0	
Idaho	5	11	0		5		6		0	
Montana	19	46	13-25		1-5		16-31		1	
Oregon	1	25	0		0		25		0	
Wyoming	9	17	6-12		0		5-11		4	
California	2	5	0		0		5		0	
Utah	5	13	7		0		6		0	
Colorado	2	15	12		0		3		0	
Total (*L. bairdi* and *washingtoni*)	52	161	45-63	**28-39**	13-18	**8-11**	8 -102	**50-63**	5	**3**
Total 1934-35	19	88	25	**24-35**	27	**23-31**	49	**43-56**	8	**9**

The results were mapped on the same system as those for Canada, (except that the areas are on the average larger) and are shown in Table 2 and Figs. 1 and 2. The distribution of snowshoe rabbit species is shown by broken lines. These follow the map published by E. W. Nelson (1909, *North American Fauna*, No. 29, p. 85). Although they disagree in detail with some of our reports, it was not possible to attempt a thorough revision; but they are inserted just to show the general distribution limits. In the Table, border line squares are counted according to the state in which the observation was made, irrespective of the proportion in which the state boundary cuts them. In one or two instances where observations from two sides of the boundary fall into the same square, the count is halved between the two states.

We wish to thank Mrs. Jane Baden-Powell for preparing the outline maps.

The *Eastern area* is inhabited by various sub-species of *Lepus americanus,* here treated as a biological unit. They occupy in reality at least three sub-regions which have no population contact, and which are therefore good indices of any widespread regional fluctuation. The number of observers was much larger than in 1934-35; the regions were a little different. Several points stand out clearly from the results. New England, after its crash two or three years back, and the resulting period of great scarcity in 1934-35, had begun to recover during 1935-36. The regions south of the Great Lakes mostly reported decrease and great scarcity, but in several areas *e.g.* in Michigan, recovery appears to have begun. Whatever their relation in detail may be to the Canadian ten-year cycle, there seems to be little doubt that the *Lepus americanus* populations of the United States fluctuate violently, and that they are now distinctly recovering from the last crash, without being as yet very abundant anywhere.

The *Western area* occupied by subspecies of *Lepus bairdi* (on the Rockies and plateau regions) and *L. washingtoni* (on the Pacific coast regions) is treated as a unit, since it would be unwise to attempt at present to define an arbitrary line of boundary between the two species in Washington. These western snowshoe rabbits live often in a very restricted forest zone on the mountains, and much useful information about habitat and height distribution is contained in the reports. They must, in general, live much more in completely isolated populations of comparatively limited extent than do the eastern species.

The conclusion tentatively drawn in the last report, that these western populations neither have such violent fluctuations, nor any cycle of regional extent, is fully borne out by the present enquiry, based on wider areas and more observers. The extremely high proportion of "no change" reports is again striking. The "no change" percentages for Canadian snowshoe rabbits in the five enquiries since 1931 have been: 5-10, 4-11, 8-22, 6-17, 8-21. In the Eastern United States in the last two years: 0, 10-17. In the Western United States: 43-56, 50-63. The proportion of "no change" is some index of the degree of fluctuation in a region. Many of the reports of "more" or "less" in this Western area refer to very slight changes in numbers. Also some of the observers state fluctuations to be slight compared to what it is in the North.

A final comment concerns the size of observers' areas. The average size is larger on the United States maps than on the Canadian ones. This is mainly due to the observers being men in charge of large areas of country, as with game wardens and foresters. Very few reports refer to small areas, and it is believed that the mapping is fairly comparable and uniform within the United States, though not exactly comparable with that for Canada, in which there are considerable more reports from small areas. The effect of using large areas such as whole National Forests is to introduce a rather more serious error if the report is incorrect. It is thought that most of the observers are well qualified to give an opinion and that this has been done with care. A fuller account will be published elsewhere.

ALASKA.

The U.S. Bureau of Biological Survey transmitted three reports from observers in Alaska, which in 1934-35 had a high abundance of snowshoe rabbits in many areas. Mr. Frank Dufresne, Executive Officer of the Alaska Game Commission reports increase still general, but that sudden decrease had been noted on the Upper Tanana River in the early spring months of 1936. In a letter to the Canadian National Parks Bureau, 30 July, 1936, he states: "Reports from our representatives throughout Alaska indicate that the peak of the rabbit cycle in the Yukon Territory above Dawson was reached

Fig. 3. Epidemics among snowshoe rabbits. Dotted areas are groups of squares overlapped by observers reporting EPIDEMICS in 1935-36. Larger dots are Hudson's Bay Company posts, etc. (1927 map.) Broken lines show main vegetation zones. Thick black lines are Province boundaries.

last summer (1935) and that practically no rabbits can be found there now. From Dawson South to the confluence of the Tanana with the Yukon, the peak seems to be at its highest point this season (1936). From there to the mouth of the Yukon, our reports indicate that the cycle of highest abundance will not be reached until next season." In the absence of details for 1935-36, the areas were mapped as circle of 50 mile radius round the same points as in Mr. Dufresne's report for 1934-35.

Mr. Otto W. Geist, University of Alaska, reports (11 January, 1937) that "rabbits in this section (25 miles radius round Fairbanks) are more numerous now than I ever observed before. I have heard that in the region about Flat, Iditarod, one man who is a good observer, killed only one this winter." He also confirms the increase during 1935-36.

Mr. Charles H. Rouse, U.S. Biological Survey, reports (22 October, 1936) also for the Fairbanks area (mostly three miles west of the settlement) "More abundant. There was no sudden decrease . . . during the last 12 months. A number of rabbits were killed during the fall, winter and spring of 1935-36. Several were found to be heavily infested with tapeworms, which were tentatively identified as *Cittotaenia ctenoides*. It was also reported to me that many rabbits were found dead during January and February, 1936, under haycocks which had been left in the fields at the University Farm and the Dana Ranch. It was thought these animals froze to death . . ." Mr. Geist

noticed rabbits sluggish on June 10th, 1936. They were sitting or moving about slowly, and 12 were secured in little over an hour. This was attributed to the abnormal heat.

The main indications are that Alaska has maintained high abundance for one or two years after Canada has had its crash, and that there are a number of signs of approaching crash in Alaska.

4. SUMMARY.

595 reports were received from Canada, one from Anticosti and one from Newfoundland. The percentage by area reporting increase has lessened steadily during the five years 1931-36. Decrease values have grown in the reverse manner. Epidemics, after a high incidence in 1934-35 show signs of abating except in the Quebec Peninsula. Although conditions are reported varying from abundance to recovery after extreme scarcity, in most places 1935-36 has witnessed conditions either at or very close to the bottom of the cycle. Abundance is still reported from Anticosti and Newfoundland.

97 reports were received from the United States, and 3 from Alaska. In the Eastern area of *Lepus americanus* the cycle appears to have reached its minimum and there is recovery in places. In the Western area of *Lepus bairdi* and *L. washingtoni* fluctuations were not well-marked, a high proportion of areas reporting "no change". In Alaska, populations were still at high density in most areas, but there were local reports of decrease setting in.

ERRATA.

In the last report (*Canadian Field-Naturalist*, 1936, Vol. 50) there are four corrections to be made.

1. p. 73. "573 reports" should be "681 reports".
2. p. 78, Table 3. "47407" (martens in 1923-24) should be "46407".
3. p. 79, Fig. 4. The lowest value shown on the diagram, for percentage decrease by area in 1931-32 should be 3%, not 0%.
4. p. 81. Summary. "673 reports" should be "681 reports".

A STUDY OF THE HOME LIFE OF THE EASTERN WHIP-POOR-WILL
(*Antrostomus vociferus*)

By HENRY MOUSLEY

IF EVER A BIRD of this species ought to have carried away its eggs and young in the supposed orthodox fashion, *i.e.* in its mouth, the present one should have done so, but it did not, notwithstanding the fact that its home was visited constantly and many photographs taken, not only by myself, but also by Mr. L. M. Terrill who actually flushed the bird off her egg, although I was just behind him at the time and so had the pleasure of witnessing the event. Speaking of this supposed method of removing the eggs or young in its mouth, if its home is being too much invaded by strangers, I am beginning to wonder if there really is anything to it, since I can find no concrete evidence of anybody having actually seen the bird in the act of performing the feat, all the well-known authors of books on birds that I have consulted—with the exception of Coues—invariably content themselves by saying, it is said, that the parent bird removes its eggs or young in its mouth, not one of them, apparently, being able positively to affirm that this is the orthodox mode of transportation, or that anybody, has ever actually seen it enacted, and the same remarks apply equally well to the Nightjar of Europe (*Caprimulgus europaeus*) the bird which so appealed to Gilbert White's fancy. Bendire in his *Life Histories of North American Birds,* 1892-5, states, that after the young are hatched the mother is more likely to remove these than the eggs but it seemed unlikely that these are carried in the mouth. Coues on the other hand in his *Key to North American Birds,* 1927, says both eggs and young are often removed in the parent's mouth if disturbed, as a cat carries off her kittens,—a practice, however, habitual to his curious family of birds.

In the present case, the young were not found in a new spot until the seventh day after hatching, by which time they were well able to run, and what I prefer to imagine for the

Whip-poor-will about to cover her two young.

Whip-poor--will incubating (good example of camouflage).

present is, that the female as soon as the young are able to move about entices them away if the nesting site has been too much invaded by strangers, but of this subject—more anon. For the present, I am viewing the matter with an open mind, for so many things are apt to happen in the bird world that it seems dangerous to be sceptical about anything. It was on May 21 of the present year (1933) that my friend flushed the female off her first egg—late in the afternoon—at the extreme corner of a small wood near St. Hubert, Quebec, the nesting site as is usual with these birds, being a well-drained and dry one. The following day, I again visited the site, there still being only the one egg in the nest, or rather I should say, on the large leaf which did duty for a nest, so I had to pay another visit the day after, the 22nd, when the second egg was laid, thus confirming what Bendire says, that the two eggs are laid on alternate days. From now onwards to the end of the first week in June, the bird was not disturbed in any way, but on the 8th, 10th, and 11th, the nest was visited each day, the latter date proving to be the one on which both young were found hatched out, although it is possible that one of them may have hatched on the day of the 10th—after my visit—in which case the incubation period would be nineteen days for each egg—this being the period given by Mr. J. H. Gurney for the European Nightjar—as one of them had a day's start over the other, incubation commencing as Bendire says, with the first egg laid.

Some little corroboration of this may be gathered from the fact that when I visited the nest on the 11th, at 9.45 a.m., half the shell of one egg only remained near the young, just as if one egg only had recently hatched out, the half shell of which the female had so far only had time to remove, the other half still remaining for future disposal. Photographs of the young were taken on this day as well as on the 13th, and 18th, one bird as usual being somewhat larger than the other. It was on the latter date when the young were seven days old and able to run—as already mentioned—that I failed to find them in the old spot, but after a good search, the female was eventually flushed off them just forty-two feet away. This being a very bad spot for photography, I removed them to the old nesting site and took pictures of them there, and as the female had followed and was near at hand, I did not trouble to take them back to where I had found them, but left them quietly resting in their former home. Returning on the 20th, or two days later, they were again missing, but as on the 18th, the female was again eventually flushed off them, about forty feet from the original nesting site. There they were found again three days later, on the 23rd, but the day following yet another camping ground had been chosen, the site in this case being thirty feet from the old original one, and here they remained until the next day, June 25, the last one on which I visited them, as by this time they were able to fly, the more robust of the two taking a flight of some fifteen feet soon after my arrival, so I concluded it would be useless to follow them up any longer, in fact, they and the parents moved right off the ground very shortly after—so I heard.

In view of the above facts, is it possible or very likely that the female removed her offspring every time in her mouth, when they were well able to move by themselves? I much prefer to assume that she led or enticed them away each time—to pastures new.

Having now discussed the movements of the young, let us go back for a moment and look into the behaviour of the parents. To begin with, the male was never actually seen at the original nesting site, but I flushed him once some hundred feet or more away from it. He, however, put in an appearance at one of the new sites on June 24, making a great demonstration, but this I shall refer to again—later on. As regards the female, she was always found either incubating the eggs or brooding the chicks, but I did not commence taking photographs of her until June 3, some ten days after incubating had been in progress.

Apparently, the close proximity of the camera did not appear to worry her very much, for I obtained several pictures in a very short time, but it is interesting to note that only one of these depicts her having landed directly on the eggs, all the others showing the latter exposed, with the bird in varying degrees of proximity to them. Regarding this matter, I find Mr. Ralph Chislett in his *Northward Ho! for Birds*, 1933, when speaking of his experiences in Derbyshire, England, with the European Nightjar. (*Caprimulgus europaeus*) says, on page 15, "Wandering attentions are suddenly and completely concentrated by a slight sound of wings and by the almost simultaneous flop of the bird upon the dead bracken. Probably it has alighted a few inches away from the eggs

Whip-poor-will about to cover her two eggs.

Whip-poor-will about to cover her two young.

or young. For a moment it stands motionless, then shuffles on short legs across the intervening inches to crouch on its treasures." This description so exactly represents the behaviour of the bird in the present study, that I have taken the liberty of borrowing and copying it verbatim. As often happened, she adopted the so-called old trick or tactics—when trying to lure me away from the eggs or young—of trailing one or both wings on the ground, or flapping them up and down as she perched—usually crosswise—on a nearby branch, often at the same time accompanying this display with a very rapid motion of the mandibles up and down, which for all the world looked as if she was chattering to herself.

Possibly, the best display was given on the 24th, when the male joined his mate—already referred to—in venting their displeasure at my intrusion. It will no doubt be remembered that this was the last day but one that I spent with them, the young being then thirteen days old and quite capable of making themselves heard, so much so, that I had nothing to do but carry one around in my pocket, produce it at intervals, make it squeak, and presto! a veritable display of fireworks would take place on the part of the parents, both coming at me as they wheeled in all directions, sometimes perching on branches of trees and thereon going through all the same antics with wings and mandibles—as already described. I had only one good chance of snapping the male as he perched for a moment on a branch, but as ill luck would have it, I was not ready with the camera, and the opportunity never came again. I did manage, however, to get some interesting pictures of the female on this, and an earlier occasion, as she sat perched both crosswise and lengthwise on a branch.

In conclusion, it is hoped that the present short study may have added something of interest in the home life of these rarely seen, but often heard, birds.

NOTES AND OBSERVATIONS

BANDED EUROPEAN WIDGEON RECOVERED IN PRINCE EDWARD ISLAND.—On the morning of September 26, 1936, Mr. Harry MacLeod of Hopefield, Prince Edward Island, shot a banded duck at "McLures Mill Pond" which is also locally known as 'Floating Bridge', about two miles from Hopefield in southern Kings County, Prince Edward Island. The band the duck was carrying bore the following inscription:—

MUS. NAT. ♣
REYKJAVIK 684
ICELAND

According to information received from Mr. Magnus Bjornsson of "The Bird Ringing Scheme of the Museum of Natural History", Reykjavik, Iceland, the band described above was placed on a young European Widgeon (*Marcca penelope* L.) on August 4, 1936, at Sandur "in the valley of ADALDALUR, North Iceland".—HOYES LLOYD.

A WINTERING TOWHEE AT OTTAWA.—A Red-eyed Towhee, (*Pipilo erythrophthalmus erythrophthalmus* Linnaeus), appeared at the residence of Mr. Alex. Roger, Billing's Bridge, near Ottawa, in mid-November, 1936. It was seen daily and was given food from that time until January 14, 1937. It was not seen on the 15th, and was found dead on the 17th, having apparently come to grief by flying against the wall of the house. When the specimen was received three days later it was found to be in first class condition of flesh. It was a male—and the first known winter record for Ottawa.—HOYES LLOYD.

Holcus mollis IN CANADA.—In checking over the grasses in the herbarium of the Division of Botany recently a specimen of *Holcus mollis* L. from British Columbia was discovered among numerous sheets of *H. lanatus* L. The latter, known as velvet grass, or in Britain as Yorkshire fog, has been introduced in several parts of this country and has become well-established especially in the eastern and western coastal provinces. The closely related *H. mollis*, however, is not nearly as widespread on this continent. The first record appears to be from Eureka, California (*Amer. Jour. Bot.* 2:304, 1915 as *Notholcus mollis* (L.) Hitchc.). Later reports indicate that it is rapidly spreading and its range now extends, on the west coast, from California to Washington with isolated stations in the eastern States. The plant from British

Columbia, which constitutes the only record, as far as we know, for Canada, was collected at Langley Prairie by Mr. H. Groh on September 5, 1930. It is easily distinguished from *H. lanatus* by the longer and geniculate, rather than hooked, awn of the staminate lemma, the almost glabrous leaf-sheaths and deep-growing rhizomes. In this latter characteristic the grass possesses the potentialities of a serious weed pest.—W. G. DORE.

* Contribution No. 496 from the Division of Botany, Experimental Farms Branch, Department of Agriculture, Ottawa, Canada.

OTTAWA FIELD-NATURALISTS' CLUB PROGRAMME OF SPRING EXCURSIONS

The Excursions Committee plans to have sufficient leaders to cover each of the more popular branches of natural science at each of the excursions, and all members of the Club who can possibly attend the excursions are requested to assist the leaders in so far as they can. The dates of the excursions are as follows:

APRIL 17—Hog's Back. Meet at Bronson Ave. Bridge, at 3.00 p.m.

MAY 1—McKay Lake. Take Lindenlea street car to corner of Maple Lane and Acacia Ave. Meet at 3.00 p.m.

MAY 15—Pink Lake. Bus trip. Meet at Chateau Laurier at 2.30 p.m. All intending to take this trip please notify Miss Whitehurst by Friday, May 14.

MAY 22—Fairy Lake. Meet at Wrightville terminus of Hull Electric Railway at 3.00 p.m.

MAY 29—Arboretum. Meet at main gate of Arboretum on Prescott Highway at 3.00 p.m.

JUNE 12—Britannia. Meet at Britannia terminus of O.E.R. at 3.00 p.m.

JUNE 26—Black Rapids. Boat trip on Dr. McElhinney's Yacht "Summertime". As accomodation is limited to 30, please notify Mr. Lanceley by Friday, June 25.

On the May 15 and June 26 trips, a small charge will be made to cover expenses.

W. H. LANCELEY,
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Rideau 1196J.

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Vice-Chairman,
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1936-37

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A PRELIMINARY LIST OF THE BIRDS OF HILLSIDE BEACH, LAKE WINNIPEG, MANITOBA

By FRED J. ROGERS, HILLSIDE BEACH, MANITOBA

HILLSIDE BEACH is a summer resort on the Victoria Beach line of the C. N. R. and is located on Lake Winnipeg approximately 70 miles north of the city of Winnipeg.

The region is in reality a large peninsular area roughly 200 miles in extent, formed by Traverse Bay from the mouth of the Winnipeg River on the east, and the lower part of Lake Winnipeg from Beaconia on the west.

The area under discussion is characterized by mixed woods, coniferous forests, tamarck and black spruce swamps, with many hills and ridges clothed with Banksian pine, or stunted aspens and small shrubs. While generally classified as being in the Canadian zone, the region is from all appearances a transitional zone between the true Transition Zone of the Prairie—Aspen Grove Association and the Canadian Zone, including the coniferous forest founded on the Pre-Cambrian formation. Thus it will be seen in the following notes that the resident bird population is a large one, resulting from the region's being the southern boundary of the northern spruce forest, which latter acts as an efficient barrier to those species not habitually found in the Canadian Zone. It should be noted also that the area under discussion occupies the Manitoba Lowlands Belt—the lowest altitude in the province, with Lake Winnipeg 713 feet above sea-level.

Gavia immer. COMMON LOON. — Casual on migration.

Colymbus holboelli. HOLBOELL'S GREBE. — Common on migration.

Colymbus nigricollis. EARED GREBE. — Casual on migration.

Podilymbus podiceps. PIED-BILLED GREBE. — Common. Breeds in marsh.

Pelecanus erythrorhynchos. WHITE PELICAN. — Rare. Two noted circling and flying south in spring of 1933.

Phalacrocorax auritus. DOUBLE-CRESTED CORMORANT. — A common migrant, but the main flight is apparently west of here towards Lake Manitoba.

Ardea h. herodias. GREAT BLUE HERON. — Common migrant. Casual in summer. One old nest found on Elk Island five miles north of here summer of 1934 resembles type described as built by this species.

Botaurus lentignosus. AMERICAN BITTERN. — Abundant breeder.

Cygnus columbianus. WHISTLING SWAN. — Very rare. Noted twice.

Chen h. hyperborea. LESSER SNOW GOOSE. — Common migrant, with the Blue Goose in mixed flocks.

Chen caerulescens. BLUE GOOSE. — A common migrant in company with the Snow Goose.

Anser albifrons. WHITE-FRONTED GOOSE. (gambeli?). — Rare. Noted twice.

Branta c. canadensis. CANADA GOOSE. — Common on migration. Of late years this species together with Blue and Snow Geese has increased in numbers during the spring migrations.

Mergus americanus. AMERICAN MERGANSER. — A common migrant.

Mergus serrator. RED-BREASTED MERGANSER. — Common on the lake in spring. Casual in summer.

Lophodytes cucullatus. HOODED MERGANSER. — A rare migrant. Noted once.

Anas platyrhynchos. MALLARD. — Common. An occasional breeder.

Chaulelasmus streperus. GADWALL. — Casual migrant.

Mareca americana. BALDPATE. — A common migrant.

Nettion carolinense. GREEN-WINGED TEAL. — Uncommon migrant.

Querquedula discors. BLUE-WINGED TEAL. — Common migrant. Occasional breeder.

Spatula clypeata. SHOVELLER. — Common spring migrant.

Dafila acuta. PINTAIL — Common on migration, and an occasional breeder.

Nyroca americana. REDHEAD. — Casual migrant.

Nyroca valisneria. CANVAS-BACK. — Common migrant.

Nyroca affinis. LESSER SCAUP DUCK. — Abundant in spring. Casual in summer.

Nyroca collaris. RING-NECKED DUCK. — A regular migrant.

Glaucionetta clangula americana. AMERICAN GOLDEN-EYE. — Common on migration.

Charitonetta albeola. BUFFLE-HEAD. — Casual on migration.

Melanitta deglandi. WHITE-WINGED SCOTER. — Rare migrant.

Cathartes aura septentrionalis. NORTHERN TURKEY VULTURE. — This species seems to be of regular occurrence here on spring migrations. A nest was found on Elk Island, five miles north of here, in a limestone cave on the lake shore several years ago by Shirley Brooks, Transcona, Man. The nest contained fledglings in August. Since then the caves have apparently not been used. In early June of 1934 three huge adults were noted together at this place perched in large dead aspens.

Circus hudsonius. MARSH HAWK. — Abundant. Breeds in marshes, and grassy meadows in the uplands.

Accipiter velox. SHARP-SHINNED HAWK. — A casual migrant.

Accipiter cooperi. COOPER'S HAWK. — Uncommon. One family of this species has persisted in nesting in a well-defined section of heavy woods. On June 1st, 1934, a nest was located containing five eggs. An old crow nest 25 feet up in the top of a small elm tree was used, and it was significant that a henhouse was situated less than 100 yards from the nesting tree. The unmarked bluish-white eggs are distinctive of this species as also its call notes, resembling somewhat the sounds one might make with a tin trumpet.

Astur a. atricapillus. EASTERN GOSHAWK. — A nest of this species was located by members of the Natural History Society of Manitoba on June 3, 1934, but failed of positive identification because of the viciousness with which the adult bird attacked. In company with my two brothers I identified the species and examined the nest on June 10. The adult attacked time and time again, but with the assistance of my brothers it was successfully beaten off. The nest, in the fork of a white birch 25 feet from the ground was made of sticks, lined with pieces of bark, and green aspen leaves. Two downy young, white, with black beaks, were in the nest on the tenth. The adult bird had a loud, vigorous call, resembling that of the Pileated Woodpecker, but shrill instead of smooth and rolling. No mate was seen on any occasion. The woods this species inhabited were of a mixed type, featuring white spruce, balsam fir, white birch and aspen poplar. It is to be noted also in this case that a flock of hens were being raised not more than a quarter of a mile away.

Buteo b. borealis. EASTERN RED-TAILED HAWK. — A common summer resident on burned-over land.

Buteo swainsoni. SWAINSON'S HAWK. — A casual migrant.

Buteo platypterus. BROAD-WINGED HAWK. — Commonest of the Buteos in summer, nesting on edge of poplar woods.

Buteo lagopus sancti-johannis. AMERICAN ROUGH-LEGGED HAWK. — A common spring migrant.

Haliaeetus leucocephalus alascanus. NORTHERN BALD EAGLE. — Rarely noted.

Falco peregrinus anatum. DUCK HAWK. — Casual on migration.

Falco c. columbarius. EASTERN PIGEON HAWK. — A casual migrant.

Falco s. sparverius. SPARROW HAWK. — Common summer resident.

Pandion haliaëtus carolinensis. AMERICAN OSPREY. — Of regular occurrence. Three nests known: one on Elk Island in heavy woods, and two in this district. One of the latter is in the extreme top of a jack pine near the junction of the spruce-pine association; and the other nest is in the top of a black spruce in a sphagnun swamp four miles away. All three nests are in use. A nest with five eggs was recorded May 25, 1931, forty feet up in the top of a large, dead aspen on waste land.

Bonasa umbellus togata. CANADA RUFFED GROUSE. — A variable resident. Some years it

is abundant, and other years scarce. It prefers the woods, and also the willows bordering sloughs and marshes.

Pediocecetes phasianellus. SHARP-TAILED GROUSE. — Fluctuates in numbers, but less so than does the Ruffed Grouse. It is much more wary than the latter species, and has a wider distribution, being found in all types of territory, except the heavy spruce forest.

Lagopus lagopus. WILLOW PTARMIGAN. — First recorded here winter of 1933-34 when large numbers appeared in southern Manitoba.

Perdix perdix. HUNGARIAN PARTRIDGE. — First recorded here winter of 1932-33 in small numbers, but none have been noted since severe winter of 1933-34 when heavy snows occurred.

Grus canadensis tabida. SANDHILL CRANE. — Casual migrant.

Rallus virginianus. VIRGINIA RAIL. — Not noted previous to summer of 1934, but apparently several pairs came in during the spring migrations of that year. A nest was located on Elk Island, June 23, 1934, containing ten eggs. The adult bird was observed from a distance of only three of four feet.

Porzana carolina. SORA RAIL. — Common. Breeds in the marshes.

Fulica americana. AMERICAN COOT. — Abundant breeder.

Squatarola s. cynosurae. AMERICAN BLACK-BELLIED PLOVER. — A regular migrant.

