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## THE VERTEBRATES OF THE OTTER LAKE REGION, DORSET, ONTARIO.

BY A. H. WRIGHT AND S. E. R. SIMPSON.

### I.—GENERAL ACCOUNT.

BY A. H. WRIGHT.

The district covered by these notes might well be termed the Lake of Bays region. More strictly they pertain to the extreme eastern part of Muskoka from the longitude of Portage (between Peninsula Lake and Lake of Bays) to that of Hollow lake (Lake Kawagama, or Kahweambelewgamat or Kahweamhegegawagamag) in northwestern Haliburton. In latitude they relate of the region from Dorset on Trading lake (the eastern end of Lake of Bays navigation) northward to Algonquin Park Station in southwestern Nipissing. The center of activity is at Camp Otter (Professor C. V. P. Young, Cornell '99, Director) on Otter lake which is two miles north of Dorset. The waters and woodlands of the above roughly outlined district are more or less traversed each summer by councillors of this camp.

Camp Otter is now in its eleventh season. From its beginning Prof. and Mrs. C. V. P. Young, its directors, have been interested in various phases of animal and plant life. Early associated with them were Dr. and Mrs. S. A. Munford and later Dr. and Mrs. Abram T. Kerr, of Ithaca, N.Y. Besides those who have encouraged the study of natural history in this region, have been several students or associates of the senior author. Some of these resident naturalists have been Prof. Asa C. Chandler, Mr. Frank M. Kilburn, Prof. E. L. Palmer, Mr. G. M. O'Connell (several seasons), Dr. H. C. Bull, Mr. D. C. Gamble and Mr. S. E. R. Simpson. We have added some observations of Mrs. Julia Moesel Haber (Prof. of Zoology in Elmira College, Elmira, N.Y.) for Fox Point (1911). Several summers Mr. L. A. Fuertes, the bird artist, has spent varying periods in the camp.

These lists are presented with the idea of starting a permanent catalogue of animal and plant forms of the region.

Otter Lake is distinctly in the Canadian life zone. The coniferous evergreens are: larch, black spruce, balsam fir, arbor vitae, hemlock, white and

red pines, and common juniper (*Juniperus communis*). Back of camp in the deeper woods or undisturbed areas occur plenty of yellow and paper birches, sugar maples, mountain ash with undergrowth of mountain and striped maples, hobblebush, beaked hazel nut and hoary alder (*A. incana*). In the more open places are quaking aspen, large toothed poplar and some balsam poplar.

Along the road southward to Dorset and Lake of Bays where sparse settlement begins, occur a few basswood, American elm, white ash, black birch, staghorn sumac, scarlet oak, choke cherry, alternate-leaved dogwood, thorn apple (*Crataegus* sp.), and (*Diervilla Lonicera*), unmistakable signs of the Transition Zone. No black walnuts, butternuts, nor hickories were recorded. On Rock Island of Otter lake and along some roads occur red oak, wild red cherry, june berry, Bebb's willow.

Along the road to Hardwood lake and at Hardwood lake a similar element we have, in some beeches among many maples and birches, plenty of wild black and red cherries, staghorn sumac, black elders, alternate-leaved dogwood and white ash.

Around or in peat bogs occur: leather leaf, bog rosemary, withe rod (*Viburnum cassinoides*), blueberries (*Vaccinium pennsylvanicum*, *V. p. nigrum*, *V. canadense*), black alder (*Ilex verticillata*), skunk currant (*Ribes prostratum*) and mountain holly (*Nemopanthus mucronata*) the last being rare.

Around some of the lakes or in swampy edges were found sweet gale (*Myrica Gale*) red berried elder, glaucous willow, shining willow, meadow sweet and black ash.

Other trees and shrubs which proved uncommon about camp were red-osier dogwood, sheep laurel (*Kalmia angustifolia*), American fly honeysuckle, hop hornbean (*Ostrya virginiana*).

The herbaceous flora reveals a strong Canadian cast. Around the camp site are twin-flower (*Linnæa borealis*), dwarf cornel (*C. canadensis*), common wood sorrel (*Oxalis acetosella*), pale corydalis (*Corydalis sempervirens*), bristly sarsaparilla,

(*Aralia hispida*), enchanter's nightshade (*Circaea alpina*), yellow Clintonia (*Clintonia borealis*), painted trillium (*Trillium undulatum*), large coral root (*Corallorhiza maculata*), shin-leaves (*Pyrola elliptica*, *P. cholorantha*, *P. minor*), false-lily of valley, (*Maianthemum canadense*) and twisted stalk (*Streptopus*).

In and around the peat bog were (*Cypripedium acaule*) both normal pink, and albino yellow-petalled specimens, small greenwood orchis (*Habenaria clavellata*), small northern bog orchis (*H. obtusata*), rattlesnake plantain (*Epipactis pubescens*), nodding ladies' tresses (*Spiranthes cernua*), multitudes of grass pink (*Calopogon pulchellus*) and rose pogonia (*Pogonia ophioglossoides*), gold-thread (*Coptis trifolia*), creeping snow-berry (*Chio-genes hispudula*), dwarf raspberry (*Rubus triflorus*), Dalibarda (*D. repens*), both cranberries, three-leaved Solomon's seal (*Smilacina trifolia*), arbutus (*E. repens*), masses of horned bladderwort (*Utricularia cornuta*), lance-leaved violet (*Viola lanceolata*), naked bishop's cap (*Mitella nuda*), Indian cucumber-root (*Medeola virginiana*) and *Aster junceus*, spatulate and round-leaved sundews (*Drosera intermedia* and *D. rotundifolia*), and Canadian and marsh St. John's wort (*Hypericum canadense*, *Triadenum virginicum*).

On the more open hillside opposite camp and toward Dorset were narrow-leaved gentians (*Gentiana linearis*) and the northern bed straw (*Galium boreale*).

The mammals are decidedly of Canadian affinity, but with the rare appearance of wildcat, raccoon, black squirrel, transition zone influences enter.

In the birds more transitional forms appear rarely or sparingly, toward Dorset, southward and westward to wit: towhee, woodthrush, yellow-throated vireo, Baltimore oriole, catbird, whippoorwill, least flycatcher, indigobird, yellow warbler, parula warbler, red-headed woodpecker, Maryland yellow-throat.

Thus in trees, herbaceous under-cover, birds and mammals there is close agreement in the preponderance of Canadian forms. At Otter Lake and northward, the incursion of the transition element is not so pronounced as at Huntsville, where railroad and other civilized encroachments play a greater role. The ride from Huntsville to Dorset and thence by foot to Otter lake emphasizes this difference to the trained observer.

To such as might wish to know what ferns we casually observed the list is:

*Woodsia Ilvensis*  
*Osmunda Claytoniana*  
*Onoclea sensibilis*  
*Osmunda cinnanomea*

*Osmunda regalis*  
*Dicksonia punctilobula*  
*Polystichum acrostichoides*  
*Aspidium noveboracense*  
*Aspidium cristatum*  
*Aspidium marginale*  
*Asplenium Filix-femina*  
*Pteris aquilina*  
*Polypodium vulgare*  
*Phegopteris polypodioides*  
*Phegopteris hexagonoptera*  
*Phegopteris Dryopteris*.

## II.—THE FISH.

BY A. H. WRIGHT.

The present list of sixteen species reveals the scanty variety of the Highlands of Ontario. Several of these are introduced species. Others are stock introduced to replenish the supply of the waning species in this series of lakes which are two hundred or more feet higher than the Muskoka group. The decided barriers do not permit incursions from the great variety of the Great Lakes. The region, however, abounds in individuals of the few game species it possesses. For comparison, we have employed Meek's<sup>1</sup> results in the Highlands of Ontario. He began at Hawkestone and Orillia on Lake Simcoe and followed the Grand Trunk railroad through Gravenhurst (Muskoka lakes) to Trout Creek and North Bay (Lake Nipissing). All the way northward the railroad bears away from Georgian bay and the stations he successively came to were successively farther away from it in barriers, etc. Lake Simcoe and the Muskoka lakes are much nearer Georgian bay and Lake Ontario than Lake of Bays or Otter lake. Hence the Great Lakes' complex of Lake Simcoe with silversided minnow (*N. atherinoides*), log perch (*Percina caprodes zebra*), spot-tailed minnow (*Notropis hudsonius*), silvery minnow (*Hybognathus nuchalis*), trout-perch (*Percopsis omiscomaycus*) and long-nosed dace (*Rhinichthys cataractae*), or Moon liver just below Muskoka lake (Bala) with log perch, spot-tail minnow and silvery minnow. Such species are never to be expected in Otter lake unless introduced or unless it was geologically connected with the Great Lakes. Otter Lake seems more comparable to Trout Creek. The former has sucker, horned dace, red-bellied dace, fathead, Cope's minnow, shiner, brook trout, pumpkin seed; the latter has suckers, horned dace, red-bellied dace, fathead, blunthead, shiner, brook trout, brook stickleback, nine-spined stickleback and pumpkin seed.

(1) Meek, S. E. Field Columbian Museum Zoological Series, Volume I, No. 17, Publ. 41, November, 1899, pp. 307-311 and Volume III, No. 7, Publ. 67, July, 1902, pp. 131-140.

and in the blunthead and nine-spined stickleback shows slightly greatly affinity to the Great Lakes than Otter Lake. Most previous lists for Ontario<sup>2</sup> although of some help related too much to the ichthyologist's boundary paradises and reservoirs, namely: Lakes Ontario, Erie, Huron and Superior, to be of particular service in the study of the far inland lakes of the province.

*Ameiurus nebulosus* (Le Sueur). Catfish.

Common in the weedy edges of Otter lake where pickerel-weed, pipe-wort, watershield and other water plants abound. Also found in outlet of the Peat bog. We found no catfish in Fletcher lake.

*Catostomus commersonii* (Lacepede). Sucker.

Reported as common throughout the region. I secured it at Otter lake. Meek secured it at Gravenhurst and Trout creek.