Oxyechus vociferus. KILLDEER PLOVER. — Abundant breeder, both on uplands and beaches.

Charadrius semipalmatus. SEMIPALMATED PLOVER. — Common migrant.

Charadrius melodus. PIPING PLOVER. — Common breeder, nesting on gravelled beaches.

Arenaria interpres morinella. RUDDY TURNSTONE. — A regular migrant.

Larus argentatus. HERRING GULL. — Spring visitor. Immatures in summer.

Larus delawarensis. RING-BILLED GULL. — Common visitor.

Larus pipixcan. FRANKLIN'S GULL. — Common in spring. Immatures in summer.

Larus philadelphia. BONAPARTE'S GULL. — A common migrant.

Hydroprogne caspia. CASPIAN TERN.—Once rare, but yearly becoming more common, and inclined to be a summer resident. Perhaps since prairie waters have been much reduced by drought this species has changed its migration routes.

Sterna forsteri. FORSTER'S TERN. — Common in spring. Casual in summer.

Sterna hirundo. COMMON TERN. — Common in spring. Casual in summer.

Chlidonias nigra. BLACK TERN. — Common. Breeds in the marshes.

Capella delicata. WILSON'S SNIPE. — Common. Breeds in the marshes.

Numenius americanus. LONG-BILLED CURLEW. — Rare. Two noted spring of 1933.

Micropalama himantopus. STILTED SANDPIPER. — Casual on migration.

Pisobia bairdi. BAIRD'S SANDPIPER. — Common migrant.

Pisobia minutilla. LEAST SANDPIPER. — Common migrant.

Pelidna alpina sakhalina. RED-BACKED SANDPIPER. — Casual on migration.

Ereunetes pusillus. SEMIPALMATED SANDPIPER. — Common on migration.

Crocethia alba. SANDERLING. — Uncommon migrant.

Totanus melanoleucus. GREATER YELLOWLEGS. — Casual on migration.

Totanus flavipes. LESSER YELLOWLEGS. — Common migrant.

Tringa solitaria. SOLITARY SANDPIPER.—Casual migrant.

Actitis macularia. SPOTTED SANDPIPER. — Common. Breeds on rocky shores in clumps of grass.

Lobipes lobatus. NORTHERN PHALAROPE. — Casual on migration.

Steganopus tricolor. WILSON'S PHALAROPE. — Casual migrant.

Zenaidura macroura. MOURNING DOVE. — A regular breeder.

Coccyzus erythrophthalmus. BLACK-BILLED CUCKOO. — Breeds regularly.

Strix v. varia. BARRED OWL. — Rare. Found in heavy mixed woods.

Cryptoglaux a. acadica. ACADIAN SAW-WHET OWL. — Casual resident. Heard calling in April on quiet moon-lit nights.

Bubo v. virginianus. EASTERN GREAT HORNED OWL. — Abundant resident in all heavy woods.

Nyctea nyctea. SNOWY OWL. — Rarely noted. Sometimes seen in spring on lake before break-up.

Surnia ulula caparoch. AMERICAN HAWK OWL. — Casual resident. Noted usually in early spring months.

Anstrostomus v. vociferus. EASTERN WHIP-POOR-WILL. — Abundant summer resident.

Chordeiles m. minor. EASTERN NIGHTHAWK. — Abundant breeder in Banksian pine zones. Two young noted on bare sandy ground July 14, 1932. The female played the broken wing stunt.

Archilochus colubris. RUBY-THROATED HUMMINGBIRD. — Abundant breeder. The usual nesting site is a small white birch tree covered with lichens. Average nesting date, June 14.

Megaceryle a. alcyon. EASTERN BELTED KINGFISHER. — Common on rocky shorelines of lake.

Dryobates villosus septentrionalis. NORTHERN HAIRY WOODPECKER. — An abundant resident in mixed woods.

Dryobates pubescens nelsoni. NORTHERN DOWNY WOODPECKER. — Abundant resident, but does not seem to be so common as *villosus.*

Picoides arcticus. AMERICAN THREE-TOED WOODPECKER. — Rarely noted, and then usually near heavy coniferous growth.

Picoides tridactylus. AMERICAN THREE-TOED WOODPECKER. — Rare. Noted once in early spring.

Sphyrapicus v. varius. EASTERN YELLOW-BELLIED SAPSUCKER — Common summer resident. Nests usually in holes of large aspens in living wood, and at considerable heights from the ground.

Coephloeus pileatus abieticola. NORTHERN PILEATED WOODPECKER. — Common in heavy aspen and black poplar woods.

Melanerpes erythrocephalus. RED-HEADED WOODPECKER. — Casual summer resident. Noted usually near telegraph lines.

Colaptes auratus luteus. NORTHERN FLICKER. — Abundant breeder. Its abundance here probably coincides with the abundance of ant colonies found on the sand ridges.

Tyrannus tyrannus. COMMON KINGBIRD. — Abundant breeder. Invariably nests in young bur oak trees.

Tyrannus verticalis. ARKANSAS KINGBIRD. — Casual spring migrant.

Myiarchus crinitus. CRESTED FLYCATCHER. — Commond breeder.

Sayornis phoebe. PHOEBE. — Common breeder. Nests early—end of May or first week of June.

Nuttallornis mesoleucus. OLIVE-SIDED FLYCATCHER. — Uncommon summer resident of black spruce swamp lands. One nest recorded June 17, 1933 containing three eggs. First record for Manitoba. Nest 25 feet up in a black spruce, and four feet out from the trunk on the end of a branch. Nest made of spruce twigs, and lined with *Usnea* (old man's beard moss); rather loosely constructed. Eggs of a rich creamy white, blotched with reddish-brown and lavender, mostly around larger end. They are quite similar to the common Kingbird's eggs in appearance.

Myiochanes virens. EASTERN WOOD PEWEE. — This species probably over-laps in range with *richardsoni* at this point. The latter species is the one generally recorded on provincial lists. *Virens* is a common summer resident.

Empidonax flaviventris. YELLOW-BELLIED FLYCATCHER. — Uncommon summer breeder. One nest recorded July 1, 1929, containing four eggs. Second recorded for the province. Female caught in hand as she sat on eggs in nesting cavity in the side of a large moss bank. Found nesting in sphagnum spruce swamp.

Empidonax t. trailli. ALDER FLYCATCHER. — A common breeder in willow thickets. Calls at four o'clock a.m. on June mornings, but is singularly quiet during the rest of the day.

Empidonax minimus. LEAST FLYCATCHER. — Abundant in all types of forest growth, except pure coniferous stands.

Otocoris alpestris. HORNED LARK. — A regular migrant, but only in small numbers. No breeding records.

Progne s. subis. EASTERN PURPLE MARTIN. — Common summer resident, nesting in dead aspens on cut-over or burned-over land.

Petrochelidon a. albifrons. CLIFF SWALLOW. — Casual migrant.

Hirundo erythrogastra. BARN SWALLOW. — Common breeder. Three nests with eggs noted in the loft of a stable June, 1934. Two families raised successfully. The writer was once "attacked" by a Barn Swallow after examining its nest, and was forced to dodge and cower as the pugnacious bird repeatedly swooped.

Iridoprocne bicolor. TREE SWALLOW. — Com-

mon summer resident. Takes kindly to bird boxes.

Riparia riparia. BANK SWALLOW. — Common breeder along the lake shore sand-cliff facings.

Stelgidopteryx serripennis. ROUGH-WINGED SWALLOW. — Rare visitor.

Cyanocitta c. cristata. BLUE JAY. — Common resident. At times a definite migrational movement is noted.

Perisorius c. canadensis. CANADA JAY. — A common resident in the purer stands of swamp conifera.

Corvus corax principalis. NORTHERN RAVEN. — A lone specimen was observed in November, 1934—the first record I have for this species here. Several more have been noted during the winter of 1934-35.

Corvus b. brachyrhynchos. EASTERN AMERICAN CROW.—Probably not unusually abundant here, but the presence of good nesting sites in willows bordering the marshes where wild-fowl nest tends to maintain their number.

Penthestes atricapillus. BLACK-CAPPED CHICKADEE. — Common resident. Nest containing eight eggs found May 28, 1932. The nest was made of brown rabbit's fur, shreds of bark, moss, etc.

Penthestes h. hudsonicus. HUDSONIAN CHICKADEE. — Seldom noted. Seen in black spruce swamps.

Sitta c. carolinensis. WHITE-BREASTED NUTHATCH. — Uncommon resident.

Sitta canadensis. RED-BREASTED NUTHATCH. — With increased knowledge of bird distribution in this district it is found that this species is more commn than *carolinensis.* Also it appears to need reclassifying as a permanent resident species instead of the present classification of summer resident, in view of the several winter records here and elsewhere in the province. A nest was noted on Elk Island June 23, 1934, in balsam fir and birch woods. Female seen carrying insect food to young, the latter calling from the nesting cavity 20 feet up in a dead birch stub. The entrance was coated with balsam gum (see Reed's Pocket Guide).

Certhia familiaris americana? EASTERN BROWN CREEPER. — Common summer resident in poplar woods of heavy growth.

Troglodytes aedon. HOUSE WREN. — Common breeder.

Nannus h. hiemalis. EASTERN WINTER WREN. — Common breeder in black spruce swamps, and heavy poplar woods. Nest found with young ready to fly, under overhanging earth on roots of upturned tree. First record for Manitoba. Nest placed on an earth-covered root; made of green moss, and lined with wren feathers. Noted July 7, 1930. Nest with three eggs found June 13, 1934.

Cistotherus stellaris. SHORT-BILLED MARSH WREN. — Found breeding here in 1930, and regularly since in dry situations in marshes. Colonies also located at Victoria Beach and Elk Island. They lay from five to seven eggs in a clutch.

Telmatodytes palustris dissaeptus? PRAIRIE LONG-BILLED MARSH WREN. — Parallels *stellaris* here in distribution, but is usually found close to or over water in heavy vegetation. Both species build many sham nests, but these are loosely constructed, and contain no lining as compared with the compact and well-lined breeding nests. Colonies of both species also noted in sloughs of the uplands which remain full of water during the month of June, at least.

Mimus. p. polyglottos. EASTERN MOCKINGBIRD.— An influx of this species into Western Canada at widely scattered points in 1928 resulted in this record in May of that year. Several subsequent records in the province serve to confirm the identification. This eye-sight record is the first one for the province. Verified by three other eye-witnesses.

Dumetella carolinensis. CATBIRD. — Abundant breeder in shrubby thickets.

Toxostoma rufum. BROWN THRASHER. — A rare visitor.

Hylocichla f. fuscescens. VEERY. — Abundant breeder in light woods.

Hylocichla ustulata swainsoni. SWAINSON'S THRUSH. — Common breeder.

Hylocichla guttata faxoni. EASTERN HERMIT THRUSH. — Common summer breeder. Occurs almost exclusively in Banksian pine zones in the breeding season. A nest with four eggs was found on June 3, 1934.

Turdus migratorius. EASTERN ROBIN. — Abundant migrant. Uncommon breeder.

Sialia s. sialis. EASTERN BLUEBIRD. — An uncommon visitor.

Sialia currucoides. MOUNTAIN BLUEBIRD. — Rare. First recorded April 27, 1934.

Regulus s. satrapa. EASTERN GOLDEN-CROWNED KINGLET. — A regular migrant, earlier than *calendula.*

Corthylio c. calendula. EASTERN RUBY-CROWNED KINGLET. — Regular migrant. One pair found nesting on June 14, 1933, in spruce woods. Nest containing nine eggs was made of moss, twigs, leaves and plant down, lined with feathers. Nest placed in a large black spruce 30 feet from the gound.

Anthus rubescens. AMERICAN PIPIT. — Regular spring migrant. Noted usually on sandy beaches.

Anthus spraguei. SPRAGUE'S PIPIT. — Rare breeder.

Bombycilla garrula. BOHEMIAN WAXWING. — Of rare occurrence, even when they are reported in sizable flocks in other areas in winter.

Bombycilla cedrorum. CEDAR WAXWING. — Very abundant breeder. Nests in second-growth scrub poplar, and also in small willows bordering sloughs and upland meadows.

Lanius borealis. NORTHERN SHRIKE. — Casual winter visitor.

Lanius ludovicianus subspecies? LOGGERHEAD SHRIKE. — A casual spring migrant only. Apparently does not breed here because of almost complete absence of thorn trees. *L. l. migrans* is the form expected here.

Vireo olivaceous. RED-EYED VIREO. — Abundant breeder.

Vireo flavifrons. YELLOW-THROATED VIREO. — Casual visitor.

Vireo s. solitarius. BLUE-HEADED VIREO. — Uncommon visitor.

Mniotilta varia. BLACK AND WHITE WARBLER. — Common summer resident in heavy poplar woods. Nest found June 19, 1930, with four eggs. Nest made of strips of dry aspen bark, lined with finer grasses, and shaped similarly to the nest of the Ovenbird. Eggs also similar to those of latter species.

Vermivora ruficapilla. EASTERN NASHVILLE WARBLER. — Common breeder in grassy woodlands

Vermivora c. celata. EASTERN ORANGE-CROWNED WARBLER.—Uncommon migrant. Suspected breeder in Banksian pine zones.

Vermivora peregrina. TENNESSEE WARBLER. — Casual summer resident of black spruce swamps.

Dendroica tigrina CAPE MAY WARBLER. — A regular migrant in small numbers.

Dendroica a. aestiva. EASTERN YELLOW WARBLER. — Abundant breeder.

Dendroica c. coronata. EASTERN MYRTLE WARBLER. — Abundant migrant. Casual breeder in Banksian pine zones. Nest found June 3, 1934, containing three eggs. Nest built of small twigs and fibres, lined with brown feathers; placed in crotch of small pine seven feet up.

Dendroica magnolia. MAGNOLIA WARBLER. — Common breeder in all coniferous growth, but prefers small balsam fir.

Dendroica pensylvanica. CHESTNUT-SIDED WARBLER. — Common breeder in hazel shrubbery on sand ridges.

Dendroica castanea. BAY-BREASTED WARBLER. — Casual spring and summer migrant.

Dendroica striata. BLACK-POOL WARBLER. — Casual spring migrant.

Dendroica fusca. BLACKBURNIAN WARBLER. — Abundant breeder in all coniferous growth. One of the commonest summer residents here.

Dendroica virens. BLACK-THROATED GREEN WARBLER. — Common summer resident of coniferous growth.

Dendroica p. palmarum. WESTERN PALM WARBLER. — Casual on migration.

Seiurus aurocapillus. OVENBIRD. — Abundant breeder in light woods. Nest found with five eggs June 20, 1930.

Seiurus noveboracensis notabilis ? GRINNELL'S WATER-THRUSH. — Uncommon summer resident near wet marshes.

Oporornis philadelphia. MOURNING WARBLER. — Common summer resident of light woods.

Geothlypis t. trichas ? NORTHERN YELLOW-THROAT WARBLER. — Abundant breeder on edges of marshes, and grassy places in the uplands.

Icteria virens longicauda. LONG-TAILED CHAT. — One recorded June 27, 1933. Noted in brush on edge of clearing in uplands.

Heard it mocking the Robin and Oriole, beside emitting other odd noises. No sign of nest was discovered to denote a breeding pair.

Wilsonia p. pusilla. WILSON'S WARBLER. — Casual on migration.

Wilsonia canadensis. CANADA WARBLER. — Abundant summer resident in light woods.

Setophaga ruticilla. AMERICAN REDSTART. — Abundant breeder. Nests in crotches of poplar saplings, and usually about eight feet from ground. Also nests in birch, but at heights of from ten to thirty feet.

Passer domesticus. HOUSE SPARROW. — Uncommon, but tends to increase with settlement. Spring migrants range north early, probably from the city of Winnipeg.

Dolichonyx oryzivorus. BOBOLINK. — Has become common during the past few years. Associates in Marsh Wren (*C. stellaris*) Habit here, and also at Victoria Beach and Elk Island marshes.

Molothrus a. ater. COWBIRD. — Common parasitic species. Noted catching young grasshoppers in 1934.

Xanthocephalus xanthocephalus. YELLOW-HEADED BLACKBIRD. — Yearly becoming more common. Noted at Victoria Beach and Elk Island marshes also.

Agelaius phoeniceus, subspecies? RED-WINGED BLACKBIRD. — Abundant breeder in marshes and wet upland sloughs.

Sturnella neglecta. WESTERN MEADOWLARK. — Not common, but odd pairs are found in dry fields adjacent to marshes.

Icterus galbula. BALTIMORE ORIOLE. — Casual breeder.

Euphagus carolinus. RUSTY BLACKBIRD. — Abundant migrant.

Euphagus cyanocephalus. BREWER'S BLACKBIRD. — Casual visitor only.

Quiscalus quiscula aeneus. BRONZED GRACKLE. — Common in spring. Casual in summer.

Piranga erythromelas. SCARLET TANAGER. — Fairly regular summer resident. Prefers heavy woods bordering on the lakeshore.

Hesperiphona v. vespertina. EASTERN EVENING GROSBEAK. — Uncommon winter wanderer noted only a few times here.

Pinicola enucleator leucura. CANADIAN PINE GROSBEAK. — Of regular winter occurrence.

Hedymeles ludovicianus. ROSE-BREASTED GROSBEAK. — Common breeder in balsam fir zones.

Carpodacus p. purpureus. EASTERN PURPLE FINCH. — Regular summer resident in small numbers.

Loxia leucoptera. WHITE-WINGER CROSSBILL. — Of rare occurrence.

Ancanthis l. linaria? COMMON REDPOLL. — Common winter visitor.

Spinus t. tristis. EASTERN GOLDFINCH. — Common summer resident.

Spinus pinus. PINE SISKIN. — Irregular on spring migrations.

Plectrophenax n. nivalis. COMMON SNOW BUNTING. — Regular winter visitor.

Calcarius l. lapponicus. LAPAND LONGSPUR. — Migrates in small numbers. Noted on lakeshore in spring.

Calcarius pictus. SMITH'S LONGSPUR. — A rare migrant. Noted only a few times in small numbers.

Pooccetes gramineus confinis. WESTERN VESPER SPARROW. — Common breeder in fields of uplands.

Passerculus sandwichensis subsp? SAVANNAH SPARROW. — Common on edges of wet marshes.

Passerherbulus caudacutus. LECONTE'S SPARROW. —Uncommon summer resident. Nest recorded July 1, 1930, containing four eggs. Nest located in wet marsh in clump of grass; made of fine grasses, unlined.

Zonotrichia querula. HARRIS' SPARROW. — Regular migrant only.

Zonotrichia l. leucophrys. EASTERN WHITE-CROWNED SPARROW. — Common on migration.

Zonotrichia albicollis. WHITE-THROATED SPARROW. — An abundant breeder in coniferous zones, and brushy hillsides.

Spizella a. arborea. EASTERN TREE SPARROW. — Common on migration.

Spizella passerina. CHIPPING SPARROW. — Common spring migrant. Breeds in Banksian pine zones.

Spizella pallida. CLAY-COLOURED SPARROW. — Abundant breeder in low shrubbery.

Junco hyemalis. SLATE-COLOURED JUNCO. — Common breeder in pine zones.

Melospiza m. melodia. EASTERN SONG SPARROW. — Abundant breeder in shrubbery wastes and edges of marshes.

Melospiza l. lincolni. EASTERN LINCOLN'S SPARROW. — Regular migrant.

Melospiza georgiana. SWAMP SPARROW. — Common summer resident in marsh.

Passerella i. iliaca. EASTERN FOX SPARROW. — A common early spring migrant with a loud clear song.

Pipilo e. erythrophthalmus. EASTERN TOWHEE. — Rare visitor. Noted once.

Passerina cyanea. INDIGO BUNTING. — A breeding colony known here since 1923. First nest discovered June 23, and four eggs laid by July 1, 1927. Of late years the birds have spread out, and are now found five or six miles away. Frequents hazel brush on hillsides. First reported here in 1926, making a re-discovery for the province after an interval of over twenty years.

Spiza americana. DICKCISSEL. — Noted once. Very rare.

Calamospiza melanocorys. LARK BUNTING. — Rare visitor. Noted once.

The total number of all species recorded is 209. Of this number about 114 are estimated to be summer residents. Actual breeding records total 75 species.

The average migration list for the spring numbers about 140 species, and the highest record was made in 1932 with 151 species recorded.

NOTES AND OBSERVATIONS

THE PYGMY OWL (*Glaucidium gnoma pinicola*) AN ALBERTA BIRD. — As far as I have been able to learn there are no published records of the pygmy owl having ever been found in Alberta. The following information, obtained from authentic sources, would indicate that this diminutive mountain dweller is, at least, a casual winter visitor in our province, with the probability that it will be found to be a permanent resident in the timbered slopes of the Rockies within our boundaries. For the data submitted herewith, I am indebted to Mr. A. D. Henderson, Belvedere, Dr. Rowan, Edmonton, and Mr. F. L. Bebee, McLeod Valley, all residents of Alberta. On December 7th 1932, as Mr. Henderson's hired man was on his way to the barn to do the morning chores, he noticed a very small owl sitting on the woodpile. Without making any attempt to escape, the bird was caught in the hand and taken into the house. It was in a dazed and exhausted condition, probably from the intense cold. The heat of the house soon revived the bird and it was placed in a cage. There it was fed raw meat and a dead shrew. On seeing it Mr. Henderson immediately recognized it as a pygmy owl. After more than a month in captivity the bird was given its liberty on January 12th, 1933.

During the same winter (1932-33) Dr. Rowan received two pygmy owls from Phoenix, Alberta, a coal mining town a few miles east of Nordegg, and approximately 75 miles west of Red Deer. One of these, a female, had been caught alive in a barn, on November 11th, 1932. It was quite thin when received and died a few days later. The second, a male, was received on January 10th, 1933. Both skins are now in Dr. Rowan's collection.

On November 13th, 1932, Mr. Bebee's neighbor, a Mr. Holland at Peers (about 100 miles west of Edmonton) saw a small owl catch a house sparrow (*Passer domesticus*) on the wing. Three days later, November 16th, Holland shot with a .22 rifle, what he believed to be the same owl, and gave it to Bebee. This proved to be a pygmy owl. Regarding the second pygmy owl reported by Mr. Bebee, I quote from his letter, dated March 12th, 1936. In this he submits his notes taken from his diary, as follows: "Saturday, December 17th, 1932, shovelled snow in the forenoon and when working, Rupert [his brother] picked up a nice pygmy owl in the woodpile. It was dead and frozen stiff. It had not died of hunger as it was in full flesh. As near as I could tell the bird must have made an impetuous rush at a mouse or bird and wedged itself between the blocks of wood and was unable to get out. In the afternoon I skinned it". Both these skins are in Mr. D. Wilby's collection, at Heather-

down, Alberta. Mr. Bebee states that he collected another pygmy owl near his home the previous winter, either in December 1931, or January 1932, but cannot give the exact date. A letter from Mr. Wilby states that he has two skins of the pygmy owl which he received from Mr. Bebee, and adds, "Authentication O.K."

It is significant that six of the specimens referred to were captured in November and December, 1932, and January, 1933, all within a period of three months; indicating that an incursion of the birds had taken place into the sparsley settled parts of the province. This was probably due to a scarcity of their usual food supply in the mountains. — FRANK L. FARLEY, *Camrose, Alberta.*

THE HAWK OWL AND RAVEN IN SOUTHERN ONTARIO — On December 11, 1935, I had word from Fred. Bidsworth, Port Burwell, Ontario, that he and a friend were engaged in mounting a Hawk Owl which had been shot near there; and on the same day I received a specimen in the flesh which came from Long Point through the kindness of Mr. Lorne Brown, who keeps the light at the east end of the Point. This bird is almost as rare in Southern Ontario as is the Great Gray Owl, and we have no recent records for either of them in Middlesex County, nor are there any specimens extant. — W. E. SAUNDERS.

HAWK AND RAVEN AT POINT PELEE. — In the October 1936 issue of *The Canadian Field-Naturalist* under the caption of Avian Murder, Mr. P. A. Taverner misquotes a red-tail hawk when he tells of the killing of a raven by that bird. The facts are that two ravens not merely one, were seen on that morning; I fired at both of them but both passed on out of sight and I supposed them to be unhurt. When I arrived back at the house, the late J. S. Wallace brought out a raven which he had picked up. His attention was attracted by a red-tail which flushed close to the road along which he was walking and he went into the shrubbery to see what was the attraction. There he found the raven, dead, but it had apparently been killed only after a considerable struggle. Tracing back the marks of the fight, Mr. Wallace found the spot where the raven was apparently standing in the road when the hawk attacked it, and had then dragged it into the thicket where it might be eaten more readily. The whole story is of a piece with the determination of nature to utilize potential food; a vigorous raven would have been left alone, but the wounded, and perhaps dying raven was a different concern altogether, and should be utilized for food immediately. Dr. William Beebe remarked on the utilization of injured individuals when he watched, with some trepidation at first the sharks swimming lazily about nearby, and paying no attention whatever to him, and near them the pigfish were carelessly swimming, though these fish form much of the food of the sharks; but as soon as a pig-fish was hooked by a line from the boat directly above, there was a rush of sharks, and the hooked fish was torn to bloody pieces and devoured.

Jack Miner plays on this same urge when he keeps blackbirds, blue jays, etc., in cages fluttering to get out, and thus attracts hawks within range of his gun, the hawks realizing that here is prey in trouble and therefore easily caught. Even hawks whose food consists normally of mammals and insects are brought near by the lure of easily obtained food and forfeit their lives. — W. E. SAUNDERS.

Note—I told the story as Mr. Wallace told it to us. Evidently Mr. Saunders being there at the time gives the additional details. — P. A. T.

THE OCCURRENCE OF THE RING-NECKED SNAKE AT CAPE RICH. — Cape Rich is a point on the shore of Georgian Bay about nine miles north of Meaford, Ontario.

This survey was made on the afternoon of June 14, 1936. It covered an area which was 200 yards wide by 400 yards in length, most of it open but bordered by cedars, other conifers and a few hardwood trees.

The surface of the ground was covered with flat rocks. It was under these that the snakes were found. Almost every rock in the above area was turned over. All reptiles and amphibians were collected.

The total for the afternoon was: one spotted salamander, two red-backed salamanders, one common toad, one common garter snake about six inches long, and five ring-necked snakes. The last named varied in length from seven inches to a foot. Four cast-off skins were found under the rocks. One of these was definitely that of a ring-neck and it is probable that the others were also.

It may be worthy of note that all the ring-necked snakes were found under flat stones,

and these were in the open but not far from the edge of the woods.

The search was made by five men, members of the Meaford Natural History Club. The time required was two hours. Weather—cloudy and warm with a little rain. — L. H. BEAMER.

NEST-HUNTING HAWKS. — The note on the nest-hunting Broad-winged Hawk in the January 1937 number recalls a number of instances of this habit in different species of hawks. I have noticed it in a number of species including the Sparrow Hawk (from nest boxes), Marsh Hawk (from tree nests), and Cooper's Hawk, but never, strangely enough, the Sharp-shin. Cooper's Hawk is by far the worst offender; only last summer I located and killed a Cooper's Hawk by the fall of the two-thirds grown nestlings of an Audubon Warbler's nest from high up in a thick-leaved cottonwood; the nestlings were uninjured except by the fall.

But the strangest case was that of a second year male Cooper's Hawk which visited my sanctuary almost daily for a fortnight before I was able to kill him. His actions reminded me of those of a cuckoo; gliding silently into a tree or clump of tall bushes he remained perfectly still, watching the actions of the scolding birds so as to locate their nest. During the whole time I never saw him attempt to capture a bird and his secretiveness and cunning made his capture difficult. When eventually I succeeded in killing him I found his stomach and the whole length of his digestive tract completely filled with egg-contents, no trace of egg-shells. — ALLAN BROOKS, *Okanagan Landing, B.C.*

BOOK REVIEW

THE HOME-LIFE AND ECONOMIC STATUS OF THE DOUBLE-CRESTED CORMORANT, PHALACROCORAX AURITUS AURITUS (*Lesson*). By *Howard L. Mendall. The Maine Bulletin, vol. XXXIX no. 3, October,* 1936. *University of Maine Studies, Second Series, No.* 38. *Pages I-V and* 1-159, *with* 20 *illustrations from photographs.*

This booklet contains a detailed and well-prepared account of the activities of Double-crested Cormorants in and near their recently-established nesting colonies on the coast of Maine, together with records of their food in that region and an appraisal of their economic status as thus revealed. There is much new information concerning this species, particularly with reference to courtship on the water, deposition of eggs, incubation, care of the young, development and activities of the young, nocturnal behaviour, and feeding habits. Previously published information about the food of this bird is reviewed and local data, based on 519 individual records, are added. Three kinds of fish of no economic value, namely, cunner, sculpin, and gunnel, are found to be the principal food items of Double-crested Cormorants along the Maine coasts, constituting together more than 81 per cent of the food examined. The conclusion is reached that "the species as a whole does little if any damage to man's interests. Protection should be given the birds in view of the fact that they exist in comparatively small numbers, although local control is probably necessary at regions where interference with net fishing becomes unduly pronounced."

Interesting information about the distribution and migration of the Double-crested Cormorant and its history in New England has been brought together from various sources and included in this publication.

Many of the photographs with which the booklet is illustrated are exceptionally good.

The author quotes at length, without his endorsation, a theory advanced by Arthur H. Norton, to the effect that the habit, common among adult and juvenile Cormorants, of holding the wings outspread for minutes at a time, while stationary on a perch, is a ceremonial act pertaining to courtship, that when the adult birds act in this way outside the limits of the breeding season it is nevertheless a form of sex ceremonial, and that when juvenile birds hold their wings spread they do so in reaction to a developing sex instinct that thus manifests itself prior to the attainment of sexual maturity. No data giving definite support to this theory

are supplied, while, on the other hand, Mr. Norton makes no reference to the observations of Taverner, Mendall, and the present reviewer, which indicate that, even in cold weather the purpose of Cormorants in holding their wings spread is to dry them. Detailed observations of the courtship ceremonials of Double-crested Cormorants by Mendall, Francis M. Uhler, and the present reviewer have now been published, but they do not include any record of these birds holding their wings spread during such activities. Close observation of adults and juveniles, both when free and when in captivity, has shown again and again that it is their common practice to hold the wings spread soon after they emerge from the water and perch. Why any one should suggest that the simple, common-sense explanation that the wings are spread to dry the plumage should be supplanted by an unsupported theory that holding the wings spread, though not known to be a part of the courtship ceremonial, is related to that ceremonial, even when performed by adults apart from courtship or by juvenile birds, is not clear.

The author of this booklet is especially to be commended in that he was not deterred from specializing in the study of a particular species by the fact that it had recently been made the subject of a published monograph, but he set himself to learn much more about that species and achieved very gratifying success. We still need much additional knowledge about every one of our birds, including the Double-crested Cormorant. — H.F.L.

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*NEW SPECIES FROM THE TRIASSIC SCHOOLER CREEK FORMATION**

By F. H. McLEARN

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THE SCHOOLER CREEK formation includes all the Triassic beds of the foot-hills along Peace river and vicinity, in eastern British Columbia. It consists of light and dark grey to almost black, partly carbonaceous limestones, very fine calcareous sandstones and shales. The exact thickness is not known, but must be more than 2500 and possibly even 3000 feet. At present the following faunal zones can be recognized:

Monotis subcircularis
Juvavites—Drepanites—Halobia
Lima poyana
Lingula
Nathorstites

The *Nathorstites* fauna includes *Coenothyris petriana* n. sp., *C. silvana* n. sp. *Spiriferina onestae* n. sp., *Daonella nitanae* n. sp., *Hoernesia? woyaniana* n. sp., *Modiola ahsisi* n. sp., *Monotis montini* n. sp., *Silenticeras hatae* McLearn, *Isculites schooleri* n. sp., *I. schooleri* var. *parvus* n. var., *Lobites pacianus* n. sp., *Nathorstites* cf. *mcconnelli* (Whiteaves); *N.* cf. *mcconnelli* var? *lenticularis* (Whiteaves), *Nitanoceras selwyni* (McLearn), *Sirenites* (*Meginoceras*) *megini* (McLearn), *Protrachyceras sikanianum* (McLearn), *P. zauwae* (McLearn) and *Sagenites gethingi* n. sp. All *Nathorstites*-bearing faunas have a northern or circum-arctic distribution and they have been found on Liard river in northeastern British Columbia, in Alaska, the Kotelny islands, Spitzbergen and Bear islands. The fauna of the Peace River area has little in common with other *Nathorstites* faunas except *Nathorstites*. It is likely of approximately, but not necessarily of exactly, the same age as the other faunas. Their exact correlation with Mediterranean faunas has been attended with difficulty, but a Karnian or early Neo-Triassic age has been usually assigned to them. It seems possible however that the Peace River *Nathorsites* fauna is earlier than Karnian and Ladinian or late Meso-Triassic age. At best only a very early Karnian or very early Neo-Triassic age seems possible.

The *Lingula* faunal zone immediately overlies the *Nathorstites* zone. The fauna includes *Lingula*, probably *Lingula selwyni* Whiteaves, and the species of *Coenothyris* and *Spiriferina* which occur in the *Nathorstites* zone. The age cannot be very much later than that of the *Nathorstites* fauna.

Above this is a zone mostly barren of fossils. Then comes a zone with *Lima poyana* n.sp., *Pinna* sp. and *Pleurophorus* sp.

Yet higher the *Juvavites-Drepanites-Halobia* zone contains *Gryphaea chakii* n. sp., *Halobia* sp., *Mysidioptera* cf. *Fornicata* Bittner, *Oxytoma* cf. *mucronata* (Gabb), *Discotropites* cf. *acutus* (Mosjsisovics), *Drepanites rutherfordi* n. sp., *Juvavites bococki* n. sp., *J.* (*Gonionotites*) sp., *Stikinoceras kerri* McLearn and *S. robustum* n. sp. This fauna shows both Karnian and Norian affinities and more than one zone may be included in it.

The fauna of the highest zone contains *Ostrea* sp., *Monotis subcircularis* Gabb and *Pecten* n. sp. It records a widely spread fauna of Norian or Neo-Triassic age.

The faunas of the Schooler Creek formation will be described in forthcoming publications. A preliminary description of a few important species is given below.

Coenothyris petriana n. sp.
Plate I, figure 1

This is comparatively large, biconvex, longer than wide, very thick species. Near the anterior margin on the dorsal valve is a low fold bordered by shallow furrows and on the ventral valve is a shallow furrow bordered by low folds. The surface is almost smooth and the shell is punctate. Dental plates are well defined in the ventral valve and there is a median septum in the dorsal

valve. The loop is unknown. This is a larger species than *"Terebratula" liardensis* Whiteaves. The outline differs from that of *Coenothyris vulgaris* (Schlotheim) and the furrows bordering the dorsal fold are not present in that species. Geol. Surv. collections, holotype, cat. no 9141 .

Coenothyris silvana n. sp.
Plate I, figure 3

This is a smaller species than *Coenothyris petriana* n. sp., and it has a higher and more pronounced median fold and deeper furrows in the dorsal valve and deeper median sinus and more pronounced folds in the ventral valve than either *C. petriana* or *"T". liardensis*. It has dental plates and median dorsal septum as in that species. Geol. Surv. collections, holotype, cat. no. 9142.

Spiriferina onestae n. sp.
Plate I, figure 5

This is a biconvex, thick, wide species, much wider than long. The cardinal area of the ventral valve is variable, but is large in all specimens and apsacline to almost catacline. The surface has about 12 to 16 rather angular folds and there is one large costa in the ventral sinus and 2 large costae or small folds in the dorsal fold. There is a well defined median septum and dental plates in the ventral valve. The shell is punctate. This is a smaller, relatively wider and shorter species than *Spiriferina borealis* Whiteaves and the cardinal area of the ventral valve is apsacline to catacline, not anacline. The size is greater and the cardinal area smaller than in *Spiriferina gregaria* Suess. Geol. Survey collections, holotype, cat. no. 9143.

Hoernesia? woyaniana n. sp.
Plate I, figure 10

This is an elongate, somewhat twisted species with a fairly convex left valve. A narrow sulcus and fold above the broadly rounded postumbonal slope are absent in *Hoernesia socialis* Schlotheim. Geol. Surv. collections, holotype, cat. no. 8768.

Monotis montini n. sp.
Plate I, figure 6

Shell rounded, nearly equilateral, convex with an almost flattened posterior wing. The radial costae are finer and more even than in *Pseudomonotis multiformis* Bittner and the size is larger and the "wing" better defined than in *P. tenuistriata* Bittner. Geol. Survey collections, holotype, cat. no. 8765.

Daonella nitanae n. sp.
Plate I, figure 11

This shell is an elongate, moderately convex species. The paired costae are more curved than those of *Daonella lommeli* Wissman. The ribs are finer and more curved than those of *Daonella dubia* Gabb. Geol. Survey collections, holotype, cat. no. 8773.

Gryphaea chakii n. sp.
Plate I, figure 8

The left valve is very convex, a little higher than long and is ornamented with irregular concentric folds and varices of growth. The size is larger and the sculpture coarser than in *Gryphaea keilkau* Boehm. Geol. Surv. collections, holotype, cat no. 8770.

Lima poyana n. sp.
Plate I, figure 9

This is a moderately convex species, ornamented with about 5 or 6 large, rounded, radial ribs. It is larger and has fewer ribs than *Mysidioptera? dubiosa* Bittner, shows a different outline and fewer ribs than *M. emiliae* Bittner. Geol. Surv. collectons, holotype, cat. no. 8772.

Modiolus ahsisi n. sp.
Plate I, figure 2

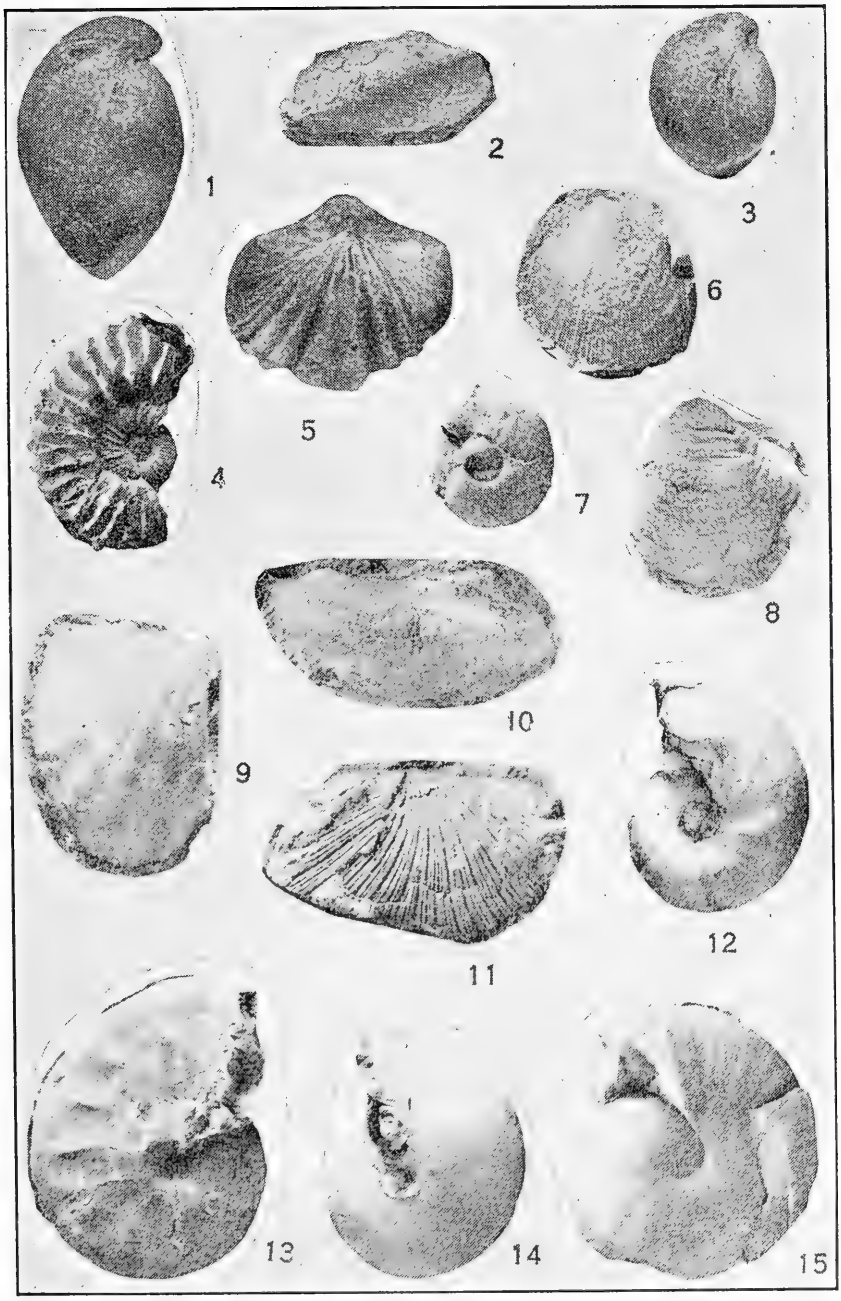
This is a convex species with short hingeline and fine, concentric growth lines. It is more convex and has beaks situated somewhat less anteriorly than *Modiolus raibliana* Bittner. Geol. Surv. collections, holotype, cat. no. 8767.

Nitanoceras n. gen.

This genus is erected to include the single species *Arcestes? selwyni* McLearn, which is smaller, even more evolute and has a simpler suture line than any of the Spitzbergen species of *Parapopanoceras* Haug. It is also smaller and has a simpler suture line, with fewer sutural elements, than any species of *Megaphyllites* Mojsisovics. In the suture line L1 is long and broad and has five indentations which do not run up very far on the sides of the saddles. L2 is smaller and has three indentations. The first auxiliary lobe has three indentations and the second has two not very well defined indentations. There are at least three additional lobes on the sides.

Lobites pacianus n. sp.
Plate I, figure 15

This species has a more irregular and subdued surface ornament than *Lobites ellipticus* (Hauer) and stouter saddles in the suture line. The earlier whorls are involute, but on the last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half of the ultimate whorl there is whorl contraction and umbilical expansion. The surface of the inner whorls have mostly fine growth lines, crossed by faint transverse striae. The living chamber has irregular, poorly defined costae and irregularly spaced, shallow constrictions or furrows, all bent forward on the sides and straight across the venter. Geol. Survey collections, holotype, cat. no. 8789.

Isculites schooleri var. *parvus* n. var.
Plate I, figure 7

This is merely a small variety of *Isculites schooleri* McLearn. Geol. Surv. collections, holotype, cat. no. 8793.

Juvavites bococki n. sp.
Plate I, figure 14

This is a moderately compressed, involute species. The whorls have converging, convex sides and narrow, abruptly rounded venter. The core is almost smooth, there being merely faint, subdued costae bent forward a little near the venter. It resembles both *J.* (*Anatomites*) *konninckı* Mojsisovics and *J.* (*Anatomites*) *sigismundi* Mojsisovics, but no constrictions are present. Geol. Surv. collections, holotype, cat. no. 8831.

Sagenites gethingi n. sp.
Plate I, figure 12

The whorls are stout, rapidly enlarging, rounded and thicker than high. There are transverse striations or very fine costae of low relief and lines and irregular varices of growth. It is not so compressed as *Sagenites inermis* (Hauer) and has mostly a larger umbilicus. Geol. Surv. collections, holotype, cat. no. 8806.

Drepanites rutherfordi n. sp.
Plate I, figure 13

Compared with *Drepanites hyatti* Mojsisovics the costation on the outer part of the sides is not so strong, the "beading" along the ventral shoulder appears to be finer, the form is more compressed and the lobes of the suture line are relatively shorter and the saddles broader and not so deep. Geol. Survey collections, holotype, cat. no. 8817.

Stikinoceras McLearn

This shows some resemblance to *Mojsisovicsites* Gemmellaro and both genera should be referred to the same family. *Stikinoceras* includes compressed evolute species with alternating long and short, even, rather stiffly sigmoidal costae, the longer of which is thickened on the umbilical shoulder or forms an incipient bulla there. On the ventral shoulder and borne on the costae are two rows of tubercles, the outer row being the larger, better defined and somewhat clavus-like in form. There is a very small ridge or thread-like carina on the almost flat, narrow venter. The costation resembles that of *Mojsisovicsites* but is more even and does not decline and give place to sigmoidal folds on later whorls. The genotype is *Stikinoceras kerri* McLearn.

Stikinoceras robustum n. sp.
Plate I, figure 4

This species has stouter and thicker whorls and, on the outermost whorl, has stouter and fewer costae than *Stikinoceras kerri* McLearn. Geol. Surv. collections, holotype, cat. no. 8839

DESCRIPTION OF PLATE 1

Note: All figures are of natural size.

Figure 1. *Cocnothyris petriana* n. sp. Side view of holotype Geol. Surv. collections, Cat. no. 9141.

Figure 2. *Modiolus ahsisi* n. sp. Holotype, Geol. Surv. collections, cat. no. 8767.

Figure 3. *Coenothyris silvana* n. sp. Side view of holotype. Geol. Surv. collections, cat. no. 9142.

Figure 4. *Stikinoceras robustum* n. sp. Holotype. Geol. Surv. collections, cat. no. 8839.

Figure 5. *Spiriferina onestae* n. sp. Dorsal view of holotype. Geol. Surv. collections, cat. no. 9143.

Figure 6. *Monotis montini* n. sp. Holotype. Geol. Surv. collections, cat. no. 8765.

Figure 7. *Isculites schooleri* var. *parvus* n. var. Holotype. Geol. Surv. collections, cat. no. 8793.

Figure 8. *Gryphaea chakii* n. sp. Holotype. Geol. Surv. collections, cat. no. 8770.

Figure 9. *Lima poyana* n. sp. Holotype, Geol. Surv. collections, cat. no. 8772.

Figure 10. *Hoernesia*? *woyaniana* n. sp. Holotype. Geol. Surv. collections, cat. no. 8768.

Figure 11. *Daonella nitanae* n. sp. Holotype. Geol. Surv. collections, cat. no. 8773.

Figure 12. *Sagenites gethingi* n. sp. Holotype. Geol. Surv. collections, cat. no. 8806.

Figure 13. *Drepanites rutherfordi* n. sp. Holotype. Geol. Surv. collections, cat. no. 8817.

Figure 14. *Juvavites bococki* n. sp. Holotype. Geol. Surv. collections, cat. no. 8831.

Figure 15. *Lobites pacianus* n. sp Holotype Geol. Surv. collections, cat. no. 8789.

Fieldwork in the summer of 1937 emphasizes the Alpine characters of the faunas. The *Halobia* zone includes *Discotropites* cf. *sandlingensis* and other upper Karnian species. No *Tropites* has yet been found. Placites and other interesting ammonoids have been collected from the *M. subcircularis* zone.

AMERICAN DOG TICK, DERMACENTOR VARIABILIS SAY, IN ONTARIO

By C. H. D. CLARKE

A GORGED female *Dermacentor* was brought to the writer on May 20, 1935, from the physiological laboratories in the medical building, University of Toronto. The specimen was alive and had recently been removed from a dog. It was taken at once to Dr. S. Hadwen, of the Ontario Research Foundation, who identified it as *D. variabilis*. Investigation by Mr. M. Fallis of the Ontario Research Foundation resulted in the finding of a second gorged female on the same host, and elicited the information that the dog had come recently from the Six Nations Indian Reservation near Brantford, Ontario.

The only reference in available literature to Ontario as being in the range of this tick is in Hooker, Bishopp, and Wood (1912), where Ontario is mentioned along with Labrador and Nova Scotia without citation of specimens or localities. It is well known in Manitoba (Hawden 1912) but Hewitt in his (1915) review gives no records for other provinces. However, besides southern Manitoba, *Dermacentor variabilis* is abundant in many localities in the eastern states not far south of the Ontario boundary. Hence southern Ontario may well be expected to be within its range.

Dermacentor variabilis is an annoying parasite to man in areas where it is common, both from the irritation of its bite and the difficulty of removing it without breaking off the mouth parts. Much more important than this is its role as a vector of tularemia and the eastern form of the Rocky Mountain spotted fever. (Bishopp 1933).

The occurrence and distribution of ticks in Ontario is practically unknown. Under such circumstances almost any specimen represents an extension of knowledge. Specimens for identification are most conveniently shipped alive in cotton stoppered vials or tubes. They can be identified at the Ontario Research Foundation, Toronto; Entomological Branch, Ottawa, or Macdonald College, Que.

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NOTES ON BIRDS OF THE LABRADOR PENINSULA IN 1934 AND 1935.

By HARRISON F. LEWIS

IN 1934 I was engaged in bird protection activities on the southern shore of the Labrador Peninsula, between Shelter Bay and Blanc Sablon, in Saguenay County, Quebec, from June 10th to August 29th, both dates inclusive. Nearly all of this period was spent in patrolling in a small motor-boat between Long Point of Mingan and Blanc Sablon.

The period which I spent in 1935 on the same coast, between Shelter Bay and Blanc Sablon, extended from May 17th to September 5th, both dates inclusive. From May 23rd to June 21st I was at Seven Islands, where I was chiefly occupied in observing the northward migration of White-bellied Brant past Pointe aux Basques, at the south-eastern entrance of the Bay of Seven Islands. From June 24th to September 1st I was engaged in patrol work, performed by motor-boat, between Long Point of Mingan and Blanc Sablon.

From my daily records of ornithological observations made during the two seasons thus delimited I have selected the following notes, which it seems desirable to publish. It will be noted that the period during which my duties required me to remain, for some ten hours daily, at a fixed observation-point, namely, Pointe

aux Basques, near Seven Islands, while the spring migration was at its height, was particularly productive of interesting records.

The names of species which have not hitherto been recorded in the Labrador Peninsula are marked herein with an *.

In a previous paper about the bird life of this region I have recorded [1] that, in the summer of 1932, a very pronounced and unusual scarcity of small fish, especially of the capelin (*Mallotus villosus* L.), along a great extent of this coast, caused widespread distress among the Gulls and large Terns that nested there and that were accustomed to feed on such fish. Bird species thus affected included the Herring Gull (*Larus argentatus*), the Great Black-backed Gull (*L. marinus*), the Ring-billed Gull (*L. delawarensis*), and the American Caspian Tern (*Hydroprogne caspia imperator*). Large numbers of their young died of starvation.

In the summer of 1933 capelin were again abundant on this coast and the Gulls that nested there raised normal numbers of young, but in both 1934 and 1935 the capelin were scarce, and resultant mortality among the young Gulls was heavy. Conditions in this regard were probably not as bad in 1934 as in 1932, but in 1935 they were the worst that I have ever seen. The remains of starved young Gulls were very common on the islands on which they had been hatched, and I do not believe that ten per cent of the young Gulls of the three species named above, hatched between Natashquan and Mutton Bay in 1935, lived to attain ability to fly. Mr. Daniel Stubbert, caretaker of Fog Island Bird Sanctuary, which contains the only colony of Caspian Terns on this coast, reported that in 1935 these birds lost all their young.

Gavia stellata. RED-THROATED LOON. — During the period in 1935 when I spent the greater part of each day in maintaining a watch for Brant at Point aux Basques, at the south-eastern entrance to the Bay of Seven Islands, I found the flight and flocking of Red-throated Loons in that vicinity very interesting. The first flocks were noticed on the morning of June 3rd. The weather at the time was calm, partly cloudy, and comparatively mild. Sunrise occurred about 4.20 a.m. (Atlantic Standard Time).

For about an hour on this morning, from 4.15 a.m. to 5.19 a.m., there was a marked movement of Red-throated Loons, chiefly in flocks, from the Gulf of St. Lawrence over Pointe aux Basques into the Bay of Seven Islands. Each flock was a very definite grouping of flying Red-throated Loons, without any observable regularity in the arrangement of the birds of which it was composed. I estimated that they flew at a height of four hundred to five hundred feet. From my position on the point they appeared very clearly outlined against the thin, bright clouds overhead. Occasonally one of the characteristic and well-known cries of this species would be heard from some member of a flock. During the morning mentioned flocks of Red-throated Loons were observed flying over Pointe aux Basques into the Bay of Seven Islands as follows:

Hour.	*Number of birds in flock.*
4.15 a.m.	46
4.30 a.m.	45
4.40 a.m.	14
4.49 a.m.	60
4.49 a.m.	13
4.55 a.m.	61
4.59 a.m.	32
5.00 a.m.	23
5.19 a.m.	24
6.14 a.m.	8
Total	326 birds, in 10 flocks.

During the same period other Red-throated Loons, singly and in pairs, were flying over the same route at various heights from time to time. No exact record of these was kept.