*Chrosomus erythrogaster* Rafinesque. Red-bellied Dace.

The most common minnow of all these lakes. It is especially a minnow of quiet clear water, both lakes and streams. Every lake or pond visited if it had minnow at all harbored mainly red-bellied dace. Meek secured it at Muskoka lake and Trout creek. Also taken by Professor Macoun in Algonquin Park.

*Pimephales promelas* Rafinesque. Fat-head.

On August 11, 1913, we seined several "fat-heads" in a marshy place of Otter lake. Meek secured it at Trout Creek.

*Notropis cayuga* Meek. Cayuga Minnow.

In weedy shallows of Otter lake and its peat bog pond we found this species. I believe this the same as Meek's *N. muskoka* taken by him at Gravenhurst and other places.

*Notropis cornutus* (Mitchill). Shiner.

The shiner or redfin occurs in many of the lakes of the region. Taken by us in Otter, Harvey Jr., and other lakes.

*Semotilus atromaculatus* (Mitchill). Horned Dact. Creek Chub.

Widely distributed. It was found in Otter, Harvey Jr., Fletcher and other lakes. Meek had it from Gravenhurst and Trout Creek.

*Leuciscus neogaeus* (Cope). Cope's Minnow.

In weedy shallows of Otter Lake, we secured representatives of this form on July 29 and August 11, 1913, associated with red-bellied dace.

*Esox lucius* (Linnaeus). Pike.

So far as we could determine there are no native pike (*E. lucius*), pickerel (*E. tridecemlineatus*) and lunge (*E. masquinongy*) in Lake of Bays, Hollow Lake, Fletcher Lake and other lakes of this

region, and no one was found to report introduced fish of these three species. Meek reports the pike and lunge from Muskoka Lake.

*Eupomotis gibbosus* (Linnaeus). "Pumpkin Seed."

Common from Lake of Bays to Algonquin Park. The boys of camp brought us sunfish from Harvey Jr., Hardwood, Fletcher and other lakes and they were not uncommon in Otter Lake. Rock bass are not in these lakes but held by local fishermen to be in lower lakes although Meek stated there were no rock bass in the lakes of the Highlands of Ontario.

*Micropterus dolomieu* Lacepede. Small-mouthed Black Bass.

Not reported from Lake of Bays eastward or northward. Meek secured it on Muskoka Lake.

*Perca flavescens* (Mitchill). Perch.

Taken in several lakes in 1913. Common in Fletcher, Skin and Porridge lakes, but not very large. Held to be put in these lakes by the Dominion government twenty or more years before. The stock is supposed to have come from Orillia. Also taken in Lake of Bays. Meek secured them at Gravenhurst.

*Cristivomer namaycush* (Walbaum).

Common in many of the lakes of the region. Held by many residents to be native of Hollow, Kimball, Bear and some other lakes. In others like Hardwood they were held to be introduced about June, 1889. About Hollow Lake, Lake of Bays, and other lakes of the region they allude to larger gray trout with white flesh and smaller salmon trout with reddish flesh.

*Salvelinus fontinalis* (Mitchill.) "Speckled Trout." Brook Trout.

Common in lakes of the region. Taken in Otter, Fletcher and Harvey lakes and others more remote.

*Coregonus clupeiformis* (Mitchill). Whitefish.

We saw no whitefish. One informant said there was a whitefish caught in the shallows of Hollow lake during the fall and winter. Others state that there is a whitefish in Lake of Bays. Whether these are true whitefishes or ciscos remains to be discovered. Some of the rangers assert there are whitefish lower down at Orillia, Peterboro, etc., but not here.

*Lota maculosa* (LeSueur). Ling.

This species is reported as very common in Lake of Bays, and Hollow lake where they are caught on night lines.

### III.—THE BATRACHIANS AND THE REPTILES.

BY A. H. WRIGHT AND S. E. R. SIMPSON.

#### THE SALAMANDERS.

Nash (1908) gives ten species of salamanders

(2) Nash, C. W., Checklist of the Fish of Ontario. Dept. of Education, Toronto, 1908. Also, "Fishes of Toronto" in "The Natural History of Toronto Region, Ontario, Canada, pp. 249-371.

for Ontario; Piersol (1913) seven for the Toronto region; and Patch (1918) six from Ottawa. Our list should include *Ambystoma maculatum*, *Eurycea bislineata*, *Notophthalmus* v. *viridescens*, *Ambystoma jeffersonianum*, and *Plethodon cinereus*. As yet we have recorded at Otter Lake or in its environs (within 10 miles) only the last three; the same species which Meek (1899, 1900) took in Gravenhurst or Trout Creek. Little effort has been made for their search except in the summer of 1913.

*Notophthalmus* v. *viridescens* (Rafinesque). Common Newt.

Two or three records of this form were made in the summer of 1913. It is, however, rare. Meek took one near Gravenhurst, September, 1899.

*Ambystoma jeffersonianum* (Green). Jefferson's Salamander.

Recorded only once in 1913 at Otter Lake. Meek and Clark (1900) secured two specimens from Trout Creek to the northward.

*Plethodon cinereus* (Green). Red-backed Salamander.

Rather uncommon about Otter Lake. Taken at three different times in 1913 by Messrs. C. V. P. Young and E. Bennett. All the material was of the red-backed phase. Inasmuch as these records were within the species' breeding season, all were found in rotting logs.

#### THE FROGS.

*Bufo americanus* Holbrook. American Toad.

Abundant. Between June 29-July 3, 1913, we found numerous transforming and transformed toads in the trails and roads. In August, 1919, they were found just transformed in some places. Most of the adults are much spotted below.

*Hyla crucifer* Wied. Spring Peeper.

Meek found this form common in September, 1899, near Gravenhurst but scarce in June 1900. It is solely a question of voice records. In 1913 lone peepers were heard from June 28-July 6. Throughout most of July they were quiet, except for a few at the very end of the month. By August 10, 1913, stray peepers began to call and from then onward into September they were not uncommonly heard. We recorded them at Lake of Bays, Gem, Hardwood, Crozier, Fletcher, and Otter lakes. We took them in midsummer in the woods, in dried up swampy areas, and around the edges of the lakes.

*Hyla* v. *versicolor* Le Conte. Tree Toad.

Not commonly found during midsummer after the breeding seasons of late May-July. Heard in late June or early July (9th) in 1913. In 1919 heard occasionally throughout the summer. Some-

times in midsummer we find them amongst the moist leaves around the lakes or in swampy areas.

*Rana catesbeiana* Shaw. Bullfrog.

Meek found it abundant at Gravenhurst and Bala and so it is at Otter Lake. The boys of this camp frequently catch them for food. By day they often club them with a paddle or with a stick, catch them by hand or with red flannel and hook. In the last of June and early July the bullfrog chorus is quite pronounced. After the middle of July, or July 20th, a few males are heard at night. Egg laying may rarely extend to August 1, some females taken on July 25, 1913, being unspent.

*Rana clamitans* Latreille. Green Frog.

Meek found it very abundant at Gravenhurst and at Bala. Very common in the Otter lake region. This species normally transforms in June and July but in August 25, 1919, newly transformed specimens were found.

*Rana palustris* Le Conte.

Scarce. In the summer of 1913 all of our records of this species came between July 14 and 25. Then only isolated specimens were discovered.

*Rana pipiens* (Schreber.) Leopard Frog.

The most abundant frog of the region.

*Rana septentrionalis* Baird. Mink Frog.

Not uncommon in the Otter lake region. They were heard croaking from July 7-16, 1913, in a small peaty lake near Otter lake. Later on July 24, 1913 (in Ten Mile creek) between Lake of Bays and Otter lake we found them common among lily pads, also at Porridge lake, July 28, 1913 and on Fletcher lake, September 1, 1913. In 1919 in the middle and last of August sixty or more were taken with a net from the lily pads.

*Rana sylvatica* Le Conte. Wood Frog.

In 1913, we secured only two newly transformed specimens on July 8 and July 24, and three adults, July 25. All were lost and we are unable to identify them positively as *R. sylvatica*. It is a woodland form in midsummer, very seldom seen.

#### THE SNAKES.

Nash gives 17 species of snakes for Ontario. J. B. Williams finds 9 species in the Toronto region, Meek, 3 species in Muskoka country and Patch, 2 species in the vicinity of Ottawa. We have five species in our list. Three more may be later reported by subsequent writers. We found no clue to the ribbon snake at all. The natives described two other snakes, one apparently the milk snake (*Lampropeltis triangulum triangulum*) and another the spreading adder (*Heterodon contortrix*) from the region somewhat south of Lake of Bays.

*Diadophis punctatus* (Linné.) Ring-necked snake.

In the summer of 1913 we recorded six specimens of this species, mainly along the road to Dorset and on the cliff to the west of camp. In 1919 one was found in mid-August between Otter lake and Dorset.

*Liopeltis vernalis* (Harlan.) Green Snake.

Meek secured one at Gravenhurst and G. S. Miller, Jr., Aug. 6, 1896, saw a green snake at this same place. Several of the natives voluntarily described a "grass green snake not very common." We have not yet taken it.

*Natrix sipedon sipedon* (Linné.) Water Snake.

Meek took one specimen at Gravenhurst and the species is uncommon in the Lake of the Bays region. Many of the natives call it a "black snake." *Storeria occipito-maculata* (Storer.) Red-bellied Snake.

This and the ring-necked snake are of about equal occurrence in the region. Through 1913 and in August, 1919 we recorded four specimens

of this species.

*Thamnophis sirtalis sirtalis* (Linné.) Garter Snake.

Abundant; the snake of the region. On August 11, 1913 one of our captive garters gave birth to 19 young.

#### THE TURTLES.

*Chelydra serpentina* (Linné.) Snapping Turtle.

Uncommon. Found more in muddy creeks and ponds than in the open lake. We took one July 23, 1913, in Fletcher lake with a carapace length of 18-20 inches. On the road to Dorset in the last of August, 1919, another specimen was taken with head width of three inches. Sometimes called "Black-turtle" in this region.