On the morning of June 4th, when the weather was mild, cloudy, and hazy, with a moderate south-east wind, five flocks of Red-throated Loons, containing 137 birds in all, were observed flying past Pointe aux Basques into the Bay of Seven Islands between 4.44 a.m. and 6.12 a.m. Their manner of flight was similar to that of the flocks seen the previous day, except that one flock, containing 42 birds, when first seen by me, at 5.10 a.m., was directly above Pointe aux Basques, facing south-east, or out to sea, and also against the wind. The birds in this flock remained practically stationary, at a height of four hundred to five hundred feet. At ground level the wind at this time was no more than a fresh breeze, and Common Loons at small elevations were observed to fly to windward easily and quite rapidly. I could see no indication that the wind at a height of five hundred

1 *Can. Field-Nat.*, 48:98

feet was markedly stronger than at ground level. After remaining poised for about half a minute from the time when I first saw them, this flock of 42 Red-throated Loons wheeled gradually around and flew before the wind over the Bay of Seven Islands.

The next few days were stormy, with easterly winds. No more flocks of Loons of any kind were seen until June 7th, when, at 8.15 a.m., a fairly compact flock of 61 Loons was seen flying south-east, out of the Bay of Seven Islands, and against a moderate east wind, at a height of one hundred to two hundred feet. No cries were heard from them, the weather was foggy, and I remained uncertain of their specific identity.

On June 8th, in cloudy, foggy weather, with a gale blowing from the east, flocks of Red-throated Loons, flying at a height of one hundred to two hundred feet, were observed issuing from the Bay of Seven Islands, heading south-east as they passed Pointe aux Basques. Nineteen flocks, containing 247 birds, were observed to fly out of the bay in this way between 7.10 a.m. and 11.55 a.m. The only flock of Red-throated Loons seen to fly into the Bay of Seven Islands on this day was one containing 6 birds that entered at 12.10 p.m. Pairs and single birds, however, frequently flew past the point in both directions.

On June 9th, which was calm, cloudy, and slightly foggy, the flocks of Red-throated Loons that passed Pointe aux Basques flew at an elevation of one hundred to two hundred feet. Between 5.25 a.m. and 9.42 a.m., ten flocks, containing 178 birds, flew into the bay, and two flocks, containing 15 birds, flew out of the bay. Two or three flocks of this species, some entering the bay, some leaving it, were seen at a later hour on this date, but were not recorded with exactness. Pairs and single birds were also noted.

Similar flights of Red-throated Loons in flocks were observed at Pointe aux Basques on June 10th, 12th, and 15th.

It was, of course, impossible to identify specifically every Loon in these flocks. Both Red-throated Loons and Common Loons (*Gavia immer*) were identified by me at Pointe aux Basques nearly every day during the period when these observations were made. But all the Loons in the flocks that were identified by plumage or voice were Red-throated Loons and, since the birds in the flocks did not appear to differ greatly in size, it is reasonable to suppose that there were none but Red-throated Loons among them. The only one of these flocks about whose identity I feel any doubt is the one seen flying out of the Bay of Seven Islands on June 7th, and I think it probable that this was, like the others, a flock of Red-throated Loons.

When, on June 3rd and 4th, the flocks of Red-throated Loons seen were all entering the Bay of Seven Islands, I thought I was witnessing part of a great migration that, like the migration of the Brant, would pass overland from this bay to more northern regions. Later, when many flocks of Red-throated Loons were seen issuing from the Bay of Seven Islands, as well as entering it, I became uncertain as to the true significance of these movements. It may be that I was observing two different migration streams, one bound northward from the Bay of Seven Islands, across the Labrador Peninsula, and the other bound eastward from that bay, along the north shore of the Gulf of St. Lawrence, to the breeding-grounds of these Loons on the eastern part of that shore and in the region of Newfoundland Labrador, or it may be that I was witnessing merely local movements, related to the daily feeding of the birds concerned.

Two or three times on June 15th I noticed flocks of Red-throated Loons which, after flying steadily along at a height of 100 feet or so, suddenly set their wings and coasted or volplaned downward until they had lost 20 or 30 feet of their elevation, then resumed steady horizontal flight without change of direction. When one flock of five birds did this directly over my head, the roar made by the passage of their flight-feathers through the air as they shot downward was loud and very striking. A similar performance has been described by Bahr.[2]

On June 16th I saw a solitary Loon, probably though not certainly a Red-throated Loon, interrupt a steady horizontal flight at an elevation of about 60 feet by suddenly turning over on its back, then turn immediately back to the normal position, and volplane downward for a descent of about 20 feet. At the conclusion of this short glide it flew away horizontally once more.

Moris bassana. GANNET. — During an easterly gale with fog, on June 8th, 1935, I watched from a concealed position at the tip of Pointe

2 *The Home Life of some Marsh-birds*. London, 1907.

aux Basques while 53 Gannets passed the point in scattered succession. From one to four Gannets were in sight at one time. Many of these birds were in adult plumage, but the majority of them were in immature plumage, of which a great many different stages were represented.

One adult bird stayed close to Pointe aux Basques for some time and plunged several times for fish, with apparent success, from a height of only three to ten feet. Twice, just before it plunged, it was heard to utter its hoarse note two or three times in rapid succession. It seemed to me that this utterance was an expression of irritation at several Herring Gulls that were wheeling close about the Gannet, perhaps getting in its way, and doubtless hoping to steal its catch.

Phalacrocorax carbo carbo. EUROPEAN CORMORANT. — In 1935 there were 12 occupied nests of this species, with several nests of the Double-crested Cormorant, on a cliff on one of the Outer Wapitagun Islands, where I observed them on July 5th. This site, which is probably the place where Audubon made his well-known observations on the nest-life of this species, in 1833, had not been occupied by any Cormorants for some years prior to 1935. It is about three miles east of Cape Whittle and about one mile east of the colony of European Cormorants on the cliff of Lake Island. I have no doubt that the small colony of European Cormorants established here in 1935 is an offshoot of the Lake Island colony and, since it is so close to the parent colony, it is included with it in the following tabulation of population data for all known colonies of this species on the north shore of the Gulf of St. Lawrence.

Year. No. of occupied nests of European Cormorants.

	Lake Island	*Cliff Island*	*Total.*
1934	102 (June 20)	22 (July 24)	124
1935	95 (July 4 & 5)	30 (July 10)	125

It seems to me that the lack of any material increase in the breeding population of this species on the north shore of the Gulf of St. Lawrence in 1934[3] or 1935 is very probably due to the unusually severe winter weather experienced in New England and the Maritime Provinces in the winter of 1933-1934. Since most of our stock of European Cormorants winter on the coasts of the regions just mentioned, they would be exposed there to the unusual cold and storms of that winter. Since birds of this species do not breed until at least their second spring, all the individuals that should have bred for the first time in either 1934 or 1935 were hatched prior to the winter of 1933 - 1934 and had to encounter its severity while they were still immature.

The European Cormorants in the Lake Island colony appear to have been unusually late in beginning to lay eggs in 1934. Of the 102 occupied nests observed when I visited the colony, on June 20th, 1934, only three contained young and those young were very small and evidently had hatched but a short time before. The nesting operations of the birds in this colony are, in most years, much farther advanced than this by June 20th.

Only one of the adults in this colony was observed to retain its conspicuous white flank-patches on June 20th, 1934.

Phalacrocorax auritus auritus. EASTERN DOUBLE-CRESTED CORMORANT.—On May 27th, 1935, I visited, on Little Boule Island, near Seven Islands, a colony of this species in which I counted 100 occupied nests, placed in small, stunted conifers, which were distributed over the face and crest of a broken cliff more than 100 feet high. The local game warden informed me that this colony was only a few years old and that it apparently began by the shifting to this island of a large part of the population of the long-established colony of this species on Carrousel Island, about six miles distant toward the south-west. A good many Double-crested Cormorants still continue, however, to nest on Carrousel Island.

Branta bernicla hrota. WHITE-BELLIED BRANT. —Since an account of my observations of this species at the Bay of Seven Islands in 1935 is being published elsewhere† it will suffice to say here that an assistant and I recorded only 4508 Brant entering the Bay of Seven Islands in that year. Five of these were seen entering the bay by its south-west entrance on May 24th, but all the others were seen entering the bay by its south-east entrance between May 31st and June 14th, both dates inclusive. The Bay of Seven Islands was formerly a notable resting-place and feeding ground for Brant on their northward migration, in May and June.

Nettion carolinense. GREEN-WINGED TEAL.—On a small pond, with a small marshy area at each end of it, in stunted coniferous woods, about three miles north-east of the post office at

3 There were 125 occupied nests of this species on that coast in 1933. See *Can. Field-Nat.*, 48:99 and 100.

† *Auk*, 54:73-95.

Bradore Bay, I found, on July 16th, 1934, six full-grown Green-winged Teal and six downy young of this species, apparently less than a week old.

One of the full-grown Teal was evidently the mother of the downy young. While I was in the vicinity she divided her time between flying excitedly about, swimming on the pond for short intervals, and walking in one of the marshes. She called loudly and repeatedly, in a nasal tone, *aahnk, aahnk,* etc.

The other full-grown Green-winged Teal in the group were moulting, as was evidenced both by their appearance and by the presence of their cast-off feathers around the margin of the pond. Two of them appeared to be adult males. The three others were judged, by the green wash on the sides of their speckled heads, to be males a year old. These five birds were very reluctant to fly and I watched them at leisure, with X6 binoculars, at a distance of 30 feet. For some time I thought that they were unable to fly, presumably because of their moult, but eventually one of the adult males and one of the young males rose together to a height of two or three feet and flew together for about a hundred feet, then alighted again on the pond.

This pond is about 171 miles north-east of Fog Island, which was previously the eastern-most point on the north shore of the Gulf of St. Lawrence at which the Green-winged Teal had been found to breed.[4]

Dr. Oliver L. Austin, Jr., has classed[5] the Green-winged Teal as an accidental visitor in Newfoundland Labrador, since the four records of its occurrence there that were known to him seemed to indicate this status. As the pond near Bradore Bay where I made this observation of downy young Green-winged Teal is only five or six miles from the boundary of Newfoundland Labrador, it now seems quite probable that this Teal may occur regularly in that region and that it may breed there.

Clangula hyemalis. OLD-SQUAW.—On another small pond, in open country, about one mile south-east of Bradore Bay post office, I saw, on July 15th, 1934, a female Old-squaw with a brood of six small downy young. The young kept close to their mother, who was easily identified, for her plumage could be seen in great detail through X6 binoculars as she swam about on the little pond. She uttered a few hoarse croaks as she guided her young away from me but from the young themselves I heard no sound.

On the same pond was another Old-squaw (sex?), in darker plumage than that of the mother of the brood, but without any observable long tail. Most of the time while I was present it stayed at some distance from the mother duck and her brood, although it seemed inclined to join them. When, on one occasion, it approached close to the group, the mother duck, with raised wings, dashed at it and readily drove it away.

It was in this immediate vicinity that Audubon found females of this species with small young on July 28th, 1833.[6] The present record corroborates evidence which I have previously published[7] to show that it still breeds here.

Haliaëtus leucocephalus alascanus. NORTHERN BALD EAGLE.—On June 28th, I found a nest of this Eagle beside the shore of the inner, shallow part of Mascanin Bay, about 24 miles west of Natashquan. The nest, built of sticks, was about eight feet high and five feet across the top and had apparently been used for many years. It was in a tamack tree (*Larix laricina* (Du Roi) Koch.) that appeared to have been dead for a long time. This tree was about two feet in diameter near the ground and more than forty feet high and was one of the largest trees in the vicinity. The top of the nest was at a height of about thirty-five feet from the ground.

Aided by the many limbs that were still attached to the dead tree, my companion, Mr. George Jones, climbed to the nest. He described its top as quite flat, with a slight depression in the center. Some dead grass and mud lay on it. The nest was occupied by one young Eagle, largely feathered, though with much down still visible, and about as large as an adult Southern Eider Duck. It was able to stand up without using its wings for support and, when it saw Mr. Jones's head above the rim of the nest, it spread its wings, gave a cry resembling that of a young Herring Gull, and advanced toward him.

Practically all the time while we were in the vicinity of the nest the two parent Eagles flew anxiously about the vicinity, "chippering" loudly. They did not at any time offer fight.

Prior to this experience I had never seen an Eagle's nest near the north shore of the Gulf of St. Lawrence nor heard of one being known to the residents there, and my only observation of the Bald Eagle in the region was a good

4 *Auk*, 44:62.
5 *Birds of Newfoundland Labrador*. Mem. Nutt. Orn. Club, VII, Cambridge, 1932, p. 44.
6 *Birds of America*. New York, 1839, Vol. VII, pp. 90-91.
7 *Can. Field-Nat.*, 41:190.

view of an adult at Betchewun on September 3rd, 1923.

That scarcity of Eagles along this shore is not a new condition is indicated by Audubon's remark, after he had sailed, in 1833, along the coast from Natashquan to Bradore Bay, with protracted stops in various harbours: "I have made many inquiries, but every one tells me Eagles are most rare."[8]

Circus hudsonius. MARSH HAWK.—One was seen at Kegashka River, June 17th, 1934. One was seen at Cross River, on the mainland, near Harrington Harbour, July 23rd, 1934, and one at this place again on July 25th, 1935.

Lagopus lagopus. WILLOW PTARMIGAN.—Two were observed on Grande Passe Island, St. Augustin, on July 11th, 1934.

Squatarola squatarola. BLACK-BELLIED PLOVER.—Three birds in breeding plumage and one in gray plumage were seen in one flock on Bald Island, near Mingan, on June 24th, 1935. This date, being between the normal periods of northward and southward migration, is an unusual one for this species in this region.

Calidris canutus. KNOT.—Three individuals were seen, in company with Black-bellied Plover, at the water's edge at Pointe aux Basques, near Seven Islands, on June 9th, 1935.

Limnodromus griseus. DOWITCHER.—At 4.30 a.m. on May 28th, 1935, I found a group of five Dowitchers on the sandy beach between the village of Seven Islands and Pointe aux Basques. The tide was low and the birds stood at the edge of the water; in fact, water from each spent wave flowed around their feet. They seemed tired and loth to fly, as if they had just concluded a long migration flight. I worked slowly up to within ten feet of them before they flew, and, in observing them, I used X8 binoculars. I noted their dark upper parts, particularly the dark "cap" on the head; a light line over the eye; bills longer than those of Knots, and with depressed tips; feet greenish; breast ruddy in two individuals, gray in two individuals, intermediate in one individual; dark spotting and barring of underparts, especially strong on sides and flanks. In the birds with gray breasts the line over the eye was whitish; in those with ruddy breasts this line was also ruddy. Their notes were musical and of a twittering character. When they finally flew, I did not get a good view of their rumps, but saw a flash of white there. Their flight was strong, swift, and swerving, with wings downcurved.

A solitary Dowitcher was found by me at the harbour in St. Mary Islands Bird Sanctuary, near Harrington Harbour, on July 8th, 1935. It was quite tame and allowed itself to be observed with care through X8 binoculars. Its characteristic markings were clearly seen. The ruddy colouring of its underparts was very pale, except on the throat.

This is a rare bird on the north shore of the Gulf of St. Lawrence. The only previous record of its occurrence there is Taverner's statement[9] that C. G. Harrold saw one at Natashquan on July 30th, 1928. In other parts of the Labrador Peninsula it has been recorded very seldom.

Larus leucopterus. ICELAND GULL.—On May 23rd, 1935, the S. S. *Sable I.*, on which I was a passenger, was followed closely, between Moisie and Seven Islands, by about a dozen Gulls. Most of these were adult Herring Gulls, but three of them were not. One was an immature white-winged Gull that may have been either an Iceland Gull or a Kumlien's Gull. One was an adult Iceland Gull. It was easy to study these Gulls at length and in detail, with X8 binoculars, from a position on the deck of the ship, and in such study the pearl-gray mantle and pure white primaries of this adult Iceland Gull were clearly seen. It was carefully compared with the adult Herring Gulls as the two species flew and poised close together in the air currents near the ship and it was judged to be slightly smaller than a Herring Gull.

Larus kumlieni. KUMLIEN'S GULL.—One of the Gulls in the group seen between Moisie and Seven Islands on May 23rd, 1935, and described in the preceding paragraph was an adult Kumlien's Gull. The dark markings on the primaries, characteristic of this species, were clearly seen with X8 binoculars, first as the bird poised and flew behind and beside the ship and finally as it alighted on the water beside the ship. It was of approximately the same size as the Herring Gulls around it.

Larus delawarensis. RING-BILLED GULL.— In the colony of this species on an island near the mouth of Kegashka River, Mr. George Jones and I counted 473 occupied nests on June 30th, 1935. There were probably 500 to 600 nests in all, for extensive dense vegetation, waist high, presumably hid many. Hatching was completed in a few nests, was in progress in a great many,

8 *Audubon and His Journals*, by Maria R. Audubon and Elliott Coues. London, 1898. Vol I, p. 415.

9 *Can. Field-Nat.*, 43:78.

and in about one-third of the total number seen had not yet begun.

Rissa tridactyla. KITTIWAKE.—The history of the little nesting group of Kittiwakes in Betchouane Bird Sanctuary, about which I have published previous statements[10], may be continued as follows:

1934. June 13th, four adults, two nests with two eggs each. July 31st, one nest containing two young birds nearly ready to leave, and two empty, used nests.

1935. June 25th, five adults, two nests with three eggs each, one nest with two eggs. August 4th, two nests containing one young bird each, and two empty, used nests. Young well feathered, but with some nestling down still attached. Apparently nearly ready to leave the nest.

Hydroprogne caspia imperator. AMERICAN CASPIAN TERN.—Two Caspian Terns were seen flying westward through the harbour at Havre St. Pierre about 10.30 a.m. on June 25th, 1935. The only known nesting colony of this species on this coast is on Fog Island, 138 miles east of Havre St. Pierre.

Alca torda. RAZOR-BILLED AUK.—On July 9th, 1935, Mr. F. W. Osborne, caretaker of St. Mary Islands Bird Sanctuary, pointed out to me, on the Western St. Mary Island, a Razor-billed Auk incubating two eggs that lay side by side and in contact with each other in a crack in the rock. He then told me that he had seen another similar instance elsewhere on the same island on the same day. On July 10th I observed, on another island in the same vicinity, two eggs of this species lying side by side and in contact with each other in a crevice in the rock. The bird that had been incubating them had presumably been put to flight by our approach.

The fact that a female of this species may sometimes lay two eggs in a clutch and incubate them together is well known, but these are the first instances of it to come to my attention in fifteen summers of field work in which frequent visits were made to breeding-places of these birds.

(To be concluded)

10 *Auk*, 42:279. *Can. Field-Nat.*, 48:116.

SOME ADDITIONS TO THE FLORA OF PRINCE EDWARD ISLAND

By J. ADAMS

(Contribution No. 492 from the Division of Botany, Experimental Farms Branch, Department of Agriculture, Ottawa, Canada.)

A CATALOGUE of the *Flowering Plants and Ferns of Prince Edward Island* by Mr. Blythe Hurst, Senior, was published in the Transactions of the Royal Canadian Institute, Vol. XIX, part 2, 1933. This contained the names of all species known to occur in the island at that time. That a considerable number of species, especially among the grasses and sedges, still remain to be discovered can hardly be doubted. The present supplemental list increases the number of Island plants by 71 species.

Of the species detailed below a number were collected by the present writer during a short visit to Summerside and Brackley Beach in August, 1936. Most of the species of *Carex* recorded below are taken from the section of the *North American Flora* dealing with that genus by the late Kenneth Mackenzie. A short paper by J. R. Churchill entitled *Some Plants from Prince Edward Island* (*Rhodora* vol. 4, pp. 31-36, Feb. 1902) contained the names of several species not previously mentioned. In other cases, following the procedure adopted in the previous list, the name of the person responsible for collecting or identifying the species is added in brackets. I am indebted to Mr. W. Dore for checking over the names of the grasses collected.

The names of the species which have been introduced by human agency are indicated in the usual way by an asterisk. For convenience of reference the families, genera, and species of both Monocotyledons and Dicotyledons are listed in alphabetical order.

PTERIDOPHYTA

POLYPODIACEAE

Cryptogramma Stelleri (S. G. Gmel.) Prantl. — (B. Hurst).

Cystopteris fragilis Bernh. — (B. Hurst).

MONOCOTYLEDONAE

CYPERACEAE

With a few exceptions all of the species of this genus listed below are taken from the *North American Flora* but no special locality in Prince Edward Island is mentioned in that work.

Carex acuta L.
C. aenea Fernald.
C. albicans Willd.
C. arctata Boott
C. Bebbii Olney
C. brunnescens (Pers.) Poir.
C. canescens L.
C. cephalantha (L. H. Bailey) Bicknell
C. communis L. H. Bailey
C. crinita Lam.
C. deflexa Hornem.
C. deweyana Schw.
C. diandra Schrank.
C. disperma Dewey
C. flexuosa Muhl.
C. foenea Willd. Summerside and Brackley Beach (J. Adams).
C. gynandra Schw.
* *C. hirta* L.
C. hormathodes Fernald
C. interior L. H. Bailey
C. intumescens Rudge. Summerside (J. Adams): also recorded in *North American Flora.*
* *C. leporina* L.
C. leptalea Wahl.
C. leptonervia Fernald.
C. limosa L.
C. norvegica Willd.
C. paleacea Wahl.
C. paupercula Michx.
C. projecta Mack.
C. retrorsa Schw.
C. rostrata Stokes
C. rugosperma Mack.
C. scabrata Schw.
C. scoparia Schkuhr. Brackley Beach (B. Hurst.)
C. silicea Olney. Tracadie Beach (Churchill)
C. stipata Muhl.
C. tonsa (Fernald) Bicknell
C. tribuloides Wahl. Brackley Beach. (B. Hurst).
C. trisperma Dewey
C. viridula Michx.
C. vulpinoidea Michx. Brackley Beach. (B. Hurst).
Scirpus cyperinus (L.) Kunth. Carleton (L. H. Muttart), Summerside. (J. Adams).

GRAMINEAE

Agrostis maritima Lam., Brackley Beach (J. Adams).
Deschampsia flexuosa (L.) Trin.. Brackley Beach (J. Adams).
Glyceria grandis S. Wats., (Hitchcock's Manual).
Panicum boreale Nash. Charlottetown. (H. Groh and R. R. Hurst).
P. capillare L.. Brackley Beach. (J. Adams).
P. lanuginosum Ell.. Brackley Beach. (J. Adams).
Spartina alterniflora Lois.. Brackley Beach. (J. Adams).
S. pectinata Link (*S. Michauxiana* Hitchc.) Summerside and Brackley Beach. (J. Adams).

ORCHIDACEAE

Cypripedium parviflorum Salisb., Fortune Bridge (B. Hurst).
Habenaria hyperborea R. Br.. Fortune Bay (R. R. Hurst).

POTAMOGETONACEAE

Potamogeton perfoliatus L.. Duck River. (H. Groh).
Ruppia maritima L.. Brackley Beach. (J. Adams).

DICOTYLEDONAE

BORAGINACEAE

* *Lycopsis arvensis* L. (R. R. Hurst)

CHENOPODIACEAE

* *Suaeda linaris* (Ell.) Moq. Summerside and Brackley Beach. (J. Adams).

In the list published by the Royal Canadian Institute this species was included among those considered doubtful or requiring confirmation.

S. *maritima* (L.) *Dumort.*. (B. Hurst)

COMPOSITAE

* *Cotula coronopifolia* L., Summerside (Churchill).
Erigeron annuus (L.) Pers.. Brackley Beach. (J. Adams).
Solidago nemoralis Ait. Cape Aylesbury.

The existence of specimens of this species in the National Museum has been brought to my attention by Mr. E. W. Hart.

According to Prof. Fernald the record of *S. serotina* Ait included in the Royal Canadian Institute list is an error.

CRASSULACEAE

Tillaea Vaillantii Willd.. Tracadie (Churchill).

CRUCIFERAE

* *Erucastrum gallicum* (Willd.) O. E. Schulz. Charlottetown (H. Groh)

ERICACEAE

Vaccinium Vitis-Idaea L.. Sand dunes, Tracadie (Churchill).

LABIATAE

* *Lamium purpureum* L. (B. Hurst)

* *Mentha rubra* Huds., Tracadie. (Churchill).

LYTHRACEAE

* *Lythrum Salicaria* L. (B. Hurst).

MALVACEAE

* *Malva rotundifolia* L. (R. R. Hurst).

ROSACEAE

Geum rivale L. (B. Hurst).

UMBELLIFERAE

Hydrocotyle americana L. (B. Hurst).

CITY GROUSE

By W. E. SAUNDERS

ON FEBRUARY 12th, 1934, I spent the night at the residence of Mr. H. C. Nunn, which is located on the brow of the mountain at Hamilton, Ontario. His lot is about 200 feet deep and terminates at a precipitous descent, below which is an area of fallen rock, overgrown with seedling trees, berry bushes and other things that combine to make particularly bad walking, and therefore affords good cover for wild birds and animals.

On the morning of the 13th, Mr. Nunn burst into my room and said. "Come and see the grouse in the rowan tree!" There they were, three of them, in the dim morning light, but within a minute or two they had all left, one by one, for the shelter of the cliff below. This occurrence of grouse within the city limits of Hamilton, and feeding in a city garden, seemed so interesting that I obtained the following details from Mr. Nunn and his neighbour, Mrs. Morton, on whose trees the birds were feeding.

The Grouse (*Bonasa umbellus*) first came on the evening of November 5th, 1933, when two of them were noted in the rowan tree (*Pyrus* sp.) about thirty feet from Mrs. Morton's house, and were joined in ten minutes by three others. After staying a short time they flew down the mountainside. From then on the five grouse came twice a day, missing only a couple of days in March, until April 6th, when the Mortons left home for a while.

Immediately their next door neigbours, the Nunns, set out an attractive showing of food and were at once rewarded by daily visits from the grouse. They tried much variety, but found the grouse had very decided tastes, apples seeming to be preferred above all else, and it was quite a common thing to see a grouse settle down to a quarter section of apple and eat at it until it was all gone. They cared nothing for grains, but would eat raisins as a second choice to the apples. Once Mr. Nunn threw out part of a can of corn (maize) and, when the other food had been finished, a single grouse ate all the corn.

They fed on the ground for a while, but almost every evening they finished off by budding in apple or cherry trees and it was one of the features of their evening appearance to see all five all birds in a single apple tree, silhouetted against the fading colours of the sky. Their habit was to feed until the city lights were on and it was almost dark when, quickly, one after another flew over the crest of the hill and down to the cedars where they spent the night.

No one discovered the time at which they returned in the dim light before dawn, but Mr. Nunn flushed one from his cherry tree just as the dawn was breaking and it was still quite dark, and they could often be seen in the rowan tree by the dim light of early morning.