*Chrysemys marginata marginata* (Agassiz.) Western Painted Turtle.

We have not seen this form in this region but the natives describe a small mud turtle other than the snapper and the description accords well with this species.

(To be continued.)

## THE LARGER FRESHWATER-CRUSTACEA FROM CANADA AND ALASKA.

BY FRITS JOHANSEN.

(Continued from Vol. XXXIV, page 132)

### II.—ISOPODA.

This order of crustacea has a great number of representatives in the sea, some of which live parasitically on fishes, other crustacea, etc., and are correspondingly deformed, especially the females. Three families are known from freshwater on this continent.

They have the following characters in common with the amphipods; a many segmented body, no carapace, but the head and first thoracic segment united, and the eyes, when present, sessile. While the body of an amphipod is compressed that of an isopod is depressed thus making the latter a less capable swimmer, but admirably suited for dodging under stones, etc., and attaching itself to moving animals. It is true that certain of the marine forms (*Mesidothea* sp.) are good swimmers (using their legs), and live almost a pelagic life when they are very young (just after leaving the brood-pouch), but they soon change this for crawling over or burrowing in the sea bottom, the typical life for most of the isopods. The eggs are carried by the females on the underside of the body in a brood-pouch,\*

as in the amphipods, and the young ones also remain inside the pouch some time after hatching. The newborn young are practically like their parents though different in color and the proportional size of the various parts of the body, and the embryonal development inside the egg is said to be not quite so complete as with the amphipods. A popular name for the isopods is "sow-bugs," and it is well known that certain of them (*Oniscus*, etc.) live on land under bark or stones, etc. The marine and terrestrial forms are predacious, while those in freshwater feed upon decaying vegetable matter. Owing to their more hidden habit the freshwater forms are not quite so important an item in the food of fishes, birds, etc., though the marine or brackish water forms are decidedly so. Among the latter is the large interesting species *Mesidothea entomon*, which has a circumpolar distribution and also is found as a glacial marine relict in the large lakes of Sweden and in the Baltic. In the arctic it is a littoral form and one of the most characteristic and commonest invertebrates along the coast west of Hudson Bay. I have observed (arctic Alaska) how it will enter the estuaries of rivers or smaller water courses at high tide, remain there in quiet

\*Formed by lamellae from the thoracic legs.

pool† and gradually ascend the streams so that it is even found in certain large freshwater lakes near the coast and serves as food for typical freshwater-fishes (lake-trout, etc.). It has not, however, in the arctic becomes a freshwater species to the same extent as has other crustacea, *Mysis relicta* Lovén (see Rep. Canad., Arct. Exped., 1913-18, Vol. VII, Parts B. and D.).

Of the three families of freshwater isopods occurring on this continent the one (Cirolanidae) is represented by a blind form in artesian wells and has so far only been found in the United States, and the other is that of the parasitic Bopyridae found upon higher crustacea (Decapoda). Nor has this latter yet been recorded from Canada or Alaska; the females in the genus *Probopyrus* become, after attachment to their host, peculiarly deformed and unsymmetrical while the young individuals and males are more normal in habit and appearance. There is a great number of marine forms of this family. The third family of freshwater-isopods is the Asellidae, which is represented by three genera of which one has so far only been recorded from the United States, and as with the species of the two preceding families is apparently missing from Canada and Alaska. It is found in underground caves or artesian wells. The Asellidae are distinguished from the Cirolanidae by the fact that the last pair of tail feet (uropods) are not inserted laterally on the telson so as to form a tail-fan, but at the posterior end. As mentioned above the family is represented in Canada by two genera. The first (*Mancasellus*) of these has only one species *M. tenax* Smith, in Canada and probably does not occur in Alaska. It is easily separated (see Huntsman's figures) from the one species of the other genus *Asellus communis* Say also occurring in Canada by the extended, truncate epimera (segmental processes) and by the head being much broader than long and with a deep incision on each side; characters which can be ascertained even in very young individuals. It has thus a much greater transverse diameter than has *Asellus communis* and is superficially not unlike its terrestrial relatives though lacking the latter's ability to roll itself up into a ball. It is far less abundant than *Asellus*, and seems to be still more retiring with mode of life, being mainly found under stones, etc., nor is it found in temporary pools and streams where the other is often found. Its distribution in Canada seems to be somewhat like that of *Eucrangonyx gracilis*, and limited to the Great Lakes area (Superior, Huron, Georgian Bay, Lake Ontario, upper St. Lawrence river, the Ottawa valley and southern Ontario); in the United States it has been recorded

†Perhaps for breeding purposes (See C.A.E. report).

from Lake Superior to the Detroit river. Its maximum length is not quite 1½ cm. About its life-history little has been known, but I am able to give some interesting data recently acquired. Thus among the specimens sent me by Prof. E. M. Walker of Toronto and collected near Lake Simcoe, Ont., on May 30, 1917, some of the females had eggs in the brood-pouch. I secured a great number of very young (3-4 mm. long) individuals of this species under stones in a bight of the Ottawa river on July 6, 1919.

The same day I found young *Asellus communis* of a corresponding size, and could thus compare them. The young *Mancasellus* could be distinguished from the young *Asellus* not only by the characters given above (greater width, lateral incision in head, etc.), but also by a very characteristic pattern of four dark brown, longitudinal stripes upon their dorsal side quite lacking on the paler young of *Asellus*. There was some variation among the different young *Mancasellus* in the intensity and distribution of the longitudinal, dorsal stripes, but the pattern was always the same, and I found it to hold good also for the young (below 5 mm.) *Mancasellus* which I secured at Alexandria Bay, N.Y., on September 1, 1919 (see below). The full-grown *Mancasellus* I collected, also, show some traces of this pattern (the animals were dusky dorsally), so it seems to be a characteristic of the young individuals. It was interesting to note, that the average size of the young *Mancasellus* collected on July 6th was larger (3-4 mm.), than that of the young *Asellus* (3 mm.) on the same date; the broods of *Mancasellus* are probably born somewhat earlier or grow faster than is the case with *Asellus*. From observations I have made regarding the birth of the young *Asellus* and the rather slow growth of both species I can say almost with certainty, that these young ones of both species taken on July 6th are about two months old. Their habits were quite the same as those of the adults.

New records of *Mancasellus tenax* for Canada are as follows:

Several young ones (below 5 mm.) from under stones in bight canal at Alexandria Bay, Thousand Islands, N.Y., Sept. 1, 1919, (F. Johansen).

One full grown (13 mm.) male from among stones; Fairy Lake, near Hull, P.Q., May 5, 1918. (F. Johansen).

One adult, Fairy Lake, P.Q., April 25, 1920. (F. Johansen).

Many specimens (various sizes) from Bridgman's Creek, Chelsea Road, Hull, P.Q., May 9, 1920, (F. Johansen).

One adult (about 12 mm.) and many young (3-4 mm. ones from underside of stones; bight in

Ottawa river, Hull Park, P.Q., July 6, 1919, see above, (F. Johansen).

A dozen adults (about 12-14 mm. some of the females with eggs in broodpouch), from upper part of Wilson's Creek, De Grassi Point, Lake Simcoe, Ont., May 30, 1917, (E. M. Walker).

It is greatly to be desired that additional data concerning the distribution of this conspicuous and interesting species should be secured from localities north, east and west of the present records.

Far more common than *Mancasellus tenax* is the other species of freshwater isopod, *Asellus communis* Say. It has been known from Georgian Bay and Toronto, Ont., and in the United States from Massachusetts to Michigan. It will be seen from the new records given below that it has a much wider distribution in Canada than formerly known, though we have no definite records of it from the Maritime\* and the western provinces. Nothing is known about its northern limit on this continent, except that it is very common around Ottawa, both on the Ontario and Quebec side. Its distribution is probably very much the same as that of *Hyaella knickerbockeri*, which means that it may occur in southern Alaska, but that it probably does not approach the barren grounds of this continent†. To a still larger extent than *Hyaella*, and in the same way as *Mancasellus* it appears to be a woodland species, and is therefore perhaps not found on the plains of the Canadian west. Where it occurs it is very common, and is found in great numbers both in rivers and large lakes and also in ponds and temporary pools and streams, both on clean bottom and also among much vegetation, dead leaves, etc.

In northern Europe this genus is represented by a closely allied species the well-known *Asellus aquaticus* Linn., which has been recorded by Packard from Labrador and may occur in Newfoundland. Not much has been recorded hitherto regarding the development (life-history) of *Asellus communis*. I am, therefore, glad to be able to add some original observations which I have made recently during my collecting trips to various localities in Canada. On April 20, 1919, I collected in a pool stream in swamp at Deschênes, P.Q., near Ottawa, some females, 1 cm. long, which had many white eggs in the broodpouch,‡ as well as some males, 1½ cm. long. These crustacea were placed in a jar for rearing, and two weeks later young ones that emerged were noticed. These latter were carried in the broodpouch of the mother-animal as late as May 6, (until the end of May in 1920),

\*See additional notes.

†I found neither it nor *Mancasellus* along the arctic coast of Alaska and western Canada.

‡In 1920 the females first carried eggs in the beginning of May.

moving freely around inside their cage, and when the mother-animal was touched some of the young ones would emerge and swim or crawl around.\*\* These new born *Asellus communis* are from 1 to 1½ mm. long; they have practically the appearance of their parents (well-developed appendages, etc.), though the head is rounded and of the same width as the succeeding segments and the terminal plate (telson) correspondingly large. In color they were pale white, with dark eyes and the brownish intestinal canal and pale-pink "gills" (abdominal feet) shining through the cuticula. While sinking to the bottom or crawling over the latter the antennae, legs and "gills" move continuously, each kind of appendage performing its particular function (feeling, crawling, respiration). I kept these young isopods for several months and could easily have kept them longer, if I had had time to continue my observations. The energy with which they crawled around looking for food or scught to escape when I tried to catch them was certainly wonderful, all the appendages going in one whirl and the body twisting as well. When about a month old they were not much larger (about 2 mm.) than when first born; they were now becoming brownish. I preserved samples of them (June 2). It will thus be seen, that the first brood of the summer is born in the beginning of May (near Ottawa), and that their growth is rather slow. It is interesting to note that even egg (brood)-carrying females of this species are considerably shorter than the males (maximum size of females noticed 1 cm.), sometimes even only half the size (8 mm.), of the maximum size of the latter ones. Females secured at Gatineau Point, P.Q., near Ottawa on June 14, 1919, had the brood pouches empty; on the other hand females secured on July 6, 1919, in Hull Park, P.Q., had the eggs (second summer-brood) in the brood pouch. The same day (July 6) and place I secured also as has already been mentioned a 3 mm. long young *Asellus communis*, probably of the first summer-brood and now about two months old. It had already the grayish dorsal color of the full grown females (the color of the latter ones is less "spotted" and brown than that of the males), and could thus by its color alone be easily distinguished from the young *Mancasellus* of a corresponding (1 mm. larger) size also found on this date. Other female *Asellus communis* secured at Alexandria Bay, Thousand Islands, N.Y., on September 1st, 1919, had also eggs in the brood pouch, thus carrying what would probably be the third brood of the summer. Females from a pool near a quarry outside of Hull city, P.Q., collected on

\*\*I have observed the same in the case of *Mesidothea entomon* in the arctic.

October 5th, 1919, had unripe eggs in the brood pouch.

New records from Canada which I have for this isopod are:

Many specimens (about 5 mm. long and less) from stream pools at foot of Diamond Hill, Quebec City, September 19, 1919, (F. Johansen).

Many specimens (up to 7 mm. long) from bigh in canal at Alexandria Bay, Thousand Islands, N.Y., September 1, 1919, (F. Johansen).

Many (younger) specimens from Montreal West, P.Q., October 19, 1918, (A. Willey coll.).

A great number of specimens from pools, streams, lakes and the river near and at Ottawa, April to October, 1917-1919, (F. Johansen).

I thus have it from the Gatineau river, Gatineau Point, Hull Park and outside of Hull city, Bridgman's Creek, Chelsea Road, Catfish Bay, Fairy Lake, foothills of Kings Mountain, Deschênes, etc., on the Quebec side of Ottawa district and from McKay Lake, Rockcliffe, etc., on the Ontario side.

It is exceedingly desirable that further data regarding the distribution of this common and important food for fishes and birds in Canada, both north, east and west of the records from Canada known so far (Quebec City to Georgian Bay), should be secured.

One of the two freshwater isopods occurring in Canada, (*Mancasellus*) is thus to be considered a more southern form with a limited distribution; the other (*Asellus*) has a much wider distribution from east to west, though its records from the United States seem to indicate, that it may not be found in the western provinces of Canada, nor in Alaska.

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#### ADDITIONAL NOTES.

So little is known about the occurrence and habits of the freshwater-crustacea during the winter, that the following note in THE OTTAWA NATURALIST for September, 1907, p. 102, is of interest:

"Mr. W. S. Odell reports an abnormal abundance (during the winter 1906-7) of certain crustacea observed under the following circumstances. At the openings cut through the ice on the clay ponds or pits near the Rideau River, crowded masses of *Canthocampus*, *Cyclops* and *Asellus aquaticus*\* came to the surface of the water. . . . The ice was about a foot in thickness, and the cold was intense, yet these water animals had not been so thick for many years. They decreased most markedly on the first mild day. . . ."

In January, 1921, I received from Dr. A. G. Huntsman of Toronto, three *Asellus communis* Say, collected on October 31, 1920, near Milton, Yarmouth County, in southern Nova Scotia. Dr. Huntsman has kindly identified them as *Asellus communis* Say (same as *A. intermedius* Forbes). The specimens are in a poor condition; but as this is the first record of freshwater isopods from the Maritime provinces it should be included in this article.

\*Probably *A. communis* Say (F.J.).

(To be continued.)





## ARGULIDAE FROM THE SHUBENACADIE RIVER, NOVA SCOTIA.

BY CHARLES BRANCH WILSON, PH. D., STATE NORMAL SCHOOL, WESTFIELD, MASS., U.S.A.

A survey of the Shubenacadie river, which empties into the Basin of Minas, Nova Scotia, was recently made by Mr. A. H. Leim in connection with the Canadian shad fisheries. During this survey many specimens of both young and adult argulids were obtained at Shubenacadie with the tow-net in tidal water which seemed to be fresh rather than salt.

These specimens were sent to the present author for identification, and they proved to contain an abundance of both sexes of two species of *Argulus*, one of which had previously been found in many localities on the Atlantic coast farther south, while the other was new to science. The following record of these two species is herewith submitted.

## ARGULUS ALOSÆ Gould.

*Argulus alosæ* Gould, Invertebrata of Massachusetts, 1841, p. 340, text figure: S. I. Smith, Report U. S. Com. Fish and Fisheries, 1872, p. 575 (281); R. Rathbun, Proc. U. S. National Museum, vol. 7, 1884, p. 485; J. F. Whiteaves, Cat. Marine Invertebrata of Eastern Canada, 1901, p. 216; C. B. Wilson, Proc. U. S. National Museum, vol. 25, 1902, p. 707, pl. 12; pl. 26, fig. 80.

*Record of specimens.* Ten specimens, including both sexes, were obtained August 1, 1919, at 8.45 p.m.: two males were obtained on the same date at 9.10 p.m.: a single male was obtained July 21, at 6.15 p.m.

*Remarks.* This species was doubtfully recorded by Mr. J. F. Whiteaves in the reference given above as attached to *Gasterosteus biculeatus* Shaw, and other small fishes taken off Pictou island in the Gulf of St. Lawrence. All the other recorded localities are much farther south. The present record substantiates that of Whiteaves and fully establishes the species in Canadian waters. Again it has hitherto been found only upon fish hosts in salt water; the present specimens were captured in a tow-net in fresh water. Their presence in the tow makes it certain that they infest fish in the immediate vicinity, and it may be that they will be found some day upon the shad whose name they bear.

## ARGULUS PIPERATUS, new species.

*Record of specimens.* Twenty-two specimens, of which six were females and the rest males, were obtained August 1, 1919, at 8.45 p.m. in company

with the first lot of *Argulus alosæ*. Another lot of ten specimens, including both sexes, were caught in the second towing, August 1 at 9.15 p.m. Five males were obtained July 31 at 9.50 p.m., and two males on the same date at 10.10 p.m. The majority of all these specimens were of small size although sexually mature. But a few of them were large enough to be regarded as fully developed adults, and from these the following description has been taken.

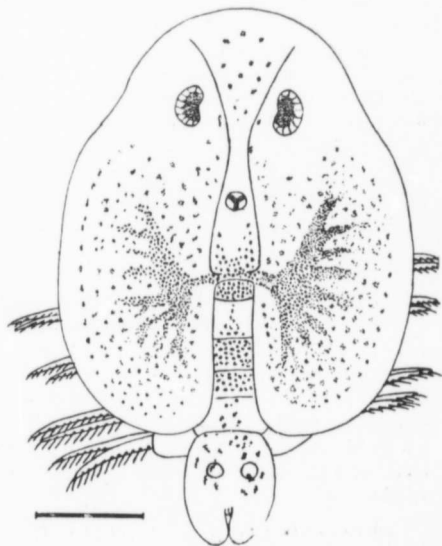


FIG. 1. Dorsal view of *Argulus piperatus*, female. The line represents  $\pm$  length of 1 mm.

*Specific characters of female.* General shape of the carapace elliptical, one-fourth longer than wide, with shallow lateral sinuses and broad, well rounded posterior lobes. Posterior sinus, one-third the length of the carapace, with parallel sides; posterior lobes just reaching the base of the abdomen. Eyes far forward and well separated.

Abdomen elliptical, one-fourth the length of the carapace, the longitudinal and transverse diameters in the proportion of 11 to 9; its posterior lobes well rounded and inclined inward so that their inner margins are in contact. Anal sinus 27.50% of the abdomen length; anal laminae basal, minute and unarmed; sperm receptacles small, circular and rather widely separated.



Fig. 2. *Argulus piperatus*: first and second antennae of male, much enlarged.

Lateral claw of basal joint of first antenna long and slender and curved into a half circle; anterior claw short and weak. Second joint slender, three times the length of the terminal joint, and armed at the distal anterior corner with a short spine; terminal joint tipped with two spines. Second antenna of the usual pattern, the basal joint one-half wider than the succeeding joints and tipped with a long spine; second joint with two spines, third and fourth joints with one spine each.

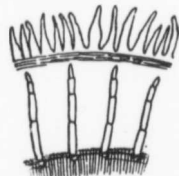


Fig. 3. *Argulus piperatus*: supporting rods in sucking disks; much enlarged.

Sucking disks of second maxillae far forward and well separated, each about 15% of the width of the carapace; the supporting rods slender and far apart, each made up of four cylindrical joints which diminish regularly in size from the base outwardly, and which do not quite reach the margin. The latter has a fringe of flattened fleshy setae, attached side by side in a single row.

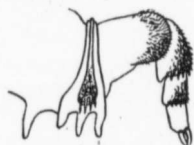


Fig. 4. *Argulus piperatus*: maxilliped of male; much enlarged.

The maxillipeds are rather short but stout; the triangular plate on their base is wide posteriorly and much narrowed anteriorly, but extends to the anterior margin of the appendage; the teeth are long and wide and bluntly rounded. Inside of the base of the appendage, on the ventral surface of the head, is an accessory tooth of the same pattern as those on the plate itself.

The rami of the swimming legs reach considerably beyond the margin of the carapace. The lobes on the basal joints of the fourth legs are small and not very prominent.

Color a light cartilage gray, the dorsal surface covered with small black dots, as though it had been sprinkled with pepper. These dots are not evenly distributed but are massed as shown in the figure.