The evening visits were timed at dusk, giving little opportunity for observation and none for photography. Often, when the snow was off the ground, the observers would think the birds were not coming and then, one after another, they would appear, but it was difficult to see them. One night a very severe thunderstorm came on just at dusk and it was expected that the birds would go to roost in the early darkness and the heavy rain. Instead of that they fed on Mrs. Morton's lawn right through the downpour.

Although they almost invariably appeared in dim light, Mr. Nunn saw one budding in the apple tree in broad daylight at noon. On

another occasion, in April, the birds came at five o'clock in the evening instead of waiting until seven. The last recorded visit of the grouse was on the morning of April 10th, when Mr. Nunn found one feeding on the lawn with Tam, his little scottie, watching it through the screen door.

Mrs. Morton believed that one bird, "an upstanding male" was invariably the first to come and he would parade about apparently surveying the land for the others. Then in a few minutes the second one would come, followed shortly by the remaining three, and the whole five would be on the rockery, in the trees, or on the ground, where they would feed for a period of ten minutes to half an hour, depending mainly on the absence of disturbance

When the snow was deep, Mrs. Morton kept the food in a box in the house at night and put it out early in the morning and, as the grouse came for breakfast in the dim light of dawn, it follows that Mrs. Morton must have been an early riser. The box was gradually brought nearer and nearer till it was right beside the house. When feeding there they were at first quite timid, but towards the end they would allow a dog to run quite close to them and even the furnace man could pass without flushing them. Mrs. Morton's experience was that they preferred rowan berries, barberries, and catkins, but when these were exhausted she gave them apple peelings and cores.

In addition to this unusual occurrence, Mr, Nunn one morning found a Raccoon in the apple tree beside the dining room window, and on another occasion, when he went out to see what excitement the morning might produce, a Duck Hawk flew from a shelf of rock under the crest at the back of the lot.

Few bird students are in so favourable a location in a great city.

JOHN A. MORDEN

1859 - 1937

Mr. Morden was born within a few miles of London, Ontario, and spent practically his whole life in the same county. At an early age he displayed an interest in nature, and began to collect insects, mammals, birds and their eggs, and made also a large collection of Indian relics. When I first met him, about 1879, he was a good taxidermist and an eager collector of the eggs of the Raptores of which the redtail and the red-shoulder were then common. About 1880 he began to work as naturalist collector for the late Dr. John H. Garnier, Lucknow, Ontario, spending most of two or three years actively in that service, much of the time at the St. Clair marshes, where Dr. Garnier had a houseboat. I visited him there in May, 1882, and he brought his companion, the late Herbert H. Keays, then of London Township, to Wallaceburg to meet me, and the beauty of that night, paddling down the Snye Cartier in a canoe, with two congenial companions, has never faded in memory.

The notable events of that trip were collecting a beautiful female Wilson's Phalarope, hearing the booming calls of the Prairie Hen which was rather common on the mainland, finding a nest of the King Rail with thirteen eggs, and the sight of two Sandhill Cranes which flew around and settled on the prairie half a mile away. All these were birds that I had not seen before.

About that time, Mr. Morden collaborated with me in publishing the Morden-Saunders annotated list of the birds of Western Ontario which came out in *The Canadian Sportsman and Naturalist* in 1882-83.

After leaving Dr. Garnier, he fell in with the late Harry R. Attwater who was then living in Chatham, Ontario, and they conceived the idea of making some money by exhibiting their birds and other specimens at the fairs, which they did for some time.

Eventually these two travelled to Texas on a collecting trip in 1883, the result of which was that Prof. Attwater remained in the south until a few years ago when he died in harness.

Mr. Morden returned, married, and spent the rest of his life on various farms in the County of Middlesex. In the summer of 1936 he had a slight stroke and eventually died on January 9th,

1937, and was buried in the Hyde Park cemetery in the county where his life had been spent. His collections were sold and dispersed before the present century, and while this keen observer never lost his interest in nature, the records of his observations are perpetuated only in the notebooks of others, for he left little or nothing in the way of written records. His sharp ears and eyes brought to our local lists some good records, notably that of the Yellow Rail which he discovered on May 12th, 1920, and when a small party of us went there the next day we found the bird still calling. There are very few ornithologists in Ontario, who would venture to name this bird, unseen, by its notes alone.—W. E. SAUNDERS, *London, Ont.*

NOTES AND OBSERVATIONS

EVENING GROSBEAKS IN OWEN SOUND, ONTARIO. — During the last week in March, 1937, the writer, accompanied by Messrs. A. S. Margolin and J. L. Poland, spent a period in study of the bird life of the Owen Sound, Ontario, neighbourhood. Early spring conditions prevailed at the time, there being only light snow on the ground. To us, the most interesting feature of the trip was the large number of Evening Grosbeaks (*Hesperiphona vespertina*) seen about the base of the Bruce Peninsula. Flocks of fifty to one hundred of these birds were much in evidence, feeding in the maples and ashes along the streets of Owen Sound, and in nearby Harrison Park. In the flocks observed males slightly predominated in numbers. Inquiry made of local persons elicited the information that Evening Grosbeaks are to be found near Owen Sound every spring and fall, that they frequently occur in large numbers, and that they do not occur locally in winter. We found a number of persons who seemingly knew the birds well, and they were all in agreement on the above statements. The first of these birds noted during the spring of 1937 came about March 15th, according to our informants. Assuming that this information is correct, and in view of the large flocks seen by us, an interesting question arises. May it not be that Evening Grosbeaks which occur in south-eastern Canada, and in the northern States make large use of the Algoma District—Manitoulin Island—Bruce Peninsula route in their travels? This would seem to account for their regular occurrence and large numbers in the Owen Sound territory. There is certainly no evidence pointing toward the use of a route south of the Great Lakes, and the writer does not know of another route where observations have indicated fairly regular migrations of these birds. Owen Sound would therefore seem to be ideally situated to receive many of the birds as they pass north and south on their way to widely scattered winter and summer homes. We feel that further studies in the territory will go far toward answering such questions as that above, and we venture to point out again the rather obvious fact that Bruce, like other peninsulas, offers a rich field for ornithological observation—MAURICE BROOKS, *West Virginia University.*

TWO BANDED NESTLING STARLING RECOVERIES. —Comparatively few nestling Starlings (*Sturnus vulgaris vulgaris*) have been banded in Canada to date, and the following two recoveries of nestling Starlings hatched and reared in the vicinity of Ottawa, Ontario, might be of interest to persons studying the spread and migration of this species. A nestling Starling No. 35-213978, banded by the writer at a place about 7 miles south-west of Ottawa, Ontario, on June 8, 1936, was found dead on February 25, 1937, in the Catoctin Mountains, near Thurmont, Maryland, almost due south of Ottawa. Another nestling Starling, No. 35-213983, banded by the writer at a place about 1 mile south of Ottawa, Ontario, on June 22, 1936, was captured at Ozark, Arkansas, in the north-western part of Arkansas near the Oklahoma-Arkansas state boundary, on December 26, 1936 — T. S. HENNESSY.

LONG DISTANCE FLIGHT OF BANDED BLUEBIRD. —What is believed to be one of the longest, if not the longest, recorded flight of a banded Bluebird (*Sialia sialis*) is that of No. B112462. This bird, one of five nestlings when banded by the writer at a place about 10 miles west of Ottawa, Ontario, on June 24, 1936, was killed near Lake City, northern Florida, on March 3, 1937. — T. S. HENNESSY.

WHITE GYRFALCON IN ALBERTA. — A White Gyrfalcon (*Falco rusticolus candicans*) in mature plumage, was shot early in December, 1936, on a farm ten miles south-east of Stavely, Alberta, by Mr. C. L. Schlosser of that town. In a letter, Mr. Schlosser states that the bird had been molesting the chickens on his father's farm and for some time it was believed to be a snowy owl. When killed with .22 rifle he thought he had secured an albino hawk. On taking it to Mr. Cook, a Calgary taxidermist, it was at once identified as a white gyrfalcon. The mounted bird is now in Mr. E. C. Webster's office in Stavely. Stavely is about 70 miles south of Calgary. As far as I am aware this is the second recorded occurrence of the white gyrfalcon in Alberta. The first was a bird killed a few miles north of Red Deer in December, 1920. This was recorded in *The Canadian Field-Naturalist,* March, 1922, p. 58. Several of the dark forms of the gyrfalcon have been killed in the province, two of them being recorded in *The Canadian Field-Naturalist* for February, 1906. — FRANK L. FARLEY, *Camrose, Alberta.*

BOOK REVIEW

VICTORIAN SEA SHELLS *A Handbook for Collectors and Students. by Charles J. Gabriel. Published by the Field Naturalists' Club of Victoria,* 1936. 1/6.

A popular guide to the sea-shells of Victoria, Australia. The descriptions are accurate but not so "scientific" as to discourage the amateur The illustrations by Joyce K. Allan are both accurate and pleasing.—A. L.

NATURAL HISTORY OF THE OTTAWA REGION

A committee of The Ottawa Field-Naturalists' Club is at present engaged in compiling lists of the fauna and flora of the Ottawa region which they hope to publish in book form when their information is reasonably complete.

Progress to date been very encouraging; Mr. Clyde Patch has completed the part dealing with Amphibians and Reptiles, Mr. Taka Kurata the Spiders and Mr. Hoyes Lloyd the Birds. Lists of Fossils, Mollusca and Fishes are under way and many specialists have promised their co-operation in other fields.

Workers interested in this project may communicate with the undersigned who will appreciated suggestions and criticisms.

A LA ROCQUE, *Secretary,*
Fauna and Flora Committee.

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Meetings are held each Monday evening, except on holiday from October to April, in the physics theatre of the University Winnipeg. Field excursions are held each Saturday afternoon during May, June and September, and on public holidays during July and August.

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VASCULAR PLANTS FROM DIANA BAY, HUDSON STRAIT

By NICHOLAS POLUNIN, M.A., M.S., D.PHIL

Department of Botany, Oxford University

CHARLES DARWIN once said "A traveller should be a botanist, for in all views plants form the chief embellishment". To be sure, those of us who know the Arctic regions would demand some modification of this great and sweeping statement; but even here plants are more in evidence than is popularly supposed, and far more numerous and important. Thus there are several hundred species of flowering plants growing north of the Arctic Circle, and several thousand species of cryptogams; and if it were not for these plants there would be no whales, fish and seals in the sea, and no caribou, foxes or even mosquitos on land.

The study of these plants, even over a limited area, is naturally a very large and intricate one, whose elucidation is a considerable undertaking. The writer has for some years been particularly interested in the Botany of the Eastern Arctic regions of Canada.

Here an arctic climate and its attendant vegetation extend far to the south of the Arctic Circle, embracing the whole of the Hudson Strait and northern Hudson Bay regions, and constituting altogether an enormous area. Much of this remains unexplored, at least botanically, and in the preparation of his detailed reports which will shortly be going to press the writer has been helped a great deal by having collections of plants sent in by travellers and others from such points as he has been unable to visit personally. Altogether the response to earlier appeals has been most gratifying and has already resulted in a number of hitherto unknown areas being "put on the map" of world flora and vegetation; a traveller should indeed be a botanist!

Among the many pleasant and profitable contacts which the writer has made during his work in the Canadian Eastern Arctic, one affords the chief matter for the present communication; in the summer of 1934, while a passenger with the Eastern Arctic Patrol, it was his good fortune to meet Mr. S. C. Knapp in Baffin Island. Mr. Knapp is a stalwart of the Hudson's Bay Company and was then stationed at River Clyde, where he had made a small collection of plants. Subsequently he made a larger one which added two species to the known flora of the region. Then, in July and August, 1936, Mr. Knapp and the writer again found themselves together, northward bound on the R.M.S. *Nascopie*. Discussions and advice about collecting followed, and when he went ashore to manage the new Hudson's Bay Company trading post at Diana Bay, lat. 61° N. long. 70° W. on the south shore of Hudson Strait, Mr. Knapp enthusiastically expressed the intention of spending every moment of his spare time collecting and studying the plants of the region.

The result was that an excellent collection, preserved in the usual simple manner by drying between sheets of paper, reached the writer by some unknown route at Cambridge, Massachusetts, in December of the same year. It comprised several hundred specimens representing 66 species.

Diana Bay was also visited in 1936 by the Geodetic Survey section of the Eastern Arctic Patrol of that year, viz. Mr. C. H. Ney, B.Sc., and his assistant Joe Courtright, who made a smaller but also valuable collection of plants for the present writer.

These collections are important not because they contain any very startling material but because they are the only ones of any appreciable size that have ever been made in this particular district; they are valuable because of the new records they afford, which are summarised in the list given below. Apart from its paucity in grasses, sedges and some other of the smaller or more insignificant types (which

should always be collected in abundance) the list seems to give a fair representation of the commoner elements in the flora of the district. In it, K indicates that the species was collected by Mr. Knapp, N by Messrs. Ney and Courtright. The order and nomenclature are based on Professor Fernald's revision of Gray's *Manual* and are essentially those to be found in the Gray Herbarium of Harvard University — with certain modifications which seem desirable in view of the present writer's forthcoming flora of the Canadian Eastern Arctic. Since the exact date of collection is rarely available it would seem superfluous to add notes on the state of each species with regard to flowering and fruiting; suffice it to say that the majority give indications of carrying out these processes quite normally, and in some cases had already shed ripe seeds before the end of August. This is in marked contrast with the situation farther north, where a large proportion of the species ripen fruit only in exceptionally favourable years, and in not a few instances appear to rely wholly on vegetative means of reproduction.

The only botanical observations or collections of any extent that have been made at all near Diana Bay, viz. in the central part of the Hudson Strait region, come (1) from Wakeham and Stupart Bays which lie in the Cape Wales district about 80 miles to the east (see *Trans. Roy. Soc. Canada* 1887), (2) from various points on the south coast of Baffin Island and (3) from Akpatok Island which lies far out in Ungava Bay (see *Journal of Botany* 1934 and *Journal of Ecology* 1934 and 1935). The vast majority of the 74 species recorded below from Diana Bay occur also at Wakeham Bay and on Baffin Island, but several appear to be absent from Akpatok Island. Nearly all are arctic-alpines of circumpolar distribution but a few are of restricted range; most interesting of these is *Carex Williamsii* which was hitherto not known east of the west coast of Hudson Bay, and whose range is thus extended nearly 800 miles to the east.

With regard to the general country at the head of Diana Bay where the collections were made, Mr. Ney reports that broken rocky slopes about 200 feet high rise up right from the water's edge in most places, and that these rocks are igneous and darker than at most other points he has visited. Concerning the hinterland Mr. Knapp writes that growth is generally very stunted, even the willows in the most sheltered valleys rarely rising more than a foot above the surface of the ground, and... "of all the many hundreds of miles I have travelled in the Arctic, I have not yet met the place so rich in lichen as this. The meadows stretch for acres uninterrupted by rock, and clothed with deep rich lichen with the usual grass growing up between. There is mile upon mile of them — dry, rich sandy soil clothed with moss and lichen. The richness and abundance of the lichen more than the moss is simply wonderful; a reindeer herd would go for years here without want".

		POLYPODIACEAE
K		*Cystopteris fragilis* (L.) Bernh.
K		*Dryopteris fragrans* (L.) Schott.
		EQUISETACEAE
K	N	*Equisetum arvense* L.
		LYCOPODIACEAE
K		*Lycopodium Selago* L.
		GRAMINEAE
K	N	*Hierochloe alpina* (Sw.) Roem. & Schult.
K	N	*Arctagrostis latifolia* (R. Br.) Griseb.
K	N	*Calamagrostis canadensis* (Michx.) Nutt. var *scabra* (Presl) Hitchcock
K	N	*Trisetum spicatum* (L.) Richt. var. *Maidenii* (Gand.) Fernald
K	N	*Poa arctica* R. Br.
K		*Poa pratensis* L., *s.l.*
	N	*Festuca brachyphylla* Schultes
K		*Elymus arenarius* L. var. *villosus* E. Meyer.
		CYPERACEAE
K	N	*Eriophorum angustifolium* Roth.
K	N	*Carex scirpoidea* Michx, *s.l.*
	N	*Carex Williamsii* Britton
	N	*Carex misandra* R. Br.[1]
K		*Carex rariflora* (Wahlenb.) Sm.
K	N	"*Carex concolor* R. Br."[2]
K	N	*Carex membranacea* Hook.
		JUNCACEAE
K	N	*Luzula confusa* Lindeb.
		SALICACEAE
	N	*Salix herbacea* L.
K	N	*Salix arctica* R. Br., *s.l.*
K		*Salix arctophila* Cock.

1. One of the specimens is badly infected with *Ustilago Caricis*.

2. This is *Carex rigida* Good. (1794, non Schrank 1789) but unfortunately the type specimen of Robert Brown's *C. Concolor* belongs instead to *C. aquatilis* var. *stans* and so yet another name will have to be found for our plant. The problem will shortly be dealt with by Mr. A. J. Wilmott of the British Museum, in a paper entitled "Notes on Arctic Plants".

POLYGONACEAE

K N *Oxyria digyna* (L.) Hill
K N *Polygonum viviparum* L.

CARYOPHYLLACEAE

K N *Silene acaulis* L. var. *exscapa* (All.) DC.
K *Lychnis furcata* (Raf.) Fernald
K N *Lychnis apetala* L.
K N *Cerastium alpinum* L.
K N *Stellaria longipes* Goldie

RANUNCULACEAE

K *Ranunculus nivalis* L.
K *Ranunculus pedatifidus* Sm. var. *leiocarpus* (Trautv.) Fernald

PAPAVERACEAE

K N *Papaver radicatum* Rottb.

CRUCIFERAE

K *Cochlearia officinalis* L. var. *groenlandica* (L.) Gelert
K N *Eutrema Edwardsii* R. Br.
K *Cardamine pratensis* L. var. *angustifolia* Hook.
N *Draba fladnizensis* Wulfen
K *Draba glabella* Pursh

SAXIFRAGACEAE

K N *Saxifraga cernua* L.
K *Saxifraga cespitosa* L. f. *uniflora* (R. Br.) Engler
K *Saxifraga stellaris* L. var. *comosa* Retz.
K *Saxifraga nivalis* L.
K *Saxifraga tricuspidata* Rottb.
K *Saxifraga Hirculus* L.
N *Saxifraga oppositifolia* L.
K *Parnassia Kotzebuei* Cham. & Schlecht.

ROSACEAE

K *Rubus Chamaemorus* L.
K *Potentilla Crantzii* (Cr.) Beck
K N *Potentilla emarginata* Pursh
K N *Dryas integrifolia* M. Vahl

LEGUMINOSAE

K N *Astragalus alpinus* L.
K *Oxytropis terrae-novae* Fernald

ONAGRACEAE

K *Epilobium angustifolium* L. var. *intermedium* (Wormskj.) Fernald
K N *Epilobium latifolium* L.

PYROLACEAE

K N *Pyrola grandiflora* Radius

ERICACEAE

K N *Ledum palustre* L. var. *decumbens* Ait.
K N *Cassiope tetragona* (L.) D. Don[3]
K N *Arctostaphylos alpina* (L.) Spreng.
K N *Vaccinium uliginosum* L. var. *alpinum* Bigel.
N *Vaccinium Vitis-Idaea* L. var. *minus* Loddiges

DIAPENSIACEAE

K *Diapensia lapponica* L.

PLUMBAGINACEAE

K *Armeria labradorica* Wallr. f. *pubiscapa* (Blake) Malte

BORAGINACEAE

K *Mertensia maritima* (L.) S. F. Gray var. *tenella* Th. Fries

SCROPHULARIACEAE

K N *Pedicularis lapponica* L.
K *Pedicularis lanata* Cham. & Schlecht
K *Pedicularis hirsuta* L.
K N *Pedicularis flammea* L.

CAMPANULACEAE

N *Campanula uniflora* L.
N *Campanula rotundifolia* L.

COMPOSITAE

K *Erigeron unalaschkensis* (DC.) Vierhapper
K *Antennaria angustata* Greene
K *Antennaria canescens* (Lange) Malte
K *Arnica alpina* (L.) Olin, *s.l.*
K N *Taraxacum lacerum* Greene

The following additional 9 species of vascular plants are mentioned by Mr. S. C. Knapp in a letter dated 20th September, 1937, as occurring at Diana Bay, Hudson Strait. Although no specimens are available for purposes of verification, the species are all known from places not far distant; there being thus no reasons for doubting the correctness of the determinations it seems safe to add them to the above list.

SALICACEAE

Salix calcicola Fernald & Wiegand
Salix cordifolia Pursh

CRUCIFERAE

Arabis alpina L.
Draba alpina L.

3. Frequently infected with *Exobasidium Vaccinii*.

CRASSULACEAE

Sedum roseum (L.) Scop

ERICACEAE

Loiseleuria procumbens (L.) Desv.
Rhododendron lapponicum (L.) Wahlenb.

SCROPHULARIACEAE

Bartsia alpina L.

COMPOSITAE

Matricaria inodora L. var. *nana* (Hook.) Torr. & Gray.

NICHOLAS POLUNIN.
Oxford, 11th October, 1937

THE SPIDERS OF MER BLEUE, NEAR OTTAWA

By T.B. KURATA
Royal Ontario Museum of Zoology

THROUGH the kindness of Dr. E. M. Walker, I was able to collect spiders at Mer Bleue on June 2 and 3, 1931. Mer Bleue is an extensive peat bog situated roughly ten miles east of Otttawa, on the Russell Road. It lies in Gloucester Township, Carleton County, and has an area of roughly ten square miles.

The collection made at this locality consisted of nearly 600 individuals, representing 60 species. The following are new to the list of Ontario spiders:

Dictyna cruciata Em.
D. phylax Gertsch and Ivie
D. rubra Em.
Linyphia nearctica Banks

The following list is arranged according to Dr. Alexander Petrunkevitch's synoptic catalogue (Bull. Amer. Mus. Nat. Hist. Vol. 29, 1911).

I am very grateful to Dr. S. C. Bishop of the University of Rochester and Professor Wilton Ivie of the University of Utah, who identified some of my collection.

A more intensive search would no doubt yield additional species, particularly those of very small size.

DRASSIDAE

Herpryllus ecclesiasticus Hentz
Gnaphosa gigantia Keyserling

AGELENIDAE

Cryphaeca montana Emerton
Hahnia cinerea Emerton

THERIDIIDAE

Pedanostethus riparius Keyserling
Theridion differens Emerton
Theridion frondeum Hentz
Theridion murarium Emerton
Theridion spirale Emerton

LINYPHIIDAE

Bathyphantes nigrinus (Westering)
Ceratinopsis nigricaps Emerton
Ceratinopsis nigripalpis Emerton
Ceratinopsis interpres (Cambridge)
Erigone longipalpis Sundval
Grannomota pictilis (Cambridge)
Hypoma trilobata (Banks)
Hypselistes florens (Cambridge)
Linyphia communis Hentz
L. marginata C. Koch
L. nearctica Banks
L. pusilla Sundval
Oedothorax plumosus (Emerton)
O. trilobatus (Emerton)

DICTYNIDAE

Amaurobius borealis Emerton
Dictyna brevitarsis Emerton
D. cruciata Emerton
D. foliacea (Hentz)
D. frondea Emerton
D. minuta Emerton
D. phylax Gertsch & Ivie
D. rubra Emerton
D. sublata (Hentz)
D. volucripes Keyserling

ARGIOPIDAE

Araneus cucurbitinus Clerck
A. benjaminus (Walckenaer)
Mangora placida (Hentz)
Tetragnatha laboriosa Hentz

MIMETIDAE

Mimetus interfector Hentz

THOMISIDAE

Misumena vatia (Clerck)
Philodromus aureolus (Clerck)
P. lineatus Emerton
P. pernix Blackwall
P. rufus Walckenaer

Tibellus oblongus (Walckenaer)
Xysticus elegans Keyserling
X. perox (Hentz)

PISAURIDAE
Dolomedes triton (Walckenaer)

LYCOSIDAE
Pardosa moesta Banks
P. distincta Blackwall
P. saxatilus (Hantz)
P. sternalis (Thorell)
P. modica (Blackwall)
P. xerampelina (Keyserling)
Pirata arenicola Emerton
P. insularis Emerton
P. marxi Stone

ATTIDAE
Dendryphantes (Metaphidippus) flavipedes Peckham
D. (Metaphidippus) marginatus (Walckenaer)
Maevia vittata (Hentz)
Pellenes latens (Peckham)

REVISION OF BIRDS OF MINERS BAY AND VICINITY, HALIBURTON COUNTY, ONTARIO

By MARGARET H. MITCHELL

IN OCTOBER, 1929, there was published in *The Canadian Field-Naturalist* a list of the summer birds of the Miners Bay region of Haliburton county. It seems time for this to be revised and brought up to date. The introductory remarks to the first list still hold good in that field notes made in the interval have continued to be rather desultory in character, being recorded during hurried week-ends or in an all too brief fortnight's holiday. The territory covered is slightly enlarged due to the acquisition of a car and general improvement of roads. Also the period of observation is extended, as week-ends are spent there occasionally from May to October.

Only those species are listed which are new for the region, or for which there are some new data. The standing of the rest remains unchanged.

The arrangement and nomenclature of the 1931 A.O.U. Check List is used.

Gavia immer (Brünnich). COMMON LOON.— The fact that the Loon remains a common bird of the region seems worthy of comment since Miners Bay and Gull Lake have both become much more populous since 1929 and are over-run with noisy out-board motor boats. To these the birds appear to be getting accustomed, often remaining on the surface while a boat passes them at quite a short distance. A juvenile in brown plumage was observed with a parent bird on August 18, 1936.

Ardea herodias Linnaeus. GREAT BLUE HERON. — Although individual Blue Herons have been seen each year in the region it is only this summer (1936) that a heronry was discovered. It is not actually in Haliburton county but over the border in Muskoka district. It is on Three Island Lake, Ridout township, and consists of about 15 nests built in the pines on two of the lake's three small islands. When visited on August 18 remains of three young birds were found below the nests as well as many fragments of egg shell. Four adult birds were seen on the lake.

Branta canadensis canadensis (Linnaeus). COMMON CANADA GOOSE.

Chen hyperborea hyperborea (Pallas). LESSER SNOW GOOSE.

Chen caerulescens (Linnaeus). BLUE GOOSE.— C. H. Irwin of Boshkung Lake reports a flock of about 40 geese on Boshkung Lake in October, 1934. It was made up of Canada Geese with 6 Lesser Snow and one Blue Goose.