Total length 5 mm. Carapace 4 mm. long, 3.25 mm. wide. Abdomen 1 mm. long, 0.90 mm. wide.

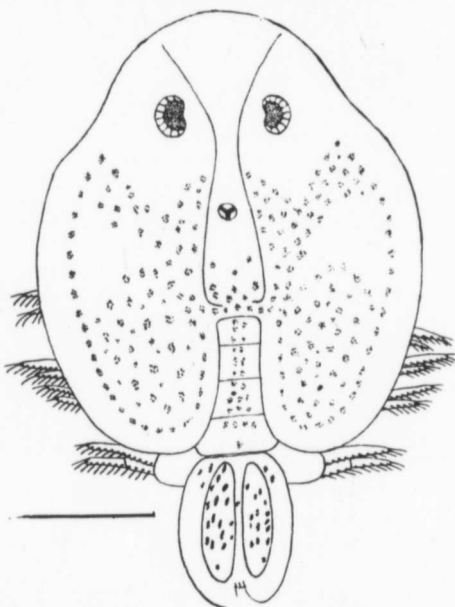


Fig. 5. Dorsal view of *Argulus piperatus*, male. The line represents a length of 1 mm.

*Specific characters of male.* Carapace relatively the same size and shape as in the female; abdomen longer, one-third the length of the carapace, the longitudinal and transverse diameters in the proportion of 15 to 11. Anal sinus not as deep, only 14% of the length of the abdomen and never closed by the approximation of the posterior lobes.



Fig. 6. *Argulus piperatus*: third legs of male, much enlarged.

Of the accessory sexual characters the peg on the anterior margin of the basal joint of the fourth legs is a broad cone, inclined strongly outwards and bluntly rounded at the tip, with a tiny spine on its

anterior margin. On the ventral surface of the basal joint of the third legs is a broad flap, projecting backwards, and on the anterior margin a rounded knob armed with minute setae.



Fig. 7. *Argulus piperatus*: fourth legs of male: much enlarged.

Color the same as in the female except that the black spots on the dorsal surface are larger and more scattered.

Total length 4 mm. Carapace 3 mm. long, 2.65 mm. wide. Abdomen 1 mm. long, 0.80 mm. wide. (*piperatus*, sprinkled with pepper, alluding to the black spots).

The types of this species are deposited in the Museum of the Atlantic Biological Station, St. Andrews, N.B.

### BIRDS IN RELATION TO INSECT CONTROL.

BY NORMAN CRIDDLE, ENTOMOLOGICAL LABORATORY, TREESBANK, MAN.

The value of birds to mankind has unfortunately been brought down to the level from which we gauge most things nowadays, namely, dollars and cents. We might in the past, have classed them with art, poetry and music, but to-day the aesthetic side is lost in the mad rush for wealth and those of us who still value wild life for what it is, rather than for its economic significance, are obliged to weigh its qualities by the standard which modern thought demands.

The value of birds in relation to agriculture is a question that has frequently been discussed. The value of birds as destroyers of noxious insects is usually linked with the preceding problem though experts are not as unanimous in their conclusions regarding this part of the question, adverse contentions being especially strong among Italian entomologists who are apt to disclaim any assistance from birds to agriculture or kindred sciences. The Italians have their school of followers in North America but they are fewer. Since, however, they are men of ability it seems well to look rather more fully into the reasons for these differences of opinion.

Probably the first obstacle to unanimity lies in the fact that two sciences are involved namely ornithology and entomology whose votaries, on the whole, have but a superficial knowledge of each other's work. For instance, the ornithologist may be well aware that birds eat insects but he does not always know that the insects consumed may contain within them those that are useful. The entomologist on the other hand, knows little of the habits of birds and is, therefore, apt to view the question wholly as an insect one and to depend upon insects for insect control arguing that birds in eating a single noxious insect may destroy half a hundred useful ones, and so prevent the spread of allies that

would control a pest far more quickly than birds could, even supposing the latter were able to accomplish the task at all.

The first point to accept in this discussion is that insect extermination is out of the question. The problem is not how to exterminate a pest but it is rather to secure the best means of keeping it within bounds.

I believe we shall eventually reach the conclusion that insect parasites are of most value in controlling serious outbreaks while birds reach their greatest usefulness by destroying the surplus under normal conditions and so prevent outbreaks. Neither of these differences in value are clearly defined, however, as a great many minor issues are involved in the whole question some of which I give below.

The rapid increase of an insect pest is due to several causes among which the absence of parasites is an important one. Under these circumstances the chances of birds destroying useful parasites in feeding upon the host at that time, is small, while by devouring the increasing pest they are playing an important part in keeping it within bounds. Occasionally, however, the pest increases beyond the rate at which birds can check it, this being due largely to meteorological conditions. At such times neither parasites nor birds are of much value and the pest spreads over wide areas as was exemplified in the grasshopper outbreak of the last two years in the Prairie Provinces. It is at this point that birds fall behind and parasites usually come to the fore and as these last have now unlimited food available they multiply with great rapidity. It matters little under these circumstances, whether birds devour parasites or not as the latter are too widely spread to be affected. Indeed the ultimate result is for the parasites to become over abundant in which case they are reduced to insignificance by starvation due

to the destruction of hosts. In eating the pest at this time birds are almost sure to devour even more parasites than hosts and by doing so they will actually help to preserve the latter by keeping down the surplus and so make room for those that remain.

One other point must be taken into consideration in connection with the part birds play in suppressing insect pests and that is while they may destroy numbers of parasites in eating the hosts they must necessarily prevent many of the hosts from depositing eggs thus enabling egg parasites and other egg enemies to concentrate upon those remaining. It might be contended on the other side, that birds are equally apt to destroy parasites in consuming insect eggs such blame being especially aimed at the Chickadee but I doubt very much whether the few useful insects destroyed in this way could compare with the value done by the birds in destroying thousands of insect eggs. Further, we must remember that many insect eggs are placed in the ground or in crevices, etc., where birds cannot get at them but where parasites can.

As a further point in the birds favour it may be pointed out that parasites are only present within the bodies of their hosts for a limited period of the hosts' life and, therefore, by eating the host before the latter becomes infested, birds are of unquestionable value to man; moreover, by this means they provide for a concentration of parasites upon the hosts that survive.

It will be noted that I have written nothing about hyperparasites in this paper, that is parasites which infest parasites. These complicate the whole question but to include them would not, I think, show birds in an unfavourable light.

Turning now to the part which birds play in actually devouring useful insects such as tachinid flies, syrphid flies, lady-beetles and other insects, we find that the birds by this habit actually reverse the arguments that have been used above but there is this in extenuation. With the exception of those I have mentioned and a few more, most of the useful insects (especially parasites) are small while the noxious ones are more often large and so easily detected. It would seem therefore, that far fewer useful insects are taken than harmful ones and this point is amply borne out by the examination of bird stomachs, as a glance through the bulletins of the U.S. Biological Survey will show.

One of the strong points in favour of the doctrine of insects controlling insects is illustrated in such pests as the hessian fly and western wheat-stem sawfly which are small and consequently little effected by birds. Naturally if these are kept in check by parasites there is not much reason why larger ones should not be. But the evidence is by

no means conclusive that they are. With the hessian fly meteorological factors are of importance at least in some parts of the insects' range and this probably applies to the sawfly also. The relation of humidity to insect prevalence is, indeed, a very important question which, however, requires a separate article to do it justice.

There are unquestionably times when even severe insect outbreaks are controlled locally through the actions of birds, a well known example of which occurred in Utah many years ago when a locust infestation was cleaned up by gulls. We need not, however, go so far afield for similar evidence of the usefulness of gulls.

During the years 1919 and 1920, a serious outbreak of grasshoppers, formerly called locusts, occurred in south-west Manitoba which threatened large areas of growing grain and required the united efforts of government officials and farmers to keep it in check. This outbreak extended from Saskatchewan far to the eastward but in this extension there was a notable gap most marked in the districts in which Boissevain, Whitewater and Ninga were situated. Since the soil is very similar over all this territory and offers equal inducements for grasshopper breeding the absence of the insects over it in destructive numbers might seem rather extraordinary, but I believe can be explained as follows: North of the villages mentioned above is a large marshy lake upon which a great many gulls and terns congregate and doubtless breed. In any case the birds make this lake their resting place and from it issue forth each day in quest of food. In the spring time before the small hoppers appear, the gulls may be seen in close attendance of the ploughman when they are often accompanied by black terns and frequently by crows and blackbirds all of which vie with each other in picking up the grubs and other insect life exposed by the plough. Later, when summerfallowing is under way and hoppers have attained sufficient size to be seen easily the gulls again devote much of their time to following the plough only now they spread out further afield and obtain a glorious feast of the grasshoppers which are endeavouring to make their way from the ploughed land to new feeding grounds.

At a still later date when harvest is beginning, the gulls and their allies take to the grain fields and roadways wandering up and down as if they imagined the waving grain were water and the grasshoppers the small fry swimming near the surface. But be that as it may the results are much the same. Many millions of grasshoppers have been eaten by the time the gulls take their departure and incidentally the farmer has reaped a far larger

crop than he would have done had the birds been absent. This, I think explains the absence of severe grasshopper outbreaks in the districts referred to.

There are very few birds that do not take advantage of a locust outbreak. Grouse find the insects especially palatable and several people are now learning to associate abundance of grasshoppers with the rearing of large families of grouse and this undoubtedly applies to several other birds.

It is, however, to those birds which congregate into flocks that we must look to most for help. I have already mentioned gulls in this respect, another is found in the crow. The crow is very fond of grasshoppers at any time and as the evidence shows, feeds its young largely upon them when they are sufficiently numerous. Indeed it is no exaggeration to state that a family of six crows would consume at least three bushels of grasshoppers in a season which would mean preventing about 9,000,000 of the insects' eggs from being laid.

In our grasshopper campaign of 1920 we ran across many instances of crows gathering in locust areas for feeding purposes. They were especially noticeable along roadways where fence or telephone poles afforded convenient resting places for their sentries. There is probably another reason for the crows gathering along roadways which is explained as follows: The outbreak of locusts referred to was made up of several species of which two were of special importance. These interestingly enough, have a marked difference in their choice of breeding sites, the one known as the Lesser-migratory locust choosing stubble fields or areas of semi-cultivation for egg-laying while the other, known as the Road-side locust, (*Camnula pellucida*) prefers the grassy road-sides for breeding purposes. On account of this habit the last-named insect is naturally massed within a comparatively small space which the crows have learnt to take advantage of.

Returning to the contention that birds frequently neutralize their usefulness in destroying noxious insects by eating the parasites at the same time, we have here at least a case where that was not so to any marked extent. Parasites of adult grasshoppers have been of small importance owing to their scarcity. Egg parasites, however, give far greater promise of eventually bringing the insects under

control. Here then we have a case where the destruction of adult locusts by birds will reduce the possible egg supply and oblige the insect feeding upon them to gather upon what remain, thus giving a far greater assurance of reducing the pest quickly.

I will conclude with one more example which, though not conclusive, provides at least strong circumstantial evidence in favour of the birds involved. Some twelve miles from my home at Treesbank, Man., is a pretty little village surrounded by hills and trees, where crows have bred rather freely in the past. A few years ago, however, prominent citizens of this place came to the conclusion that the crows were greatly reducing the bird life, especially game birds, which the citizens looked upon as their own special privilege to kill. In consequence of this belief, these people inaugurated crow-destroying competitions in which they formed sides of equal number, those bringing in the greatest number of crows and their eggs winning a prize, which the losers had to pay. The result of this annual competition in crow destruction has had a marked effect upon crow life in the vicinity without apparently producing very noticeable results in the direction expected. What interests us here, however, is this. The district, which is a grain-growing one, was infested by a severe and isolated outbreak of grasshoppers last year, while surrounded areas where crows had been protected escaped. As I said above, this may be a coincidence, but since the region is no more suitable for grasshoppers than others nearby, such would hardly seem to be the case.

In the preceding remarks no effort has been made to plead the cause of birds, the evidence has merely been given as it was presented to me in the field. I have said nothing of the aesthetic side, yet few can depict anything more beautiful than a flock of gulls following a ploughman, flying with their graceful curves within a few inches of his head and darting down with a characteristic little flutter to pick up the insect newly exposed. To see them flying over the lakes is equally pleasing, and we ought surely to be thankful in realizing that such perfect creatures are our friends. This can be said with almost equal justice of many other birds, which, if they are not as pleasing to look upon, make up for that by a sweeter song or some other characteristic which should endear them to us.

## ADDITIONS TO THE BIRDS OF SHOAL LAKE, MANITOBA.

BY ERNEST S. NORMAN.

The following species of birds have been observed by me at Kalevala, Man., which is situated approximately about 25 miles north of the north end of Shoal Lake.

RED-THROATED LOON, *Gavia lumme*. This bird is seen on Birch Lake, near Kalevala P.O., nearly every fall just before freeze-up. It arrives here generally several weeks after the common Loon and the Holboell's Grebe have left for the south. Only one or two seen at a time.

AMERICAN SCAUP DUCK, *Aythya marila*. Regular summer visitor, though perhaps less numerous than the Lesser Scaup. I have never found its nest though the Lesser Scaup's nests are often discovered.

TURKEY VULTURE, *Cathartes aura*. One individual of this species was seen several times in the spring of 1919. It came every day for two or three weeks to feed on a horse carcass, at which I had set some wolf traps on the winter previous. It was very tame and I had many chances of seeing it at very close range, being thereby able to establish the identity beyond any doubt.

COOPER'S HAWK, *Accipiter cooperi*. This hawk is only an accidental summer visitor here. Nevertheless, I have seen it several times during the last six years.

GOLDEN EAGLE, *Aquila chrysaëtos*. One adult in a beautiful plumage was shot by Mr. G. Carlson, of Mulvihill, Man., in the summer of 1916. Mr. Carlson brought this bird to me for identification and later on sent it to Mr. W. Darby, the taxidermist, in Winnipeg, for mounting.

GREAT GRAY OWL, *Scotiaptex nebulosa*. One morning in February, 1918, I noticed an unusually long and fluffy feather hanging in a willow bush near my barn. I at once knew that it was that of an owl, but had never met here any species of owls with such tremendously long feathers. Several days later the puzzle was solved, when, in broad daylight a Great Gray Owl (the first one and only one that I have seen) flew to a shade tree in front of our house. It stayed around for several weeks after that.

RICHARDSON'S OWL, *Cryptoglaux tengmalmi richardsoni*. In the winter of 1914-15, several birds of this species were seen. They were very tame, coming sometimes in broad daylight into the barnyard where they could have been knocked down with a

stick. None have been seen since.

SAW-WHET OWL, *Cryptoglaux acadica*. I saw one specimen of this little owl in June, 1918. I saw it on several occasions in one particular spot in a poplar bush. Hunted for the nest high and low, but it could not be found.

AMERICAN HAWK OWL, *Surnia ulula caparoch*. In the winters of 1914-15 and 1915-16 this was by far the most common of all the owls. It is possible that they were breeding, as few were met with right in the breeding season, in 1915. Not a single one has been observed here in the last three years.

ARCTIC THREE-TOED WOODPECKER, *Picoides arcticus*. Regular, though rare, winter visitor at Kalevala, Man. One or two can be seen in the poplar forests north of our post office almost any day during the cold weather.

NORTHERN PILEATED WOODPECKER, *Ceophlax pileatus abieticola*. This largest of our northern woodpeckers was very common here six and seven years ago, when the first settlers arrived. On account of their unwary habits many of them fell easy victims to the Sunday hunter and the boy with "the 22." It has been entirely absent for two or three years, but last autumn (1919) a pair came into our poplar woods (where they are protected) and have stayed there all winter. They were seen nearly every day hammering at a large poplar stub just a short distance from our barn. As many of the largest poplars in our bush have very large holes excavated into them, it is almost certain that these birds used to breed here regularly not so very many years ago.

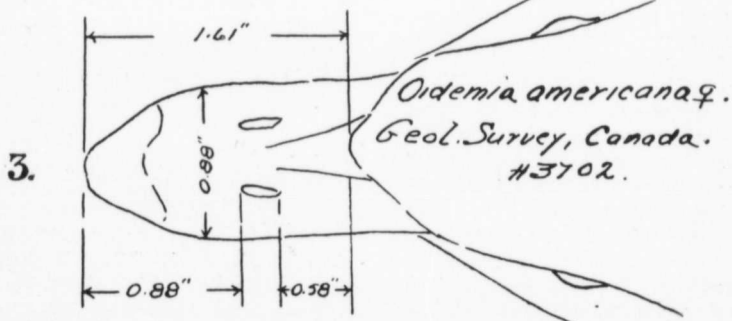
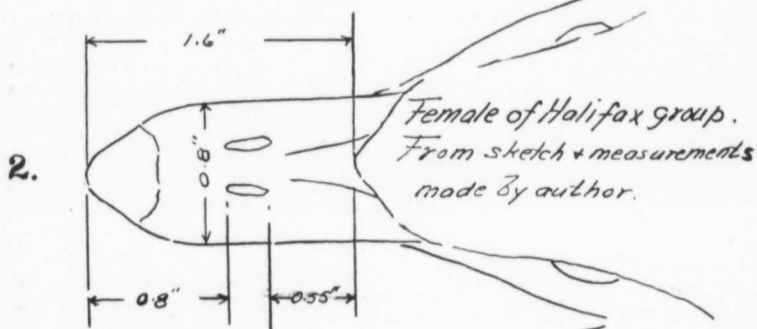
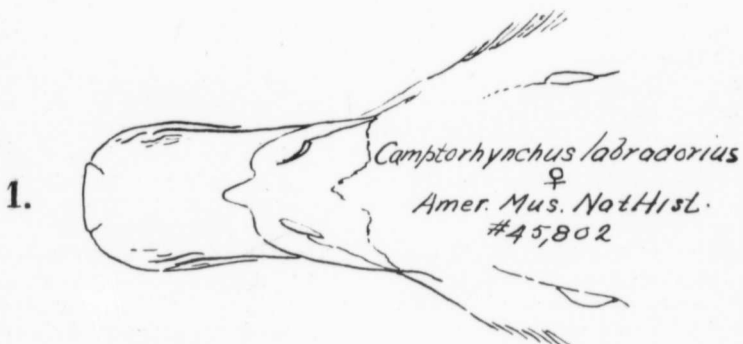
PINE GROSBEEK, *Pinicola enucleator leucura*. Common winter visitor at Kalevala, Man. Generally appears in small flocks from 4 or 5 to a dozen birds of both sexes. They are very tame and feed mostly on frozen high-bush cranberries.

REDPOLL, *Acanthis linaria*. Common winter visitor. Sometimes large flocks of several dozens of birds are seen. They feed on weed seeds and are far too tame for their own safety. The ordinary house cat generally catches more than its share of them.

WHITE-BREASTED NUTHATCH, *Sitta carolinensis*. Resident. Can be seen here any day both summer and winter.

THE DUCK SPECIMENS RECORDED AS LABRADOR DUCKS (*CAMPTORHYNCHUS LABRADORIUS*) IN DALHOUSIE COLLEGE, HALIFAX, NOVA SCOTIA.

By HOYES LLOYD.



- 1 - Traced from original drawing  
by Louis Agassiz Fuertes.  
2&3 - by P. A. Taverner.

William Dutcher<sup>1</sup> revised the list of extant specimens of this extinct species in the collections and museums of the world. His totals were Canada 2; United States 25; Europe 11; amounting to 38 in all.