Pandion haliaetus carolinensis (Gmelin). OSPREY. — An occupied nest of this species has been seen for ten years situated on the top of a dead tree stub near the Gull river above Norland. I believe it is not actually in Haliburton county, but just south of the border in Victoria. It was hoped for some time that it was an eagle's nest but last summer the parent birds were watched in good light and with strong glasses and definitely identified as Ospreys. This summer they seem to have taken a fancy to Miners Bay for fishing and have been seen there several times. Once one plucked a fish from near the surface of the water making hardly a ripple as it did so.

Bonasa umbellus togata (Linnaeus). CANADA

RUFFED GROUSE. — Grouse appear to be at the bottom of their number cycle in this region at the present time. For the past two years very few have been seen, and strangely enough none has been heard drumming in the spring.

Philohela minor (Gmelin). AMERICAN WOODCOCK. — This species was first positively identified in the region about five years ago and since then seems to have been increasing. At least it has been seen once or more every summer—this year three times in the immediate vicinity of the author's cottage.

Larus argentatus smithsonianus Coues. HERRING GULL. — A small colony of these gulls still nests on Gull Rock at the north end of Gull Lake and this year evidence was found (several shell fragments and what appeared to be a broken-up nest) of nesting on a smaller reef at the south end of the lake.

Coccyzus erythropthalmus (Wilson). BLACK-BILLED CUCKOO. — Cuckoos were either unusually numerous or unusually vocal this June. During the week of June 21 to 28 they were heard at all hours and in several localities. None was seen although some time was spent looking for them and it is presumed that the Black-billed was the species, since it has been seen on former occasions. There is, however, a possibility of the Yellow-billed occurring also as a nest of the latter species was taken near Bobcaygeon recently.

Strix varia varia Barton. NORTHERN BARRED OWL. — Two distinct types of Owl hootings are heard each summer; one, all on one key, presumably the Great Horned; the other saying, as Forbush suggests: "Who cooks for you? Who cooks for you *all?*", and being the Barred. Neither has been seen, but judging from frequency of hooting the Barred is the commoner. This summer for the first time the blood-curdling scream was heard and it quite came up to advance notices. It sounds exactly like a woman in her last extremity and if it had not ended with a few hoots I am sure we should have been rushing out of the house to investigate the murder. It was evidently given by the Barred Owl, as the hooting which continued for some time afterwards was of that species.

Chaetura pelagica (Linnaeus). CHIMNEY SWIFT. — For several years a pair of this species has nested in our boat house. The nest is approximately in the same place each year, high up on the end wall near the roof peak. Curiously enough it is built before the boat house is opened for the season and consequently when entrance to the building is very small, only a narrow space between the water and the boat-slip door. Later when doors are all open the birds invariably enter by the slip opening and leave by a side door. They frequently leave by this door as one enters and zip past the head at a most startling speed.

The young are very noisy when fed and have the most unpleasant bird-voice I have ever heard. As the parent arrives with food they break out into a grating chatter that almost hurts the ear.

Until about the third week in August the whole family, parents and young (usually three young) returns each night to roost by the nest.

Ceophloeus pileatus abieticola Bangs. NORTHERN PILEATED WOODPECKER. — It is most tempting to think that the Cock of the Woods is increasing, and it really does seem so, or else it is becoming more accustomed to man. Whatever the cause it is much more frequently seen than formerly. Ten years ago it was most unusual and now it is a strange summer when we do not see it several times and even have it within sight of the cottage. Many trees in a stand of hardwood on the author's property are deeply cut by the work of this species.

Melanerpes erythrocephalus (Linneaus). RED-HEADED WOODPECKER.—Through natural fluctuation or some other cause this bird has been almost non-existent in the region during the past two years. None was seen this summer (1936).

Otocoris alpestris. HORNED LARK. — The first record of this species for Haliburton county was made on June 20, 1936. A single bird was seen by the roadside near the southern county boundary.

Hylocichla mustelina (Gmelin). WOOD THRUSH. — My former list gives the Wood Thrush as rare. Probably it would be truer to say "restricted to certain localities", for I know now a woods road where it may always be heard in spring and where I have heard three singing at one time.

Sturnus vulgaris vulgaris Linnaeus. STARLING. —Starlings have approached within about two miles of Miners Bay, having been seen this year in fields at Moores Falls.

Dendroica virens virens (Gmelin). BLACK-THROATED GREEN WARBLER. — First definite evidence of breeding of this species in the region was the sight of a young bird being fed on August 10, 1936.

Dendroica fusca (Muller). BLACKBURNIAN WARBLER. — An immature bird, presumably a male, was seen at Miners Bay on August 21, 1936.

Dendroica pensylvanica (Linnaeus). CHESTNUT-SIDED WARBLER. — The breeding of this species in the region has been established by the finding of nest and young birds during the past few years.

Geothlypis trichas brachidactyla (Swainson). NORTHERN YELLOW-THROAT. — Young of this species were seen being fed at Miners Bay during the last week in June, 1936.

NOTES ON SOME LEECHES FROM ONTARIO AND QUEBEC

By MARVIN C. MEYER

THE MATERIAL on which this paper is based was collected by Mr. Aurele La Rocque, of the National Museum of Canada, Ottawa, from 1932 to the end of 1935 from the lakes and streams in the region of Algonquin Provincial Park and other points in Ontario and Quebec. The park is located in the south-eastern portion of the Province of Ontario. Although in the collection there are no species not previously reported from Canada, it seems to the writer that the collection is extensive enough, both in the number of specimens and the area collected over, to justify a brief paper. It will further add to the records of the geographical distribution of leeches for North America, and especially Canada. Among the 198 specimens in the collection, twelve species are represented.

The writer is indebted to Dr. H. J. Van Cleave for his helpful suggestions and criticisms of this work, and to Mr. La Rocque for the privilege of studying the collection.

Synopsis of the Orders and Families of the Class Hirudinea included in the present study.†

ORDER I — RHYNCHOBDELLAE

Alimentary canal with a protrusible, muscular proboscis, whose sheath opens in the middle of the anterior sucker. Blood colourless. Coelom well developed. Fertilization always through spermatophores.

Family *Glossiphonidae*: Body dorso-ventrally flattened, seldom cylindrical. Anterior sucker always without adhesive disk. Posterior sucker round and plainly separated from the body. Somite composed of two, three, or six annuli, generally three. Eyes, one to four pairs. Stomach with one to ten pairs of caeca. Intestine always with four caeca. Eggs and young are fastened to the ventral surface of an adult and are carried until fully developed. Genera: *Helobdella, Glossiphonia*, and *Placobdella*.

Family *Piscicolidae*: (*Ichthyobdellidae*)* Body cylindrical, seldom flattened. Often consisting of two distinct regions. Anterior sucker usually, posterior sucker always, bell-shaped and distinctly set off from the body. Clitellum not visible. Complete somite with three to fourteen annuli. Eyes one to three pairs, or absent. Often with eye spots on the posterior disk. Ectoparasitic on fish or crustaceans. Genus *Piscicola*.

ORDER II — GNATHOBDELLAE

Pharynx with three longitudinal elevations, one medio-dorsal and two ventro-lateral. On the anterior end usually a toothed jaw which, however, can be reduced or completely lacking. Five pairs of eyes arranged in a regular arc on the head. Metameric sensillae plainly evident. Anterior sucker shovel-shaped and not extended as an adhesive disk. A circulatory system separated from the coelom is lacking. A long atrium and a long penis present. Female sex-organs with a long vagina, corresponding to the length of the penis. Intestine without ample caeca. Fresh water or land. Blood suckers or carnivores.

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*Contribution from the Zoological Laboratory of the University of Illinois, No. 512.

†In the following classification, that proposed by Scriban, J. A., and Autrum, H., 1934 has been adopted and followed in full, with the exception that two sub-groups under the family *Hirudinidae* have been purposely omitted.

*In view of the fact that authorities on leeches are divided as to the status of the generic name *Placobdella* R. Blanchard 1893, the present writer has continued to use the currently accepted name without any commitment as to the possible validity of the generic name *Haementeria* de Filippi 1849.

*The family name *Ichthyobdellidae* in common usage is not available since the name *Ichthyobdella* for the type genus is regarded as a synonym of *Piscicola*.

Family *Hirudinidae*: Normal somite composed of five annuli, excepting somite XXIII which is composed of three, and XXIV and XXV, of two annuli. The nephridal pores open near the margins of the body upon the ventral surface from VII to XXIII. Third and fourth pairs of eyes, as a rule, separated by one somite. In fresh water or in damp earth. Genera *Haemopis* and *Macrobdella*.

ORDER III — PHARYNGOBDELLAE

Normal somite formed of five annuli, of which the fifth is broader than the others and more or less divided into secondary annuli. Eyes are not arranged in a regular arc. Very long pharynx opening anteriorly forming three equal angles (one mid-dorsally, two ventro-laterally). Jaws lacking and rudiments seldom present. A circulatory system separate from the coelom is lacking. Male sex organs without penis, vagina short. Testes numerous. Gastric caeca lacking. In fresh water or in damp earth. Carnivorous.

Family *Herpobdellidae*: Stomach and pharynx without caeca. Complete somites composed of five to eleven, often enlarged, annuli. The nephridial pores open near the margins of the body on the ventral surface. Eggs deposited in flattened capsules which are attached to some foreign object. In fresh water or in damp earth. Genera *Herpobdella, Dina*, and *Nephelopsis*.

A distributional list of the species follows.*

Helobdella stagnalis (Linnaeus, 1758) Blanchard, 1896.

Widely distributed in North America, having been reported from Massachusetts (Moore, 1898), west to Arizona, and Colorado and from Florida (Verrill, 1874) north to the province of Ontario (Moore, 1924). Further reported from Loughborough Lake and Cedar Lake, Ontario.

Glossiphonia fusca Castle, 1900. Previously reported from Massachusetts (Castle, 1900) west to Minnesota (Moore, 1912) and from Ontario (Moore, 1924) south to Missouri (Meyer). In the collection, this species was taken from Meach Lake, Quebec.

Glossiphonia complanata (Linnaeus, 1758) Johnston 1816.

Reported as common from the province of Alberta (Bere, 1929) east to Massachusetts (Castle, 1900) and north from Ontario (Moore, 1924) to southern Missouri (Meyer). Further reported from Gauvreau, and Meach Lakes, Quebec.

Placobdella rugosa (Verrill, 1874), Moore, 1901. From New York (Moore, 1923) west to Alberta (Bere, 1929) and from southern Canada, Ontario (Moore, 1936) to Southern Missouri (Meyer). New record for the following lakes: Bernard, Meach Lakes, Quebec and Ontario, Cedar and Head, Cache, Tanamakoon, Lakes and Carp River, Ontario, also Otterslide Creek, Ontario.

Placobdella montifera Moore, 1912. Reported from Connecticut (Verrill, 1874) west to Wisconsin (Bere, 1931) and from Ontario (Moore, 1922) south to Missouri (Meyer). Further reported from Cedar Lake and the Ottawa River at Duck Island in Ontario.

Piscicola punctata (Verrill, 1871) Moore, 1912 Reported in almost all collections taken in the area of Great Lakes and neighbouring states, and southern Missouri (Meyer). Further reported from Meach Lake, Quebec.

Haemopis marmoratis (Say, 1824) Moore, 1901). Reported from Philadelphia (Moore, 1901) to Kansas and Yellowstone National Park, Colorado, and from Alaska (Moore, 1898) south to Missouri (Meyer). Further reported from Blue Sea Lake, Quebec, and Head Lake, Ontario.

Haemopis grandis (Verrill, 1874) Moore, 1912. Reported previously from New England (Verrill, 1874) west to Minnesota (Moore, 1912) and to Canada (Moore, 1924), south to Illinois and Ohio (Miller, 1929). In the collection from Bernard Lake, Quebec.

Macrobdella decora (Say, 1824) Verrill, 1872. "The American Medicinal leech is widely distributed throughout the northern United States and southern Canada. It extends across the entire width of the continent and has been taken in every state from Maine to Washington. The known north and south ranges from Labrador to Kansas and Virginia." (Moore 1923, p. 21.)

This conspicuous form is the most abundant species in the collection, having been taken from: Head, Joe, Little Island, and Little Joe Lakes in Ontario.

Herpobdella punctata (Leidy, 1870) Moore, 1901 Previously taken from Yellowstone National Park, Colorado. (Moore, 1898). East to New York (Moore, 1923) south to Missouri (Meyer).

New record, abundant in Cedar Lake, Ontario.

*Genus and species descriptions are not given here as they can be found in more complete works.

Dina fervida (Verrill, 1871) Moore, 1901. Reported abundant in the Great Lakes and neighbouring states. In the present collection from Little Joe Lake, Ontario.

Nephelopsis obscura Verrill, 1872. Abundant in southern Canada (Moore, Ryerson, 1915, Bere, 1929) Wisconsin (Bere, 1931) and Minnesota (Moore, 1912). New record taken from Meach Lake, Quebec.

This list, of course, is not complete. In several cases only one collection was made from some of the lakes and in many of the lakes in the Park, no collections were made. Judging from previous reports on adjacent areas, it is logical to conclude that several additional species not included in this paper are present.

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NOTES ON BIRDS OF THE LABRADOR PENINSULA IN 1934 AND 1935.

By HARRISON F. LEWIS

(Concluded from Page 105)

Zenaidura macroura. MOURNING DOVE.—At Pointe aux Basques, near Seven Islands, on the morning of June 4th, 1935, I flushed a Mourning Dove from the ground in a very open growth of white spruce and green alder just back of the treeless sand beach. The bird flew out of sight among the spruces. I followed it and soon put it to flight again, this time from a perch in a tree. It then flew away over the tree-tops.

There are several records of this species from Newfoundland Labrador, but this appears to be the first observation of it on the north shore of the Gulf of St. Lawrence.

Nyctea nyctea. SNOWY OWL.—On July 13th, 1934, one of these birds was seen perched on a hummock on the top of Ile au Bois, near Blanc Sablon. On June 24th, 1935, a Snowy Owl was seen on Bald Island, near Mingan, where it was being harassed by Common Terns (*Sterna hirundo*) and probably also by Arctic Terns (*S. paradisaea*).

Chordeiles minor minor. EASTERN NIGHTHAWK.—At 4.00 a.m. on June 11th, 1935, a silent Nighthawk was seen flitting rapidly, in the dim light of dawn on a cloudy morning, back and forth along the straight sand beach between Seven Islands village and Pointe aux Basques. It flew at a height of two or three feet, sometimes along the top of the beach, sometimes at the water's edge, sometimes over the water of Seven Islands Bay, a few feet from shore.

On June 12th a Nighthawk was seen acting in a similar fashion along the same beach at the same hour. On this occasion a heavy rain was falling.

On June 13th the morning was fine and partly cloudy and at 3.30 a.m., when the light was of about the same strength as it had been at 4.00 a.m. on the two preceding, cloudy days, two Nighthawks were observed together as they coursed silently back and forth just above the sand and water in the same place.

On June 16th, a cloudy morning, two Nighthawks were seen flying in the same way along this beach about 4.00 a.m., just after a light shower. Although they flew at times along the upper part of the beach and at times over the water of the bay, it was noticed that they spent most of their time in flying above the strip of

moist sand from which the falling tide had just receded and here they passed back and forth very low indeed, within a few inches of the ground.

I supposed that these Nighthawks were feeding as they flew and I wondered what they were eating. I could not see any flying insects above the beach at that early hour, although it is possible that they were there, but, because of the dimness of the light, were invisible to me. It seemed very doubtful if any small insects could maintain themselves in the air above the open beach in the heavy rain that was falling on the morning of June 12th.

At dawn every day this beach was fairly alive with multitudes of "beach fleas" (amphipods), which then skipped about freely in the open in the most lively fashion, though after sunrise they were hidden in the sand. As these little creatures commonly reached a height of six inches to a foot above the sand in their skipping, it would seem quite possible for the Nighthawks to capture them as they flew back and forth along the beach. Whether these birds were actually feeding on beach fleas or not I do not know, but I could see no other food in the air where they were persistently flitting.

Colaptes auratus. YELLOW-SHAFTED FLICKER.—At Harrington Harbour, on May 21st, 1935, I twice heard the loud "eè-yoo" call of a Flicker from an area of stunted, tangled coniferous woods near the cemetery. On approaching close to this area I saw the bird well, both in flight and on the ground. I used X8 binoculars and saw the size, brown coloration, white rump, and red nuchal patch characteristic of this species. I heard its spring "song" two or three times.

I was told by a local resident that, about a year earlier, a Flicker was picked up, near the same place, after a snowstorm. It was very feeble and expired soon afterward.

These records indicate a migration of this species through the bare coastal strip in the vicinity of Harrington Harbour to breeding-grounds in the interior of the Labrador Peninsula. Harrington Harbour is, following these observations, the easternmost point on the north shore of the Gulf of St. Lawrence at which the Flicker has been recorded, but it has been found occasionally in Newfoundland Labrador and it is probable that it occurs as a migrant at coastal points between Harrington Harbour and the Strait of Belle Isle.

Tyrannus tyrannus. EASTERN KINGBIRD.—Hearing the familiar cry of a Kingbird at Pointe aux Basques, near Seven Islands, about mid-morning on June 16th, 1935, I looked up and saw the bird flying eastward, just above the tree-tops, where the spruce woods bordered the beach. It was not seen again.

Empidonax trailli trailli. ALDER FLYCATCHER.—An individual of this species was observed at Pointe aux Basques, near Seven Islands, on June 11th, 1935.

One was heard giving its "song" repeatedly from some brookside alders, but was not seen, at Thunder River on June 22nd, 1935. Neither of these places is as far east as Eskimo Island, near Havre St. Pierre, where, as previously published,[11] I observed an adult Alder Flycatcher feeding a young one out of the nest, on August 24th, 1923.

Otocoris alpestris alpestris. NORTHERN HORNED LARK.—On May 25th, 1935, at Pointe aux Basques, near Seven Islands, I saw one of these birds fly up from the beach and alight on a horizontal limb of a healthy young white spruce tree. The tree was about ten feet high; the limb on which the bird alighted was about five feet from the ground. The Lark remained quietly on its perch for one or two minutes, while I identified it carefully through X8 binoculars, getting a good view of the characteristic face markings. It took flight only when I approached so near to it that it became alarmed.

I cannot recall having seen a Horned Lark of any subspecies alight in a tree on any other occasion.

Observations made during the spring of 1935 indicate that, while some Northern Horned Larks were already in the breeding-range of this subspecies by May 20th, the principal migration of this subspecies did not pass Seven Islands, which is south of its breeding-range, until about a week later. At Harrington Harbour, where Northern Horned Larks breed commonly, I saw one of these birds on May 20th, 1935, which was the day of my arrival. I returned to Seven Islands on May 23rd. My daily records of Northern Horned Larks seen there betwen that date and June 3rd, after which no more were seen, indicate that the principal flight of these Larks passed through the Seven Islands region between May 26th and May 31st. These records are as follows:

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11 *Auk*, 42:83.

Date	*Number of Northern Horned Larks seen at Seven Islands.*
May 23	None
May 24	"
May 25	3
May 26	29
May 27	17
May 28	92
May 29	145
May 30	24
May 31	31
June 1	3
June 2	1
June 3	3

Corvus brachyrhynchos brachyrhynchos. EASTERN CROW.—One individual was seen and heard at Cross River, on the mainland near Harrington Harbour, on August 7th, 1934.

Mr. William C. Anderson, who resides at Cross River, reported to me in May, 1935, that a pair of Crows were then nesting there. At my request, he took one egg from the nest and kept it until a later date, when I examined it, thus making certain that the nesting was that of Crows, not of Ravens. In July, 1935, I was shown the empty nest that the Crows had built and used. It was placed at a height of about fifteen feet from the ground in a white spruce tree in dense coniferous woods near the beach.

Cross River, which is situated in latitude 50° 27′ N., longitude 59° 38′ W., is the most northeasterly place where I have seen the Crow or known of its nesting.

An Agricultural Illustration Station was established at Cross River in 1932. It suffered from a severe outbreak of cutworms in 1934 and from a somewhat less severe infestation with these pests in 1935. The abundant supply of food which the cutworms constituted may have had a part in attracting Crows to this particular locality.

Sitta canadensis. RED-BREASTED NUTHATCH.—One was observed at Pointe aux Basques, near Seven Islands, on June 16th, 1935. Another was seen on Perroquet Island, in Bradore Bay, on July 20th, 1935. This island is treeless. A third individual was noted at Harrington Harbour on August 28th, 1935.

Anthus spinoletta rubescens. AMERICAN PIPIT.—Observations on the spring migration of the Pipit in 1935 reveal a pattern of migration very similar to that of the Horned Lark, for, on the breeding-grounds of the former species, at Harrington Harbour, I saw a Pipit on May 20th, 1935, the date of my arrival there, and noted two Pipits on May 21st, while the main body of the northbound Pipits apparently did not pass through Seven Islands, which is south of the breeding-grounds of this bird, until the period extending from May 25th to May 29th, both dates inclusive. My records of Pipits observed at Seven Islands in 1935 are as follows:

Date.	*Number of Pipits seen at Seven Islands.*
May 23 (my arrival)	5
May 24	7
May 25	24
May 26	159
May 27	27
May 28	5
May 29	37
May 30	2
May 31	8
June 1	1

None was seen after June 1st.

It will be noted that the migration of the Pipits past Seven Islands was slightly earlier than the passage of the Horned Larks past that point, although for eight successive days both species were present there together.

Bombycilla cedrorum. CEDAR WAXWING.—One individual of this species was plainly seen and heard at Musquarro on August 6th, 1934. This is the easternmost record for this species on the north shore of the Gulf of St. Lawrence, the previous most easterly record being for two birds at Natashquan[12], 35 miles west of Musquarro.

In the vicinity of Seven Islands, the Cedar Waxwing was recorded in 1935 on seven different days, from June 4th to June 20th. The largest number of individuals seen in one day was 12, which were observed in one flock at Pointe aux Basques on June 5th.

It seems very likely that the Cedar Waxwing is a regular summer resident in the region about Seven Islands.

Sturnus vulgaris. COMMON STARLING.—I have already recorded[13] the nesting of the Starling at Natashquan in 1933 and 1934.

12 *Can. Field-Nat.*, 48:118.
13 *Auk*, 52:313.

Mr. P. C. Camiot, of that place, told me, in an interview on June 29th, 1935, that some Starlings remained about Natashquan in 1934 until mid-December. In the spring of 1935, he said, they returned in increased numbers, and on June 1st he counted 24 Starlings at Natashquan. Some of them nested in the building in which they had nested in previous years, but the re-roofing of this building, which was done in the early summer, made so much noise and commotion that these birds abandoned their nests.

**Vireo solitarius solitarius.* BLUE-HEADED VIREO.—About 11.30 a.m. on May 30th, 1935, I saw and heard an individual of this species in rich mixed woods at Pointe aux Basques, near Seven Islands. I observed it for some time, through X8 binoculars, as it moved slowly about in the trees, and saw thus, at a distance of about 20 feet, the bluish-gray top and sides of its head, its white eye-ring, wing-bars, throat and breast, and its yellow flanks. Its characteristic song and call-notes were distinctly heard.

This is the first record of this species in the Labrador Peninsula.

Mniotilta varia. BLACK AND WHITE WARBLER.—At St. Mary Islands, near Harrington Harbour, I was shown, on August 29th, 1935, a living Black and White Warbler, which had been picked up, apparently in a partly stunned condition, near St. Mary Islands light, early on the same day. I held it in my hand while I examined it. It appeared to have returned to its normal condition and, when released, it flew quickly away.

The capture of this bird is evidence of its autumnal migration past these bare coastal islands. This species is found regularly in the breeding season on the western part of the north shore of the Gulf of St. Lawrence, but the easternmost record of its occurrence near that shore had previously been that of an individual found at Mascanin, 118 miles west of St. Mary Islands.[14] It is improbable that Black and White Warblers from Mascanin and places farther west would migrate eastward past St. Mary Islands after the breeding season. Therefore I think that the occurrence of this species at St. Mary Islands in autumnal migration is an indication that its breeding range includes forested areas north of those islands, but at some distance inland.

**Dendroica tigrina.* CAPE MAY WARBLER.—At Pointe aux Basques, near Seven Islands, visible sunrise on June 2nd, 1935, occurred about 4.25 a.m. Three or four minutes before that time I heard the song of a Cape May Warbler uttered repeatedly from a grove of tall white spruces on the point. After sunrise the song continued to be heard and a search resulted in my finding the songster, which I was able to watch to good advantage through X8 binoculars at a distance of 15 to 20 feet. I observed distinctly the bird's dark cap, greenish back, and streaked underparts, and the light-coloured sides of its head, while it continued to sing its sibilant ditty before me. Unfortunately, the light of the early morning sun was of such a quality that yellow and white appeared alike, but observation of the markings mentioned fully established the bird's identity. It moved gradually eastward by short flights among the spruces and in a few minutes it had left the area.

This is the first record of the Cape May Warbler in the Labrador Peninsula.

Dendroica castanea. BAY-BREASTED WARBLER.—An adult male of this species was seen, in full sunlight, with X8 binoculars, at a distance of 15 to 20 feet, in spruce woods at Pointe aux Basques on the morning of June 2nd, 1935. Its characteristic markings, including the bay-coloured cap and breast and the buffy patch at the side of the neck, were very clearly seen. It was heard to sing once only.

This is the fifth record of the Bay-breasted Warbler in the Labrador Peninsula.[15]

Quiscalus quiscula aeneus. BRONZED GRACKLE.—Two were seen together by me at the Hudson Bay Company's fox farm, on Eskimo Island, near Havre St. Pierre, on June 13th, 1934.

I saw one at Seven Islands on May 23rd, 1935.

Loxia leucoptera. WHITE-WINGED CROSSBILL.—At Pointe aux Basques, near Seven Islands, I watched, on June 1st, 1935, a richly coloured adult male of this species while, perched in the top of a conifer, it fed a streaked young White-winged Crossbill, in whose beak I could see no sign of crossing of the mandibles. The young bird fluttered its wings as it was being fed.

The spruces in the vicinity of Seven Islands bore, at that time, a good production of cones of the previous year. A few White-winged Crossbills were observed there from time to time.

14 *Can. Field-Nat.*, 44:111.

15 *Can. Field-Nat.*, 48:118.

**Chondestes grammacus.* LARK SPARROW.—At about 11.30 a.m. on August 25th, 1934, I was among the houses in the western part of Aguanish village, on the western side of the lagoon at the mouth of the Aguanish River, in latitude 50° 14′ N., longitude 62° 6′ W. Dense fog which had followed a light southeasterly blow with rain (of the previous night) prevailed at the time. Numerous sparrows, in loose, scattered flocks, were feeding in gardens and small fields about the houses. Most of these Sparrows were Juncos, but White-throated Sparrows and at least one Fox Sparrow were also noted, and probably several other species were present.