Subsequently A. B. Meyer<sup>2</sup> recorded a specimen in the Dresden Museum, Saxony, and Dr. Witmer Stone<sup>3</sup> recorded one from an old collection which brings the list of total known specimens to 40, distributed as follows: Canada 2; United States 26; Europe 12.

It may not be generally known that two of the 28 North American specimens a male and a female were reported by Dutcher on the authority of Thomas I. Egan and Andrew Downs as being in the collection of Dalhousie College at Halifax, Nova Scotia.

In April, 1919, I had the pleasure of visiting Dalhousie College and through the courtesy of Professor Moore was allowed to examine these specimens, both of which are mounted and carefully preserved under glass.

One is a male Labrador Duck (*Camptorhynchus labradorius*) in full plumage and the other is an

American Scoter (*Oidemia americana*) in the plumage of the female.

At the time, I neglected to notice the speculum of the bird in question, but Mr. R. W. Tufts, of Wolfville, Nova Scotia, has since examined the specimens to make sure of this point, and he reports that the supposed female Labrador Duck is so mounted that the characteristic speculum of that species would not be shown if it were present, but close examination of this specimen shows the absence of the special wing marking of the Labrador Duck.

Aside from this, the bill of the supposed female Labrador Duck shows it to be an American Scoter. To emphasize this point a sketch showing the upper aspect of the beaks of these two birds was drawn to scale and a comparative sketch showing the bill of a female Labrador Duck has been kindly prepared for me by Louis Agassiz Fuertes. These are shown in the figure.

It is stated with much regret that only one specimen of the Labrador Duck is known to exist in Canada today, and not two as has been supposed.

Note.—Fleming saw one in Montreal some years ago, which was not the specimen purchased by Dutcher, but its present condition, if still in existence is unknown.

1. The Auk, Vol. VIII, 1891, p. 201.

2. Ibid., Vol. IX, 1892, p. 389.

3. Ibid., Vol. X, 1893, p. 363.

#### NOTES AND OBSERVATIONS.

THE PROTHONOTARY WARBLER AT LONDON. On May 30, 1920, at 5.25 a.m., my attention was attracted by the notes of a Swamp Sparrow which was singing in a large elm tree. For the reason that Swamp Sparrows do not go up into large elms to sing, I set about locating this one to make sure of the identification, but before I could locate him in the tree, he flew into some willows only ten or fifteen yards away, and again started singing. I saw at once that he was no Swamp, but a warbler, and the glass showed pure yellow beneath, and pure yellow on top of the head, coupled with a tail that appeared very short and a bill larger in proportion than I remember on any other warbler. A Prothonotary, without the shadow of a doubt! Further study of his song indicated that while a Swamp Sparrow sings from four to six notes per second, the warbler was much more deliberate and used two seconds for his song which was invariably of six notes on the same pitch, and almost identical with the Swamp in tone. This is my first Prothonotary, and the second one this century in Ontario,

the other being a specimen taken at Pelee by Taverner about 1915. Macoun's Catalogue quotes one specimen taken at Hamilton, and sight records, indefinite at that, from Toronto (Fleming) and N.B. (Chamberlain). Apparently there are two Canadian specimens in existence.

An eager party hunted my bird that Sunday afternoon, and I was after him with a gun on Monday, but when he left me, as he did in a few minutes, he flew east beyond hearing, and has not been heard from since.—W. E. SAUNDERS.

EPICUREAN TASTE IN SWALLOWS.—Near the village of Shazy, New York, lies Hearts Delight Farm, the property of W. H. Miner, who is not only a farmer at heart and in fact, but a lover of nature and of all things elevating and good.

Given such a man and a farm of 12,000 acres, with sufficient desire and opportunity for improvement along aesthetic as well as economic grounds, the ultimate achievement can hardly be forecasted.

At Hearts Delight, achievement is magnificent, but one phase only is to be noted here.



Protection of wild life, animate and inanimate, holds a prominent place in the owner's plans, and there the wild things may find home locations suited to their varied needs, and the woods and fields are everywhere vocal with bird song. Among others, Swallows are abundant, and the great feature of the splendid farm is the group of three enormous Martin houses on one of the large lawns. Two of these houses are nearly equal in size, about 4 by 7 feet, with perhaps 200 domiciles in each. The large one is 8 by 12 feet and contains about 400 domiciles. As nearly as one can see, every cavity is occupied, a very few of them with House Sparrows, but practically every one with Martins; which would mean in the neighbourhood of 800 pairs of these useful birds. At the rate of only four young to each nest, 5,000 birds would need to be fed everyday from June 10 to August 20. Surely the unfortunate insects that form the food of these birds, ought to become scarce, compelling long flights on the part of the parents to supply their young.

One seems to have an instinctive feeling that Swallows, catching their food on the wing, feed on almost everything that comes along, and that they hunt the whole air in general. Perhaps that is because we have an idea that we would act that way if we had the ability.

My experience at Chazy, on July 7, 1919, gives me a hint that this rule (of my own imagination) does not invariably apply. Here is a place where Martins are living in vast numbers, and yet, hawking over the lawn by the house, all day long, were Barn Swallows, and Barn Swallows only!

Why no Martins, and why the Swallows, if no Martins?

Questions are easier to ask than to answer.

All one can say in reply is that the Swallows were there, and that the Martins, though nesting absolutely in thousands within a quarter of a mile, were absent. Investigation showed that the grass of the lawn was infested by an insect, less than 1/2 inch long. Passing the hand over two or three feet of the grass would invariably cause one or more of these insects to rise from the grass, and after flying never more than eighteen inches high, and four feet in distance, they settled again. This low, short flight accounted for the motions of the Swallows, who were hawking back and forth at from one to two feet over the surface, swerving in their flight at intervals when an insect was to be caught.

The reasonable explanation is that these insects were very palatable to the Swallows, and unattractive to the Martins, but why this should be the case is a puzzle. There can be no doubt that the Martins knew of this source of food, because birds

find out such things with marvellous facility when the facts are of sufficient interest, but why should an insect be so attractive to one species of bird, and so lacking in interest to another species, when so closely allied?—W. E. SAUNDERS.

PROSECUTIONS—MIGRATORY BIRDS CONVENTION ACT AND NORTHWEST GAME ACT BY OFFICERS OF THE DOMINION PARKS BRANCH AND ROYAL CANADIAN MOUNTED POLICE.

MIGRATORY BIRDS CONVENTION ACT.

Francois Mandeville, Fort Smith, Northwest Territories, interfering with a game officer in the discharge of his duties. Fine \$10.00 and costs.

William Goss, Kensington, Prince Edward Island, buying Canada Geese in closed season. Fine \$10.00 and costs.

Austin Fluke, Gaspereau, Nova Scotia, possession of Black Ducks in closed season. Fine \$10.00 and costs.

Fred B. Cox, Labrador Coast, Quebec, possession of Ducks in closed season. Fine \$10.00 and costs.

John P. Cox, Halifax, Nova Scotia, possession of Eider Ducks in closed season. Fine \$10.00 and costs.

John Chapman, Mossbank, Saskatchewan, shooting at Wild Ducks in closed season. Fine \$10.00 and costs.

Charles Elder, Mossbank, Saskatchewan, hunting Wild Ducks in closed season. Fine \$10.00 and costs.

William Pace, Meadowvale, Colchester Co., Nova Scotia, possession of a Downy Woodpecker. Fine \$10.00.

W. L. Hendsbee, Hawkesbury, Nova Scotia, possession of Gull. Fine \$10.00.

Nicholas Eull, Minnesota, U.S.A., shooting at Ducks in close season near Cudworth, Sask. Fine \$10.00 and costs.

Tilman Landry, 7 Highfield Street, Amherst, Nova Scotia, possession of a Great Blue Heron. Fine \$10.00 and costs.

Lucien Tinant, Oban, Saskatchewan, possession of nine Ducks in closed season. Fine \$15.00 and costs.

Louis Blean, Montcalm Market, Quebec, P.Q., possession of Semipalmated Sandpiper. Fine \$10.00 and costs.

Frank Pattenden, Bayfield, Westmoreland Co., New Brunswick, shooting Semipalmated Sandpiper. Fine \$10.00 and costs.

Fern McMorris, Bayfield, New Brunswick, possession of three Semipalmated Sandpipers. Dismissed.

Charles Bent, Bayfield, New Brunswick, possession of Sandpiper. Fine \$10.00 and costs.

James E. McDonald, Mira, Cape Breton Co., Nova Scotia, killing Scoters from a power-boat. Fine \$10.00 and costs.

Frank Wheeler, Dominion, Cape Breton Co., Nova Scotia, possession one "Ring-necked Plover." Fine \$10.00.

Robert Weaver, Doaktown, New Brunswick, in possession Pileated Woodpecker. Fine \$10.00 and costs.

Charles Grotto, Trenton, Nova Scotia, attempting to kill Greater Scaup Duck by use of power-boat. Fine \$10.00 and costs.

Daniel Levy, Little Tancook, Lunenburg Co., Nova Scotia, attempting to kill Black Duck by the use of a motor-boat. Fine \$20.00 and costs.

Harvey Cross, Big Tancook Island, Lunenburg Co., Nova Scotia, attempting to kill Black Ducks by the use of a "Sunken Boat." Fine \$20.00 and costs.

William Heizler, Oakland, Lunenburg County, Nova Scotia, attempting to kill Ducks by the use of a power-boat. Fine \$20.00 and costs.

William Murdock, New Glasgow, Nova Scotia, attempting to kill Greater Scaup Duck by use of power-boat. Fine \$10.00 and costs.

Walter Winsloe, Trenton, Nova Scotia, attempting to kill Greater Scaup Duck by use of power-boat. Dismissed.

Alexander Grotto, Trenton, Nova Scotia, attempting to kill Greater Scaup Duck from a power-boat. Dismissed.

#### NORTHWEST GAME ACT PROSECUTIONS.

W. F. Dow, Fort Rae, Northwest Territories, possession two Musk Ox skins. Seizure.

D'Arcy Arden, Dease River, Great Bear Lake, Northwest Territories, possession Musk Ox skins. Seizure.

#### BIRD BANDING WORK BEING TAKEN OVER BY THE UNITED STATES BUREAU OF BIOLOGICAL SURVEY.—

The Bureau of Biological Survey at Washington, D.C., has taken over the work formerly carried on under the auspices of the Linnaean Society of New York by the American Bird Banding Association. In taking over this work the Bureau feels that it should express the debt that students of ornithology in this country owe to Mr. Howard H. Cleaves for the devotion and success with which he has conducted this investigation up to a point where it has outgrown the possibilities of his personal supervision.

Under plans now being formulated this work will give a great amount of invaluable information concerning the migration and distribution of North American birds which will be of direct service in

the administration of the Migratory Bird Treaty Act, as well as of much general scientific interest.

It is desired to develop this work along two principal lines;—first, the trapping and banding of waterfowl, especially ducks and geese, on both their breeding and winter grounds; and secondly, the systematic trapping of land birds as initiated by Mr. S. Prentiss Baldwin, the early results of which have been published by him in the Proceedings of the Linnaean Society of New York, No. 31, 1919, pp. 23-55. It is planned to enlist the interest and services of volunteer workers, who will undertake to operate and maintain trapping stations throughout the year, banding new birds and recording the data from those previously banded. The results from a series of stations thus operated will undoubtedly give new insight into migration routes; speed of travel during migration; longevity of species; affinity for the same nesting-site year after year; and, in addition, furnish a wealth of information relative to the behavior of the individual, heretofore impossible because of the difficulty of keeping one particular bird under observation.

The details of operation are now receiving close attention, and as soon as possible the issue of bands will be announced, with full information regarding the methods to be followed and the results expected. In the meantime, the Biological Survey will be glad to receive communications from those sufficiently interested and satisfactorily located to engage in this work during their leisure time, for it is obvious that a considerable part must be done by volunteer operators. It is hoped that a sufficient number will take this up to insure the complete success of the project.—E. W. NELSON, *Chief of Bureau.*

MIGRATION STUDIES BY BIRD BANDING.—The work of bird-banding referred to above by Dr. E. W. Nelson, which is now being taken over by the U.S. Biological Survey, is a system of placing registered numbered aluminum bands on the legs of birds which are then liberated so if again taken information may be derived on their lives, habits and movements. The amount of exact information that might be obtained in this and in no other practical manner is very great indeed. For years we have each had ideas as to whether birds returned to their old haunts year after year, the permanency of their matings, ages, routes of travel, etc., but it was mostly guesswork and authorities disagreed. Under the bird-banding association organized under Mr. Harold Cleaves and others some of these questions are in a fair way of exact solution.

Our own Jack Miner, of wild goose fame, whilst working independently of the bird-banding association has done considerable in this direction with the wild fowl. His geese banded at Kingsville,

near Lake Erie, Essex Co., Ontario, have been taken on the Atlantic Coast from New Jersey to North Carolina and along the east shore of James and Hudson Bay. He has had returns also from ducks from Louisiana and the Gulf States, north to Sault Ste. Marie and west as far as Alberta. These irregular (?) migration routes are of special interest in confirmation of the soundness of the view that proper protection of migratory game is an inter-provincial problem more than a local one and well within the logical field of federal authority.

The systematic trapping done by Mr. S. Prentiss Baldwin mentioned by Dr. Nelson is a development of these activities and has opened up unlimited possibilities to the work. Normally but very few land birds banded are ever heard of again. In the work cited some surprising and valuable results have resulted from constant and systematic trapping of small birds within a limited area. A box trap made of fine meshed poultry wire is used which captures the birds without injury and from which they can be removed, banded and released, without other damage than a little passing fright. To show how evanescent this is Mr. Baldwin says that many individuals acquire what he calls "the trap habit" and return again and again, even many times a day, to the annoyance of the trapper, for the easily secured food supplies offered by the bait and they even wait patiently for the apparently expected liberation. All told he has so handled some five thousand birds in this manner and amongst the most interesting facts that the work has brought out are the following,—

Many birds do return to the same locality year after year but not always to the same spot. The chances seem to be about one in five, that at least one of a pair will return to the previous year's nesting site and about one in twenty-five that both will. In some cases birds that seemed to be the same as last season's friends proved to be entire strangers whilst the old marked ones were found nesting at some little distance.

The marital tie is somewhat looser in some cases than had been expected and not only do some birds often change mates from season to season but even for successive broods during the same season. A second brood in a nesting box was found to have one new parent whilst the jilted one was discovered helping to care for another family nearby.

It is also shown that as soon as the young are out of the nest they are usually taken immediately quite away from the vicinity. A family of young Wrens were found at the end of the first day some three hundred yards distant from their natal home.

The average daily range of many birds is surprisingly restricted. With traps set one hundred yards apart "repeaters," birds returning again and again to the trap, were rarely taken more than one trap away from their usual station.

Not only do birds return annually to their summer homes but to their winter ones as well and even along the way between follow the same locality stations year after year. Migrants merely passing through, have been taken on successive years, up to three, under the same bush.

Another bit of interesting evidence is on the actual mechanics of migration. It seems that the species studied do not pass along on their vernal and autumnal passages doing daily stints of travel, but pause for a while here and there where food is good and while the weather is fine, to pass on with, or just before, the storm that brings others of their kinds along.

All this is most interesting and valuable work and is such that many of otherwise limited opportunity can follow and, whilst indulging in a pursuit, fascinating in itself, amass a large amount of information of great popular, economic and scientific value. It is well that such important work is being directed by the experienced Bureau of the Biological Survey and that steps will be taken to extend its scope and correlate its results.

P. A. TAVERNER.

THE JAEGER AT SYLVAN LAKE, ALTA.—While living at Sylvan Lake, Alberta, this summer, I was fortunate enough in September, to observe a fine Jaeger attacking a Common Tern. This gave me a splendid opportunity to observe this unusual visitor. When finally the Tern escaped, the Jaeger settled on the water, and with my prism binoculars I was able to note its every feature. The upper parts were very dark while the throat underparts appeared to be a creamy white.

This is the second time I have seen this species at Sylvan Lake. In June, 1916, hearing an unusual note above the din of a large flock of Franklin gulls feeding in the bay, I saw what for the moment I took to be a fish hawk swooping about amongst the gulls, but as it poised above them for a second I was amazed to see the long middle tail feathers. Shortly after it settled on the water, and I watched it for a long time with my binoculars. I did not report this occurrence outside my own circle of friends, thinking I would not be believed, but, now with the advent of the second one I am glad to report this record for Alberta.—ELSIE CASSELS.

## BOOK NOTICE.

BIRDS OF EASTERN CANADA, Memoir 104, No. 3, Biological Series, Geological Survey of Canada, by P. A. Taverner: King's Printer, Ottawa, 1919. 297 pages, octavo with 50 colored plates, illustrating 105 species and varieties; price 50 cents.

The introduction to this work is unusually attractive, and will be found both interesting and instructive to the student of Birds. It deals with classification, distribution and other problems and even has a chapter on Attracting Birds about the home.

The index appears very complete and comprises English, French, and scientific names.

A most useful feature, that might well be copied in similar works is the description of the different classes, orders and families. Too often the young student is left to surmise as to the scope of these divisions of the science.

One of the most attractive features of the book is the inclusion of the section "Field Marks." No other part of the work will receive as earnest study from puzzled nature students, to whom unidentified birds are a frequent experience. After one has pursued birds long enough to have identified 75 species, he is apt to make a good guess at the identity of any unknown, and needs only confirmation from a book to change surmise into certainty, and the section under consideration provides easy reference for such a puzzle.

The key is good, but if a key is worth providing, it is worth while to carry it out to the limit, and not abandon the seeker after knowledge at the broad heading "Sparrows," and leave him to grope through 34 different species, when a color key could easily have been given on a few added pages.

The colored plates, by Frank Hennessey, are on the whole, very creditable. Indeed, the colors are exceptionally true to nature. It would seem to the writer that this book illustrates well a missed opportunity. To certain of a large circle of readers, it is regrettable that the contents of the book are limited so nearly to bare outlines. It has come out as very little more than a book of reference, wasting a splendid opportunity to change casual readers into bird-loving enthusiasts. There are so many interesting details of bird life that could be added to such work, and the author is so competent to add them, that

one is almost tempted to regret that the book was sent out ill equipped for what might have been a greater accomplishment.

It happens to come within the scope of the reviewer's knowledge that the added touches, without which the book makes comparatively uninteresting reading, were actually provided by the author, and were eliminated by a mistaken editorial policy. The reason, for the elimination is unknown, but could hardly have been aught than either poor judgment or economy. For the sake of the future, it is to be hoped that it was not the former, and if the reason were economy, it was a most erroneous application of the term. True economy lies in the production of the greatest and best results at a reasonable cost. In the case of a train from Toronto to Ottawa, there might be an economy of coal in stopping the train 10 miles before its destination, but no one would be so deluded as to claim real economy in throwing the passengers on their own resources for the last ten miles, when the equipment was ready to complete the journey. The present instance is a parallel. The names of the birds have been published, descriptions added, field marks, nesting, distribution, all of the skeleton on which to hang vital and interesting facts, clothed in language that would attract the casual reader and open many eyes to the charm that lies in this as in every other department of natural science, but the opportunity has been lost through no fault of the author.

It is so unusual, in such a work to omit all details of the capture of rarities, that the reviewer cannot become sufficiently accustomed to the change to consider it other than an error of omission. Take for instance, Blue-wing Warbler. "Though taken only once in Canada," how much better to have said, "One taken at Point Pelee on September 2nd, 1906, is the only Canadian specimen." The information might just as well have been given definitely while the writer was at it, and the book would have been worth just that much more as a reference.

Perhaps one may be judged meticulous for such fault finding, but the duty of the reviewer is to state the case as he sees it, in the hope that his opinion may have a favorable influence in the future.

W. E. SAUNDERS, London, Ont.