As several Sparrows took flight together, I noticed one that was very different from the others and that I was sure was new to me. Unfortunately, I had no binoculars with me at the time. I followed the strange Sparrow about the village for a period of between five and ten minutes, observing it very carefully at distances of 20 to 30 feet, while it perched on rail fences, sought and obtained food on the ground, and made short flights. It was about the size of a White-throated Sparrow (*Zonotrichia albicollis*), but the general tone of the coloration of its upper parts was grayer than the tone of coloration of the upper parts of the White-throats with which it was associated. The upper parts of the stranger were a distinctly grayish brown. The crown showed a broad streak, reminding me of the central streak in the crown of a Savannah Sparrow (*Passerculus sandwichensis savanna*). There were distinct dark markings on the side of the head; the throat was white, bounded on each side by a short, pronounced black streak, but shading gradually into the somewhat grayish breast. On the breast I could make out one (or more) dark marks, but no regular streaking. The bird generally kept its breast turned away from me, especially when at close range, so that my observations of that part of it were comparatively poor. When the bird was perched with wings closed, some small flecks of lighter tone than the ground-colour could be seen in the plumage of its upper parts. To a certain degree some of these lighter flecks seemed to tend to be arranged as two wing-bars on each wing, but distinct wing-bars could not be made out. When the bird flew, its tail was very conspicuous. It was slate or fuscous, with white tipping, which was very distinct and appeared on all the tail-feathers except perhaps two or four feathers in the center of the tail. The white tips on the outer tail-feathers were more extensive than those on the others and often showed when the bird was perched, with tail closed. The coloration scheme of the tail reminded me somewhat, on a small scale, of that of the tail of a Mourning Dove, but the Sparrow's tail was not sharply attenuated. No notes were heard.

While I was watching this bird intently, a second individual of the same kind was clearly seen near it. Both of them flew at once, so that I saw the two striking and characteristic tails spread at one time. The second bird soon wandered off and I saw it no more.

I suspected at the time that these birds were Lark Sparrows, a species that I had not previously seen in my field experience. On returning, half an hour later, on board the motorboat on which I was cruising, I consulted Dr. Frank M. Chapman's "Handbook of Birds of Eastern North America"[16] and became convinced that this identification was correct. I immediately wrote down an extended description of these birds as I had seen them. After returning to Ottawa I further confirmed my identification by examining Lark Sparrow specimens in the collections of the National Museum of Canada and by discussing my observations with Mr. P. A. Taverner, Ornithologist of that institution.

This is the first record of the Lark Sparrow in the Labrador Peninsula and in the Province of Quebec.

The straying of these two Lark Sparrows to a point so far north-east of their usual range may bear some relation to the fact that the breeding-grounds of this species in the central part of the United States experienced drought conditions of unusual severity in the summer of 1934.

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16 Revised edition, New York, 1912.

ON THE STATUS OF THE STARLING (*Sturnus vulgaris*) AT TORONTO

By L. L. SNYDER and J. M. SPEIRS

THE FIVE YEAR period between 1920 and 1925 represents the pioneering stage in the starling's occupancy of the Toronto region. The first record of occurrence, made on August 14, 1920, was approximately two years prior to the second recorded occurrence. During the next three years, starlings increased and expanded into new territory, slowly, but with some acceleration noticeable by 1925. A brief history of this stage has been recorded[1].

The second five-year period, from 1925 to 1930, brought about a pronounced increase and spread. Most available niches were rapidly filled,—all but the noisy downtown business blocks, and even there a few birds were established. This "boom" phase of the local starling history has also been briefly recorded[2].

Not much can be added in the way of a historic record for the subsequent five years, from 1930 to 1935, except that the starling continued to take over downtown Toronto until it too offered no considerable room for expansion. This was accomplished early in the third five-year period.

It is now possible to review this past history, together with more recent data on file in the Division of Birds, Royal Ontario Museum of Zoology, and summarize the nature of the starling incursion and establishment in the Toronto region.

In 1920 there were available in this area a certain number of places which could be occupied by starlings. The finding and filling of niches proceeded slowly at first, but in the light of our records for the subsequent seventeen years, it is apparent that by 1929, a population supersaturation had been reached. The saturation point, or the numerical status below which they have not since fallen, was attained in 1928. Incidentally, this was the period during which the casual observer, or the unornithologically-minded citizen, took notice of the starling.

The 1929 peak resulted in the occupation of the last available space, the noisy downtown business blocks. Further, our records show that, since 1929, more or less marked supersaturation peaks occurred in 1932 and again in 1935. These peaks suggest that the local starling population now fluctuates over approximately a three-year period. It is evident that, during a peak of numbers, the local surplus moves out or is otherwise eliminated from the region. It seems possible that similar conditions may have prevailed in other areas during the early period of the starling's invasion of the Toronto region, which may have produced waves of influx in 1926, 1923 and the first appearance in 1920. Our data for these periods suggest this possibility.

Some additional comments, based on the starling's establishment, are of interest. The majority of the first records of occurrence for the various sections of the Toronto region were made in late winter or early spring. Winter wandering in search of food would explain the winter arrivals and the searching out of nesting territories, those of spring.

An analysis of the annual fluctuations of starling numbers in the Toronto region is now made possible by our records. Taking the winter level as a basis for comparison, we find the numbers observed[3] rise markedly in March until they are at least double those of winter. This can be explained by the return of migrants, the fact of which has been established by banding records. In April the numbers fall off to the winter level, probably because of migrant birds passing on the other regions. In May the numbers decline to about half of the winter level. This would result from half of the birds being engaged with incubation and brooding. A gradual increase of birds observed, continues through June and July, with the release of adults from nest confinement, and with the appearance of young from the nest. During July, family flocks are common. These gradually combine for roosting as autumn approaches, eventually producing the enormous flocks of September. Some very large flocks persist until the end of October, when there is a rather abrupt and marked reduction of numbers observable. This is attributable to migration southward.

Starlings are least numerous during the month of November. Their subsequent increase may be due to a concentration of birds from outlying areas, after the snow falls. The numbers in winter, though keeping a fairly constant ratio to numbers at other seasons, vary from year to year over a three-year period.

1. Snyder and Baillie, *Can. Field-Nat.*, Sept., 1925.
2. Snyder and Baillie, *Can. Field-Nat.*, Nov. 1930.
3. Observed abundance, equals the number of individual birds estimated, divided by the number of observers.

NOTES AND OBSERVATIONS

THE ARKANSAS KINGBIRD IN SOUTHERN ONTARIO. — The lack of published reports or any other record of the occurrence of the Arkansas Kingbird in Ontario seems sufficient to warrant the following notes.

On June 1, 1937, while making observations at the tip of Point Pelee, Lake Erie, I was surprised to come upon four Arkansas Kingbirds (*Tyrannus verticalis*). They were perched on the dead branches of small willows, which form the first trees to be met with when coming inland from the point proper. These birds appeared to be resting as from a long flight and allowed close approach before flying a short distance. At first glance they resembled Crested Flycatchers, but closer observation with 8-power binoculars revealed their light greyish heads, yellowish underparts and dark, white-bordered tails. When further disturbed, two were seen to move in a series of short flights, up the west shore towards the base of the point, while the other two remained in the vicinity of the willows during the afternoon.

A week or so later, on June 11, 1937, Mr. George North detected an Arkansas Kingbird at Van Wagner's Beach, near Hamilton, and has accorded me the privilege of recording it here. For one day only, June 12, North saw two birds, and one was seen daily until June 27, when it disappeared. During its stay, the Kingbird could usually be found in the vicinity of the hydro towers along the beach road, and occasionally was noted down at the beach. Parties of ornithologists from London and Toronto journeyed to Van Wagner's and made the acquaintance of this unusual visitor.

So far as I have been able to ascertain, the first report of the species in Ontario was one seen by R. V. Lindsay and F. H. Emery on May 25, 1930, at Fisherman's Island, Toronto. (unpublished)

While the distribution of the Arkansas Kingbird is western, there is evidence to show that it is gradually extending its range eastward as described by Dr. T. S. Roberts. (*Birds of Minnesota*, Vol. 2, pp. 7-10)

In this connection it is interesting to note that a breeding record for Ohio has been established in recent years. (Campbell, *Auk* 51:85, 1934 — O. E. DEVITT.

THE AMERICAN EGRET AT THE EASTERN END OF THE NIAGARA PENINSULA. — Following the receipt of information supplied by Mr. G. J Clout of St. Catharines, Ontario, who had previously been advised of the occurrence of these large white herons by Mr. H. P. Nicholson of that same city, the writer visited the measuring weir on a feeder waterway close to the Welland ship canal at Allanburg on July 27, 1937, and there had the good fortune to observe seven American Egrets (*Casmerodius albus egretta* (Gmelin.).

When first seen the birds were perched in a clump of large trees at a bend in the waterway about a third of a mile distant; but within a few minutes after the writer had taken up his station in the window of the weir-house, the Egrets, moving two together, or singly, commenced to fly up stream, sailing low over the water directly toward the point of observation. Of the first two, one bird veered off shortly before it reached the vicinity of the weir-house and disappeared over the western bank of the waterway, but the remaining bird, and those following, continued with the direct flight until all six had alighted on the eastern bank at such a short distance from the weir-house that all characteristics could easily be discerned and positive identifications made with the naked eye, although 8X glasses were carried, and used to a certain extent.

According to the weir-house attendant, the birds had been in the vicinity for several weeks prior to my visit, and were apparently attracted by minnows, or other small fish, which became more or less trapped in a wooden structure built into the water just below and to the side of the weir.

Kingfishers, Common Terns, and Bonaparte Gulls were also said to pay frequent visits to this point below the weir, but during my stay in the vicinity only the first two species were present. The Terns in some numbers, and apparently very excited by the presence of the trapped fish.

In connection with the present report of the occurrence of this large and interesting southern Heron, it will perhaps be of interest to mention here some of the more recent of the previous occurrences at the eastern end of the Niagara Peninsula.

On August 8, 1936, Messrs. W. E. Hurlburt of Vineland and G. J. Clout of St. Catharines, observed an American Egret at Decew Falls in Lincoln county, and on August 12th of that same year James Savage, and others of the Buffalo Ornithological Society, saw two on the ship canal feeder near Wainfleet in Welland county.

Several other occurrences in this area have already been recorded in the pages of *The Canadian Field-Naturalist*, and include the following references:—Two on the Niagara River bank about 5 miles from Fort Erie on August 8, 1933 (R. W. Sheppard et al 50:97, 1936); White Herons, apparently *C. a. egretta* reported from Niagara in July-August 1930 (E. M. S. Dale 46:107, 1932), and one seen on August 15, 1928, by a party of six observers in the Wainfleet marshes of Welland county (W. E. Hurlburt, 42:210, 1928); while without specifically mentioning the area under discussion, P. A. Taverner (48:39, 1934) writes of receiving numerous reports of white herons in Southern Ontario localities during July and August 1933. — R. W. SHEPPARD, *Niagara Falls, Ontario.*

REVIEW

NICE, MARGARET MORSE. STUDIES IN THE LIFE HISTORY OF THE SONG SPARROW. Vol. I. *A Population Study of the Song Sparrow. Transactions of the Linnaean Society of New York, Vol. IV, April,* 1937.

Natural history is — in many scientific laboratories — a term of mild opprobrium. If one wished to date the origins of this stigma, he would have to read hundreds of publications, but if one wished to date its termination he might well read only one: Mrs. Nice's "Life History of the Song Sparrow." If field ornithology has produced any science, this is it. In it is exhibited a complete and convincing integration of the field observation, controlled experimentation, and scientific deduction.

Robert Cushman Murphy (whose own work, "Oceanic Birds of South America," could well compete with the present volume as the ornithological book of the year) quotes a French encyclopedia, vintage 1868, as saying, "The natural history of penguins may be considered complete." Mrs. Nice has given an astonishing demonstration of how incomplete is our natural history, even of the most ordinary back-yard birds. She marshals her evidence on question after question in bird physiology, psychology, and ecology which the old-fashioned field naturalist has hardly heard of, and which the laboratory scientist has discussed only in terms of white rats, guinea pigs, and fruit flies. This feat of moving laboratory methods into the outdoors is made possible by the individual identification of an entire song sparrow population by means of coloured and numbered leg bands.

Mrs. Nice's conclusions challenge many an investigator to extend or verify his work. She finds, for example, that spring migration is correlated with temperature rather than sunlight, thus seeming to contradict Rowan's experiments (though her definitions of sunlight are a bit ambiguous). She amplifies the work of Lorenz on thresholds of effectiveness for stimuli to behaviour, and on the fixed sequences which seem to inhere in the behaviour-pattern. She corroborates Kendeigh and Baldwin on the physiological expressions of temperature. She contributes many new measurements of mortality, reproduction, longevity, and the general mechanism of population-maintenance.

Not the least significant aspect of this monograph is its human circumstance. Mrs. Nice is an amateur. No one paid her to blaze a new by-path for ornithological science, or to search the libraries of the world for its direction and route. Many a full-staffed museum and university has searched longer and done less.—ALDO LEOPOLD, *University of Wisconsin.*

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The Canadian Field-Naturalist

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*CONTRIBUTIONS TO THE TRIASSIC OF PEACE RIVER, B.C.**

By F. H. McLEARN

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SINCE the preparation of a recent publication on new species from the Triassic Schooler Creek formation (*Canadian Field-Naturalist, October,* 1937) the writer has had the opportunity of reinvestigating this formation in the foothills of the Rocky Mountains along Peace River and of making additional collections. Pending the publication of a report on the Triassic faunas it seems advisable to make some additional comments in advance and describe some new species.

Stratigraphy

The field work of the past summer has confirmed the validity of the *Nathorstites*, *Lima poyana*, *Halobia* and *Monotis subcircularis* zones. The *Lingula selwyni* zone however has not stood up so well. A new pelecypod zone has been found, below that of the *L. poyana*. Its relation to, and degree of distinctness from, the *L. poyana* zone has yet to be determined by exact office study. The 1937 collections also add considerably to our knowledge of the *Halobia* and *Monotis* faunas.

As noted in a previous publication the *Nathorsites* fauna is of Ladinian or very early Karnian age. No exact correlation with Mediterranean faunas has yet been made, although there is a considerable resemblance to them. A number of pelecypods not previously found in this fauna were collected during the past summer field season.

The *Halobia* fauna was found at several new localities during the past season, including ledges at river level on the north side of the Peace between the mouth of Clearwater River and Rocky Island and on the high hill on the south side of the Peace River near the mouth of Nabesche (Otterail) River. Additions to the fauna include *Discotropites* cf. *sandlingensis* Hauer, *D.* cf. *formosus* Smith, *Trachyceras* and *Halobia* n. sp. ? (cf. *superba* Mojsisovics, *ornatissima* Smith and *gigantea* Smith). These species, together with the previously listed *Discotropites* cf. *acutus* Mojsisovics, *Gonionotites*, *Juvavites* and other genera and species reveal the Mediterranean aspect of the fauna and suggest a correlation with the Upper Karnian or *Tropites* zone of the Mediterranean and with the *Tropites subbullatus* zone of the Hosselkus limestone of California.

The section at Parle Pas rapids is very interesting. If there is no overturning of strata there and no faulting the succession is as follows: At the base is a considerable thickness of strata with *Monotis subcircularis*, *Oxytoma* sp. and *Placites*. Above are beds with *Placites*, "*Nautilus*" and some pelecypods. Both of these zones are of Norian and upper Triassic age. The highest beds at the rapids contain an "*Arnioceras*"-like ammonite and *Pecten* n. sp. The possibility of a Jurassic age of these high beds, however, can only be considered after a careful examination of the rather poorly preserved ammonite.

Of particular interest in the study of the structure of the foothills along Peace River is the alternation of areas of gently dipping strata with areas of steeply dipping and folded strata, and the high angle overthrusts from the west. Peculiar asymmetric anticlines (or monoclines), with eastward dipping axes, low dipping or almost flat east limbs and steep west limbs occur at 8-mile Creek, at Aylard Creek and just east of the Nabesche (Ottertail) River.

Systematic Palaeontology

Genus *Nathorstites* Boehm

At early stages of growth the whorls are stout and depressed, the umbilicus is fairly small and there are folds on the inner part of the sides. With growth there is compression, sharpening of the venter, closing of the umbilicus and loss or decline of folds on the sides. Some specimens become more compressed than others and

become oxycones. Others at the same stage of growth and of the same size as the oxyconic variety are still fairly stout-whorled, have only angular venters and still retain reduced lateral folds around the umbilicus. Rare constrictions occur, particularly in earlier whorls. The direction of the growth lines on specimens from Peace River is mostly that of a single curve, convex forward on the sides and bent back a little on the venter. There is at least superficial resemblance to shells from the Middle Triassic of California referred by J. Perrin Smith, incorrectly perhaps, to *Dalmatites* Kittl.

Isculites schooleri McLearn

1930 *Isculites schooleri* McLearn, Trans. Roy. Soc. Can., 3rd ser., vol. 24, sec. 4, p. 5, pl. 1, fig. 6.

The generic name *Isculites* was first mentioned by Mojsisovics in 1886. It was followed in brackets by *"I. hauerinus"*. The genus was not described by him until seven years later, together with several species, the first of which was *Isculites decrescens* (Hauer). In 1915 Diener recorded *I. decrescens* as the genotype. In 1934 Spath also recognized this species as the genotype.

The important features of the Peace River shells are the involute, rounded globose inner or earlier whorls, the contracted anterior part of the living chamber and accompanying umbilical expansion, the long living chamber more than a whorl in length, the subdued, ill defined, irregular ornament or almost smooth surface and the simple, mostly goniatitic, suture line, with broad rounded ES and S1, small, very low or indistinct S2, L1 narrower than the saddles and rounded and entire L2.

The Peace River species lacks the costate *Anatomites*-like sculpture of typical Norian *Isculites* (*See* Mojsisovics 1893, pl. 87, figs. 3a to 3d). In form and poorly defined surface ornament it resembles the Norian species *Isculites subdecrescens* Mojsisovics, the Karnian species *Isculites heimi*. Mojsisovics and the Karnian *Isculites bittneri* Gemmellaro from Sicily, but it lacks the more elaborate ceratitic or almost ammonitic suture line of this group of species. It is closer to a species from Timor, *Isculites ladinus* Welter, which has a similar whorl shape, contracted living chamber, lack of well defined surface ornament, broad rounded ES and S1 and L1 narrower than the saddles. The Timor species also has two notches in L1 which appear to be present in at least one specimen of the Peace River species. *Thanamites* Diener, particularly *Thanamites bicuspidatus* Diener has a similar suture line, but lacks the umbilical expansion of the outermost whorl.

It may be necessary to make a new genus for the group of *I. subdecrescens* and another for *I. ladinus* and *I. schooleri.*

Sirenites (*Meginoceras*) *meginae* (McLearn)
Plate 1, figures 8 to 11

1930 *Steinmannites* (*Meginoceras*) *meginae* McLearn, Trans. Roy. Soc. Can., Ser. 3, vol. 24, sec. 4, p. 4, pl. 1, figs. 7, 8

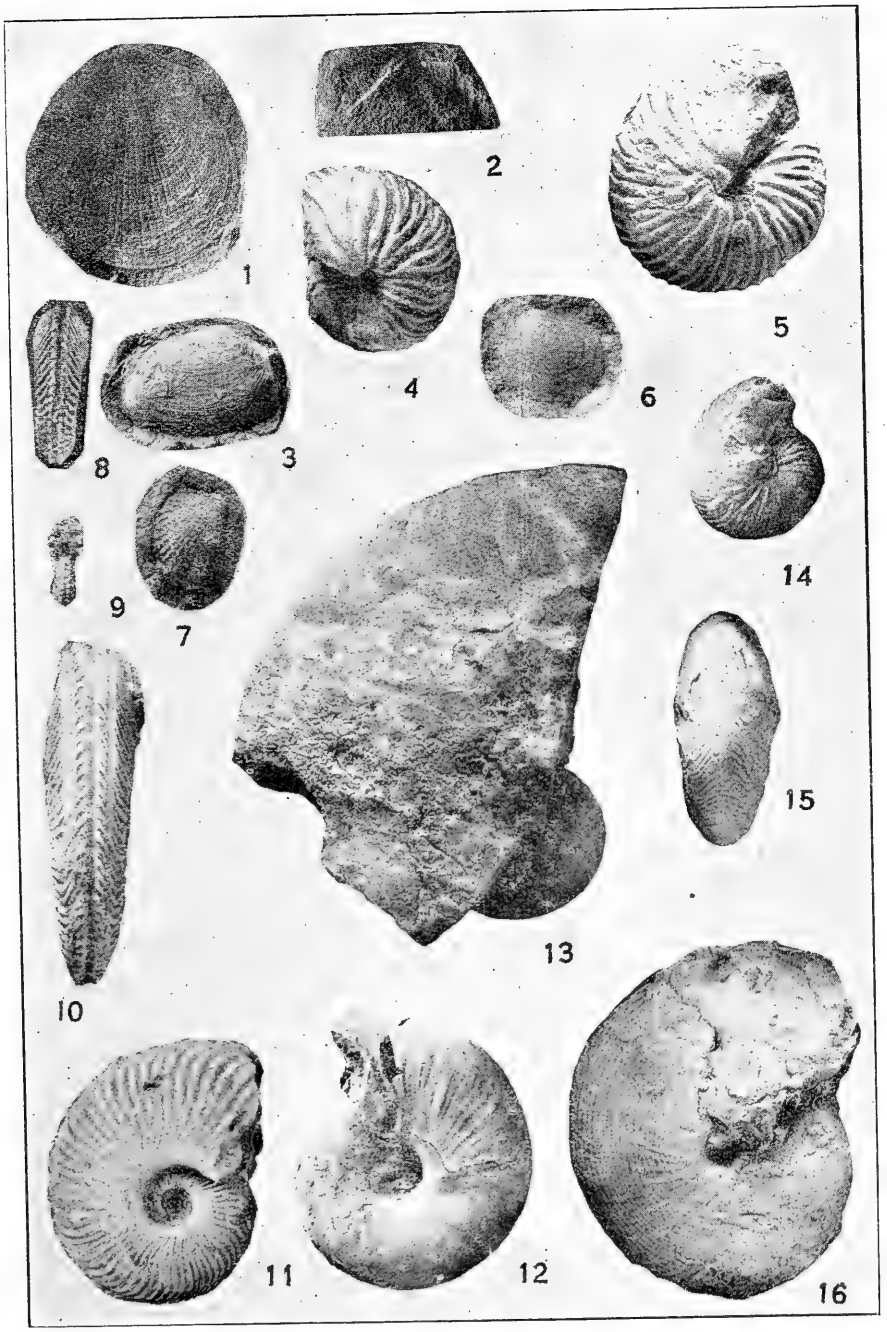
The assignment of the Peace River species to *Steinmannites* was of course not justified. Later it was referred to *Paratrachyceras.* As it shows a beginning, but only a beginning, of the *Sirenites* type of ventral ornament, it is retained in subgenus *Meginoceras* and included in the genus *Sirenites.* It differs from typical *Sirenites*, for example the genotype *Sirenites senticosus* Dittmar (Mojsisovics, 1893, p. 727, pl. 161, figs. 8-12, 14 to 15), in the fewer tubercles, clavi or short ribs marginal to the sulcus as compared with the number of costae on the sides of the whorl. There are only about 6 ventral clavi to 5 lateral costae or 8 to 7, instead of about 3 ventral clavi to each 2 costae on the sides, as in typical *Sirenites.* This means that only about every fifth, seventh or eighth costa divides on the ventral shoulder, each branch to end in a tubercle, clavus or short thick rib marginal to the ventral sulcus, instead of every second costa doing so as in the type of *Sirenites.* The Peace River shells also differ from typical *Sirenites* in the lack of tubercles on the sides of the whorl. A specimen figured as a variety of *S. senticosus* by Mojsisovics (1893, pl. 161, figs. 12a,b) however, does not appear to have tubercles on the sides of the ultimate or outermost whorl.

In growth the ventral ornament passes from a tuberculate, through a clavate, to a "short rib" or braided stage.

Silenticeras hatae (McLearn)
Plate 1, figure 12

1930 *Daphnites* (*Silenticeras*) *hatae* McLearn, Trans. Roy. Soc. Can., 3rd ser., vol. 24, sec. 4, p. 4, pl. 1, fig. 3.

This, the single species included in *Silenticeras*, resembles typical species of the Norian Alpine genus *Daphnites* Mojsisovics in the compressed form, ventral sulcus, strong projection of the falcoid growth lines and simple ceratitic suture line. It differs in the less well defined and less regular costation, even more strongly projected growth lines and greater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involution. The early Karnian Alpine genus *Klipsteinia* Mojsisovics has not the strong projection of the growth lines at the periphery, has tubercles on either side of the ventral sulcus and is more evolute.

Juvavites (Gonionotites) spickeri n. sp.
Plate 1, figure 13

This is a large, compressed, almost discoidal, involute species. The whorls are much higher than thick, have converging almost flat sides and narrow abruptly rounded venter. The umbilicus is small and has a rounded but well defined border. The surface of the outermost or ultimate whorl is not well preserved, but it appears to be smooth on the sides and costate on the ventral shoulder, where the costæ are bent forward. The outer and ventral part of the penultimate whorl is covered with arcuate, faint, very fine, approximate, even costæ or coarse striæ of low relief, the inner part with fewer and stronger costæ. The lobes of the suture line are long and narrow. The saddles are long and slender. There are at least an auxiliary saddle and an auxiliary lobe. Saddles and lobes are moderately indented.

The holotype and only specimen does not show, at the anterior end, the broadened venter of typical *Gonionotites*, but it is probable that only the beginning of the ultimate whorl is preserved.

This species has much finer costation on the inner whorls and deeper and more slender saddles than *Gonionotites italicus* Gemmellaro. *Gonionotites discus* Gemmellaro has very fine ornament on the inner whorls, but lacks the costæ on the ventral shoulder of the ultimate whorl.

Geol. Surv. collections; holotype, cat. no. 8807.

Juvavites mertoni n. sp.
Plate 1, figures 14, 15

This is a compressed, involute species. The whorls are much higher than thick and have convergent, gently convex sides and narrow, arched venter. The umbilicus is small, and the umbilical border well rounded. The surface of the outer part of the whorl of the holotype is covered with fine even costæ curved forward near the venter and continuous and strongly arcuate across it. The inner part of the side of the whorl of the holotype is poorly preserved, but appears to have only a few distantly spaced fine costæ. The inner part of the side of the whorl of the paratype has fewer and more elevated costæ than those on the outer part of the same whorl. The costation somewhat resembles that of a figured specimen of *Juvavites (Anatomites) sigismundi* Mojsisovics, but *J. mertoni* shows no constrictions. The ornament is even more like that of *Juvavites (Dimorphites?) weberi* Welter but the costation is finer.

Geol. Surv. colls; holotype, cat. no. 8828, paratype, cat. no. 8796.

Juvavites mackenzii n. sp.
Plate 1, figure 5

This is a robust, stout-whorled species with almost flattened venter. There are about 25 stout costæ on the last whorl, which are not continuous across the venter. The whorls are thinner than those of *Juvavites otiartis* Diener.

Geol. Surv. collections; holotype, cat. no. 8829.

Juvavites (Anatomites) humi n. sp.
Plate 1, figure 4

In this small, somewhat compressed species, the costæ are more curved near the venter and the almost flattened venter is narrower than in *Juvavites (Anatomites) herbichi* Mojsisovics. The costæ on the anterior part of the ultimate whorl are coarse and of strong relief. In the posterior part of this whorl, the spaces between the constrictions are partly smooth.

Geol. Surv. collections; holotype, cat. no. 8799.

Malayites dawsoni n. sp.
Plate 1, figure 16

This is a compressed, involute species. The sides of the whorls are convex and convergent, the venter rounded, the umbilicus small and the umbilical shoulder rounded. There are well defined spiral fine costae on the venter and outer part of the side of the whorl and spiral flat bands on the inner part of the side. On the inner or earlier whorls are fine radial costæ of low relief which bifurcate on the side of the whorls and are arcuate across the venter. On the outermost whorl all the radial costæ are of low relief, some have disappeared on the sides, but all remain on and near the venter, so that there may be three on the venter to one on the side. The spiral ornament, however, persists unchanged to the anterior end of the holotype specimen. The suture line has somewhat triangular fairly deeply indented, saddles and lobes.

Compared with *Malayites brouweri* Pakuckas, the Peace River species is more compressed and

the costation is not so well defined on the ultimate whorl.

Geol. Surv. collections, holotype, cat. no. 8836.

Pecten sarsianus n. sp.
Plate 1, figures 1, 2

The left valve is compressed, a little higher than long, and has a broad depression parallel to and just below the postero-dorsal margin. The greater part of the shell, but not the ears, is ornamented with very fine, widely spaced, finely nodose costæ.

Geol. Surv. collections, holotype, cat. no. 8781, paratype, 8780.

Pleuromya ? nidovana n. sp.
Plate 1, figure 3

This is a thin-shelled, quite convex species with the beaks situated about one-fourth to one-third distance from the anterior end, and evenly rounded postumbonal slope, and the surface ornamented with fine, fairly regular costæ or ridges of growth.

In form and sculpture this species closely resembles the American Karnian species described as *Posidonia madisonensis* Smith. It appears, however, to have a thinner shell.

Geol. Surv. collection; holotype, cat. no. 8775.

Monotis ? ireneana n. sp.
Plate 1, figure 6

Apparently specimens of only one valve are preserved. This is rounded to somewhat obliquely oval in outline and moderately convex. The umbones are low and the hinge line long. The surface is flattened to concave in the dorsal angles, but there is no very pronounced demarcation of wings. The surface slopes more steeply to the left "wing" than to the right. The surface is ornamented with radial, fine, even costæ of low relief with wide spaces between. If a *Monotis*, or nearly related to it, the shape suggests a right valve. The left "wing" however is not so distinct as the posterior wing of *Monotis*.

The species is smaller, less convex and has a relatively longer hinge line and finer, more distant costation than *Monotis montini* McLearn. The radial fine costæ are not so closely arranged as in *Pseudomonotis tenuistriata* Bittner.

Geological Survey collections; holotype, cat. no. 8762.

Lima napii n. sp.
Plate 1, figure 7

This is a small, moderately convex species, higher than long. The anterodorsal umbonal slope is long, rounded and abruptly descending to the anterodorsal margin. There are about 18 to 20 elevated, rounded, radiating costæ with relatively wide spaces between them.

There are more radial costæ than in *Lima subcumaunica* Krumbeck or *Lima cumaunica* Bittner.

Geological Survey collections, holotype, cat. no. 8784.

Submitted for publication
30 October 1937.

DESCRIPTION OF PLATE I

Note: All figures are of natural size unless otherwise stated.

Figure 1. *Pecten sarsianus* n. sp. Paratype. Geol. Surv. collections, cat. no. 8780.

Figure 2. Same species. Holotype. Geol. Surv. collections, cat. no. 8781.

Figure 3. *Pleuromya ? nidovana* n. sp. Holotype. Geol. Surv. collections, cat. no. 8775.

Figure 4. *Juvavites (Anatomites) humi* n. sp. Holotype, Geol. Surv. collections, cat. no. 8799.

Figure 5. *Juvavites (Anatomites) mackenzii* n. sp. Holotype. Geol. Surv. collections, cat. no. 8829.

Figure 6. *Monotis ? ireneana* n. sp. Holotype. Geol. Surv. collections, cat. no. 8762.

Figure 7. *Lima napii* n. sp. Holotype. Geol. Surv. collections, cat. no. 8784.

Figure 8. *Sirenites (Meginoceras) meginae* McLearn X 2, Ventral ornament in clavate stage. Plesiotype. Geol. Surv. collections, cat. no. 8842.

Figure 9. Same species X 2. Ventral ornament in tuberculate stage. Plesiotype, Geol. Surv. collections, cat. no. 8841.

Figure 10. Same species. Ventral ornament in "short rib" stage. Plesiotype. Geol. Surv. collections, cat. no. 8811.

Figure 11. Same species. Holotype. Geol. Surv. collections, cat. no. 9042.

Figure 12. *Silenticeras hatae* n. sp. Holotype. Geol. Surv. collections, type no. 9043.

Figure 13. *Juvavites (Gonionotites) spiekeri* n. sp. Holotype. Geol. Surv. collections, cat. no. 8807.

Figure 14. *Juvavites mertoni* n. sp. Paratype. Shows ornament on inner part of side of whorl. Geol. Surv. collections, cat. no. 8796.

Figure 15. Same species. Holotype. Geol. Surv. collections, cat. no. 8828.

Figure 16. *Malayites dawsoni* n. sp. Holotype. Geol. Surv. collections, cat. no. 8836.

DISTRIBUTION OF MARINE ORGANISMS

By C. McLEAN FRASER

DURING the last five years, distribution in the world of commerce and industry has been the subject of much discussion. Some economists place the blame for all the worries that have beset mankind during this period on the lack of international organization, or even in some cases the lack of national organization, to control or to produce the means of distribution in such a way as to provide everyone with food, clothing and the other necessities of life, that apparently are produced in sufficient quantity to supply such a demand upon them.

Distribution holds a position in the economy of the sea just as strategic as it does in the commercial and industrial world. Distribution of ocean tides and currents, upwelling and stratification, of temperature, salinity and alkalinity, of chemical elements and compounds, and of marine organisms, comes near to being the "be-all" and "end-all" of oceanography.

The appearance of man on the face of the earth and the disturbances in the balance of nature that he has wrought since his first appearance, have had less effect on and in the ocean than elsewhere, but even here it has often been very significant.

The physical and chemical constitution of the ocean has been subject to disturbance only along the shore or a short distance from it, when the sewage and the drainage from the land and the effluents of industrial plants of various kinds are poured into it, but with marine organisms, the effect may be noticeable far out to sea as well as inshore. Too often this effect has been disastrous, at least as far as individual species are concerned, since it has meant serious depletion or even complete extermination. Probably the most striking instance of such a calamity in the north eastern Pacific is the case of the sea cow, *Rhytina*. The presence of this large, defenceless species was first noted by the naturalist, Steller, in 1741, when he was with the Bering expedition, in what has since been known as the Bering sea. This species provided such a large supply of good fresh meat for the whalers, sealers, etc., who visited this sea, that depletion was rapid, and, as far as records go, none has been seen since 1768. Discovery, exploitation, extermination, all in twenty-seven years.

Sometimes there is another side to the story, but it usually comes as an afterthought. After exploitation of a species until serious depletion is evident, the exploiter may begin to worry about the possibility of continuing the exploitation, *i.e.*, he may wake up to the fact that it might be to his ultimate advantage (the good of the species is not taken into consideration) if the species were conserved. Then protection and regulation may come into the picture. If it is not too late, rehabilitation, partial or complete, may be possible. Such rehabilitation is evident in the case of the North Pacific fur seal. Through exploitation the numbers were rapidly decreasing and it appeared as though the species was doomed to extermination. In 1911, the four nations most directly concerned signed a treaty to regulate effectively the destruction of this seal for commercial purposes. Since that time the number has increased quite rapidly and before long it should be back to that of the days before fur sealing in that area was first in vogue.

To offset this, in the same area, the sea otter, protected by the same treaty, was, at this time so close to extermination, that there is little to indicate, as yet at least, that it will ever be brought back to the abundance that provided the main article of trade from this part of the coast, in the latter part of the eighteenth century.

As soon as the idea of conservation of any species comes up for consideration, it becomes evident, at once, that it is necessary to know much about the life-history of the species and its distribution, at all times of the year, before satisfactory regulation can be arranged. As the investigation to obtain such information proceeds, the scope rapidly widens, soon getting beyond the species itself, because, to know any species and its distribution, it is necessary to learn much about other species, related to, or associated with it, and the physical and chemical conditions of the sea in the different areas occupied at different times. By this time the problem is ocean wide and becomes oceanographical in its fullest sense, for, in these later days, it has become evident to oceanographers especially, but also to others interested in science or in conservation, that investigation in any one of the sciences, that go to make up

oceanography, must be interlocked and interrelated with that in every other of these sciences before the results can be satisfactory to any extent. It is practically useless to attempt to solve the problem of conservation of any species by treating the species as something apart, dissociated entirely from its setting.

The distribution of marine organisms and the conditions that account for this distribution can be examined best by studying the distribution, whether this covers much of the ocean or is confined to some small, seemingly insignificant area.

To illustrate this, hydroid distribution in the northern hemisphere may be taken for consideration. In the northern half of the northern hemisphere, most of the families and genera, and, in some cases, even the species, appear to have had a centre of origin in the polar seas. How long ago this was, and how the development in this area became initiated, it is impossible to say at present. It is quite possible that geological, geographical, and climatic conditions then were somewhat different from what they are now, possibly vastly different. In any case, these polar seas (the particular portion of these is not yet indicated) seem to have been, and are, the distribution centre.

As apparently there were no serious barriers to distribution, in time, many, if not most, of the species had a circumpolar distribution. From this circumpolar area as a base, the distribution gradually extended southward in the shallow, or comparatively shallow water, for, of course, the abyssmal depths are not well suited for such animal life. Thus it happens that many species are found in common on the west coast of Europe, the east coast of North America, the west coast of North America, and the east coast of Asia. Some of them, probably the older species, have reached as far south as 45° or even 40° north, but others have not reached anything like that distance. As far as hydroids are concerned, there is no distinct break in distribution at any point on any of these coasts. There is just a gradual dropping out of these species as the distribution extends southward.

The distribution spread to its present dimensions must have taken a long time for the facilities for transportation in hydroids are decidedly limited. Some species have a medusa phase or stage, that may last for a considerable period, but the medusa is not a strong swimmer; its pulsation movement is of little avail against tides or currents, so that in any one generation the change of general position is not likely to be great. Many of the hydroids have not even this transportation aid. There is no free swimming stage, except the young and small planula with its fleeting life of a few hours, or a few days, at most, so that the distribution spread must be very slow. Since that is the case, it is not surprising to find that new species have developed here and there as the distribution was extended, so that certain of the younger species are not necessarily present in the circumpolar area.

As mentioned previously, these hydroids are not scattered promiscuously throughout all of the oceans, north of 40° or 45°. They thrive only in certain rather well-defined areas, where the physical and chemical conditions are favourable, and of course, where they can get a satisfactory food supply. Few of them find deep water to their liking. The richest areas are probably in depths not greater than one hundred fathoms. That restricts them pretty well to the areas over, or near to, the continental shelf, and to various banks in other parts of the ocean that come to within one hundred fathoms of the surface. In these areas they are found almost entirely on hard bottom (most of them shun mud and silt), suitable for colony attachment, where the currents are such as to keep the water in motion to bring along the food supply, and where other physical and chemical conditions are favourable (it is altogether probable that these organisms need traces of iron, copper, manganese, etc., as do other animals). These suitable conditions are being determined by degrees, the case of temperature being most definite at present. Convincing evidence has been obtained that the suitable bottom temperature range for these boreal species is from 3° to 8°C.

It is not surprising that this is the very temperature range that is favourable for the halibut, and possibly for a great number of other boreal species, for it seems to be very definitely the case that a rich hydroid area is a good fishing ground and vice versa.

The detailed distribution of the individual species within this wide range has to be considered on a somewhat different basis. In an old species that has become widely distributed during the successive geological periods, while there must be an optimum temperature, salinity, etc., as well as food supply, there is likely to be a range of tolerance much greater than in a young species, developed because of special features in the immediate environment,

and hence restricted to a narrowly circumscribed area. *Sertularella tricuspidata* is present in almost every suitable area in the whole boreal zone, with a bathymetrical range from zero to 1800 fathoms. *Tubularia aurea* has been reported only from a limited area in the Queen Charlotte Islands, where the surf beats against the intertidal rocks, where they are exposed to the waves of the open ocean.

The distribution of each species, therefore, is a story in itself because no two species react in exactly the same way to any environment, or to environment in general.

In this respect then, the study of distribution is like the study of taxonomy. With little trouble, one can readily become familiar with the characters that determine phylum, class, and order, but when the acquaintance is extended to include family, genus and species, the subject becomes more and more complex, so much so, that no one can hope to master it. The best he can do is to retain his interest in the whole field as it is represented by the larger constituents and then to restrict the investigation of minute details to a small group, possibly a family or a genus, with the hope that in time he may know something worth while about them. In a similar way, one may retain an interest in the broad scheme of distribution, and at the same time, proceed to investigate the effect of environment on a limited number of species.

So much for boreal hydroids. They have been taken up because the distribution of these is better known than that in any other area so large. As a matter of contrast it might be well to consider the hydroids of the tropical and sub-tropical areas. Here too, there may be hydroids in abundance, but here the species and often the genera and even the families are different. It would seem that there was, and is, a distribution centre for these, somewhere in the vicinity of the West Indies. The present state of our knowledge of oceanography, or, may I say, palaeo-oceanography, gives no clue to an explanation of the divergence of these two distribution centres, where, in so many cases, nearly related families, and genera in the same family, have been so widely separated.

The distribution east and west, has become general in the equatorial area and from this has extended northward along the continental shelf area on each coast concerned. The distribution of the boreal and the tropical species interdigitates to some extent, so that there may be considerable mixing in the marginal areas.

The distribution centre and the distribution from the centre must have been in existence for a long period, palaeontologically speaking, active, when North and South America were separated by an extensive connection between the Atlantic and the Pacific, so that there was no barrier to the extension of the distribution into the Pacific, for the hydroids off the coast of Central America, Mexico, and over to the Galapagos Islands, show strong affinities to the hydroids of the West Indies. The species common to the two coasts or areas must be long-existing species, and there has been plenty of time for the development of many new species since the barrier appeared or reappeared. As an indication of this, it might be stated that in a recent collection made in the area above mentioned, 43 percent of the species appear to be new, *i.e.*, not previously reported, or described.

As yet insufficient oceanographic work has been done in this tropical area, to determine any of the physical and chemical limits, but one would surmise that there is quite a different optimum (in temperature, for instance,) from that in the boreal zone. Some day the range in these various conditions will become known and by that time the reason for the original divergence may become apparent.

An effort has been made to offer one glimpse at one angle of this distribution puzzle. The time and the place allow for no more. Every oceanographer may get other glimpses as he proceeds with the research in his own particular field.

The field for investigation in the distribution of marine organisms is as wide as the ocean itself. It has so many sides and so many angles, that the attempt to fit these together is as fascinating as the solution of a jigsaw puzzle, with this difference in its favour that almost every contribution to the science of oceanography throws some light on the investigation.

SOME ADDITIONAL SPECIES FROM ANTICOSTI ISLAND

By J. ADAMS

(Contribution No. 495 from the Division of Botany, Experimental Farms Branch, Department of Agriculture, Ottawa, Canada).

MY VISIT to Anticosti Island during 1936 extended from July 31 to August 13 and included a number of localities in a different part of the island, about two and a half days being spent in the neighbourhood of the Potato River. The scenery in this region is much more picturesque than that along the south shore and consists of bold headlands with deep river valleys between. The Potato River enters the sea on the north shore at a point about half way between the two extremities of the island. This central area of the island has usually been considered as a "nunatak" in that it escaped being covered with ice at the time when so much of the Canadian mainland was glaciated. This I feel inclined to doubt seeing that boulders of granite of all sizes and colours were found scattered among the shingle of the beach for a distance of a mile and a half while the native rock of the island is an impure limestone.

According to Schmitt's "Monograph" the northern region of the island is the only area in which the White Pine (*Pinus Strobus* L.) occurs. Examples of this species were found during my visit in various places with trunks a foot thick at the base along the Potato River valley and also along another smaller stream further west.

It is perhaps worthy of mention here that of the four species of plants introduced in 1933 for the purpose of feeding muskrats only one survived. This was *Acorus Calamus* which was still alive in 1935, but without flowers, in the swampy ground near the Chateau Menier. The other locality was in the swamp near Anse aux Fraises where it still existed in 1936 but did not flower. Presumably it is only a question of time until it becomes extinct.

The present list contains the names of 19 species of which two (marked with an asterisk) were doubtless introduced. It is highly probable that there still exist on this island a considerable number of species belonging to higher groups which have not so far been discovered.

For the identification of the two species of Lichens I am indebted to Mr. Raymond H. Torrey of New York.

LICHENES

Alectoria jubata (L.) Ach. Whitehead Lake.

Usnea trichodea Ach. Whitehead Lake.

MONOCOTYLEDONAE

CYPERACEAE

Carex canescens L. Along logging railway near Port Menier.

C. concinna R. Br. Potato River valley.

C. diandra Schrank. Along logging railway near Port Menier; also near Baie Ste. Claire.

GRAMINEAE

Calamagrostis inexpansa A. Gray. Potato River valley.

Poa palustris L., Cape Henry.

P. pratensis L., Ellis Bay vicinity.

ORCHIDACEAE

Corallorrhiza maculata Raf. Potato River valley.

Listera convallarioides Torr. Potato River valley.

POTAMOGETONACEAE

Potamogeton heterophyllus Schreb. Lake Simonne.

P. pusillus L. Whitehead Lake.

DICOTYLEDONAE

COMPOSITAE

Aster foliaceus Lindl. Ellis Bay vicinity.

**Hieracium vulgatum* Fries. Potato River valley.

CRUCIFERAE

**Lepidium densiflorum* Schrad. Shore east of Carleton Point lighthouse.

HALORAGACEAE

Myriophyllum alterniflorum DC. Lake Simonne.

OENOTHERACEAE

Circaea alpina L. Cape Henry.

Epilobium anagallidifolium Lam. Potato River valley.

PYROLACEAE

Pyrola chlorantha Sw. Potato River valley.

THE FOOD OF THE SNOWY OWL (*Nyctea nyctea*) DURING A MIGRATION TO THE GULF OF ST. LAWRENCE

By R. A. JOHNSON

DURING November and Decembeer, 1933, there was a snowy owl migration from the mainland to the islands in the vicinity of Cape Whittle on the north shore of the Gulf of St. Lawrence. In this vicinity there are numerous islands ranging in size from small barren rocks to islands of many acres with a dense low growing cover of vegetation. The islands are all of granite formation and have been lifted from the sea since glaciation. They are for the most part clothed with the same vegetative cover as the nearby mainland. Some of the islands are within a fraction of a mile of the mainland. Others range from three to six miles offshore.

The mouse population[1] (mostly *Microtus*) on these islands is cyclic being very dense some years. It appears to become much denser on some of the islands than on the mainland. During the summers of 1931 to 1933 the density of population appeared to be reaching a maximum. During the summer of 1933 after a winter when rabbits were plentiful on the mainland, some were found stranded on a few of the islands to which they had traveled over the ice. The western island of the St. Mary Islands group is reported to have yielded 28 rabbits for a one day hunt in the fall of 1933. In addition to these I found three skeletons during the following summer. No rabbits were seen on any of the islands during the summer of 1934.

These islands in the fall of 1933 must have offered considerable attraction to owls in search of food. As early as 1927-28 (Strong; *Journal of Mammalogy* Feb., 1930.) the northern regions of Labrador had reached a very low ebb in the numbers of all species, resident as well as migratory. "It was not at all unusual to travel fifty or sixty miles a day in the utterly uninhabited interior and not see a single bird or animal track, let alone any living creature." If this condition of scarcity did gradually move toward the south of the Labrador peninsula it did not, according to my observations, affect seriously the mouse population of the islands in the gulf until the fall and winter of 1933. But when I visited the vicinity of Yankee Harbour and the Boat Islands in the summer of 1934, mice had become so scarce on the islands that one could see very little fresh evidence of their presence. Only two or three visited my camp kitchen during the summer.

While traveling over the islands during the summer of 1934 I found pellets of large owls to be very numerous. These were not fresh, but had been deposited several months before. Their location indicated the perching places of the owls on all the higher rocks and on the frame work of beacons constructed as an aid to navigation. Mr. Fred Osborne, lighthouse keeper on the St. Mary Islands, stated that, "During the latter part of November and early December of 1933 these white owls were to be seen, one on every hill on the islands". How long the owls remained in the vicinity is unknown since Mr. Osborne leaves the islands at the close of navigation, about the middle of December.

As a means of determining the nature of the food of this migration I collected during the following summer, seventy-five pellet ejections for laboratory analysis. Each collection, I believe represents the food of an owl during one active feeding period. The following is a summary of the analysis of the pellets[2].

58 contained nothing but remains of mice.
8 contained parts of Black Guillemot in addition to remains of mice.
7 contained parts of Dovekie in addition to remains of mice.
5 contained parts of passerine birds in addition to remains of mice.
1 contained feathers of an Eider duck in addition to the foot of a rabbit.
1 contained remains of a rabbit in addition to remains of mice.

It is not possible that the entire blame for the diminution in the mouse population which took place on the islands between the summer of 1933 and of 1934, should be charged against the owls. Considering the density of the mouse population of 1933 as shown by the excrement, burrows, and destroyed vegetation it is more feasible to suppose that the same destructive influences which depopulated the mainland came to influence the island populations at a later date. During the winter, rabbits and foxes from the mainland go to the outer islands[3] and it may be assumed that mice do so also. It would be quite possible for disease to reach the island populations. Yet this might happen

some time later than its effect was shown on the mainland. Such appeared to be the situation in 1933 on these islands. What attraction the mouse population had for the snowy owls, if any, can only be stated as a speculation, but whatever factors brought them worked some havoc on the smaller birds present.

1. According to Dr. C. E. Johnson, formerly of the College of Forestry of Syracuse University these mice (from specimens collected by me) are mostly *Microtus pennsylvanicus fontigenus*. One specimen of *Synaptomys borealis* was taken on Lake Island in 1930.

2. I am indebted to Miss Vera Davie for valued assistance in the laboratory analysis of the owl pellets.

3. In the fall of 1934 a muskrat (young of the year) migrated to the St. Mary Islands. At one place this animal had to swim approximately three miles in the open sea to reach these outer islands.

NOTES AND OBSERVATIONS

TWENTY YEAR OLD FERRUGINOUS ROUGH-LEGGED HAWK. — A leather collar to which was fastened a bell and a name plate bearing a return address and the date was attached to the neck of a Ferruginous Rough-legged Hawk at Clayton, New Mexico, on January 7, 1917. Approximately 20 years later, presumably during the spring of 1937, this hawk was found dead at Strongfield, Saskatchewan. The bird is reported to have wintered at Clayton during the years of 1918 and 1919, and to have nested in the same tree at Strongfield for the last 4 or 5 years prior to its death. The collar, bell and tag were returned to the person who placed them on the hawk and he positively identified them, and supplied the information upon which this item is based.

Official numbered leg bands are now being used in tracing bird migrations and solving problems relating to the general life histories of native wild birds. The Controller, National Parks Bureau, Ottawa, has custody of the Official Canadian Bird-Banding Records, and the work is being conducted in full cooperation with the United States Bureau of Biological Survey, Washington, D.C. Persons who take or find banded birds should help with this important scientific investigation by reporting the facts to the Central Bureaus. — HOYES LLOYD.

REVIEW

LES INSECTES FOSSILES DES TERRAINS OLIGOCENES DE FRANCE. *by Nicolas Théobald. 473 pp. 29 pls. many text figures. Nancy, 1937. On sale by the author (6, Avenue du Château, Malzéville près Nancy, France) 120 francs.*

Fossil Insects are rare, but their scarcity makes them all the more interesting. Dr. Théobald has made an exhaustive study of the species present in the Oligocene of France, but he has not confined his work to a mere enumeration of genera and species. A section on the stratigraphy of the non-marine Oligocene which takes up fully one-quarter of the volume gives the reader the geological background for the palaeontological work. Then follows the detailed study of 650 species, 300 of which are new. After the account of each locality the author describes the conditions which obtained when the insects were living, basing his conclusions on the habits of the living relatives of the fossil species and the relative abundance of each group. For instance, the abundance of *Mycetophilidae* (flies whose larvae feed on fungi) indicates a moist climates; the predominance of the *Bibionidae* confirms the affinity between Oligocene faunas and modern Oriental and American faunas.

The study of these fossils has thrown some light on many problems of sedimentation and palaeogeography. An interesting series of conclusions bears on climatology; climatic zones were already established in Oligocene time but differed slightly from those of to-day.

This monograph is of special interest to Canadian palaeontologists, since we too have deposits in which fossil insects are found. A re-study of the Tertiary Insects of southern British Columbia, using Dr. Théobald's methods would give some interesting results. Certainly, whenever and wherever work is done on fossil insects, Dr. Théobald's monograph will be an indispensable reference and a model for work of the same nature.—A. L.

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CHRISTMAS BIRD CENSUS

The Bird Census Committee wishes to remind any interested readers to take a Christmas Bird Census on some day between December 20 and 28, and send a report of it to the Editor as promptly as possible. For the kind of report desired, please see published reports of previous years and discussion in The Canadian Field-Naturalist for September, 1933, pages 112-116.

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