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NOTES ON THE MAMMALS OF RIDOUT, DISTRICT OF SUDBURY, ONTARIO.

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The comparative isolation of much of Northern Ontario from centres of habitation, seems a reasonable cause for the relative dearth of literature on the mammals from this region. The smaller species have, naturally, received little attention, and much is yet to be known about them, notably in regard to their range and life histories. Big game hunting and the fur-trade have doubtless conducted to a greater familiarity with the larger mammals than would otherwise have been the case. So far as is known the Ridout country has had no detailed investigation of its animal life; because of this fact the present paper based upon a collection of 55 mammals and observations thereon made in the immediate vicinity of Ridout is presented.

The first visit to the locality was from October 20 to November 2, 1917, efforts being mainly directed to the accumulation of notes on the larger mammals and birds of that period. With the present paper in view a return was made the following year, from October 1 to November 1, with every provision for the collection of specimens in order to round out the data as fully as possible.

The Jumping Mice (*Zapus hudsonicus* and *insignis*) were not secured, due partly to their early habit of hibernation. No bats were observed, nor Flying Squirrels (*Sciuropterus sabrinus*). No signs were seen of the Star-nosed Mole (*Condylura cristata*). Various circumstances prevent the list from being complete.

Ridout is situated on the Canadian Pacific Railway, 132 miles north-west of Sudbury, 166 miles south-east of White River, 96 miles north of Lake Huron and 280 miles south-west of James Bay. It is located upon the northern height of land at an elevation of 1,364 feet above the sea and 778 feet above Lake Superior. The surrounding hills range in altitude from 1,400 feet to probably 2,000 feet. Magnetic variation is about six degrees west of astronomical north.

The whole region is intersected by hundreds of streams and dotted with countless lakes of all sizes. Many feeders of that noble stream, the Moose River,

find their source along the height of land, converging fan-like to the majestic tide that sweeps northward to James Bay. Others, notably the Spanish River, flow southward to the Great Lakes.

The general character of the country about Ridout is that of vast rolling forested hills with frequent outcrops of gneiss or perhaps schist and greenstone. Some distance to the east, however, the region is broken into gigantic rock masses, mountains, and escarpments of desolate and infinite grandeur. The whole lies to-day as through all the ages.

Ridout lies well within the Canadian zone and in floral aspect resembles broadly that of all timbered sections west of Sudbury. Occasional boreal "islands" suggest the stunted evergreen forests of the Hudsonian zone. Conifers are everywhere predominant, the greater portion of the woods consisting of White and Black Spruce (*Picea canadensis* and *mariana*), Balsam Fir, (*Abies balsamea*) and Banksian or Jack Pine, (*Pinus banksiana*). Yellow and Canoe or White Birch (*Betula lutea* and *papyrifera*) occur, the latter especially being common and growing frequently in pure stands upon the side-hills. White and Red Pine (*Pinus strobus* and *resinosa*) flourish in varying numbers. The remaining common trees of the forest are Hemlock (*Tsuga canadensis*), Tamarack (*Larix laricina*), White Cedar (*Tsuga occidentalis*), Aspen Poplar (*Populus tremuloides*), Balsam Poplar (*Populus balsamifera*) occurring on low ground along lakes and streams, Alder (*Alnus incana*) and the Mountain Maple (*Acer spicatum*). *Salix rostrata* is the only tree-like willow. Blueberries are usually an abundant crop, and numerous flowers, particularly the wild rose, I understand, grow in great profusion during the northern summer. Mosses and lichens occur almost everywhere on rocks, logs, ground and upon the branches of standing trees.

The avifauna of the region for October while inextensive will convey certain impressions in a brief list, impossible to other things. Birds noted

during the first week of the month were Robin (*Planesticus m. migratorius*), Crow (*Corvus brachyrhynchus*); Raven (*Corvus corax principalis*); Canada Jay (*Perisoreus canadensis*); Blue Jay (*Cyanocitta cristata*); White-throated Sparrow (*Zonotrichia albicollis*); Great Blue Heron (*Ardea herodias*); Black-capped Chickadee (*Penthestes atricapillus*); Slate-colored Junco (*Junco hyemalis*); Horned Lark (*Otocoris alpestris*) and Rusty Blackbird (*Euphagus carolinus*). On October 10, a Kingfisher (*Ceryle alcyon*) and Pileated Woodpecker (*Ceophloeus pileatus abieticola*) were observed, the latter again on the 21st. One Tree Sparrow (*Spizella monticola*) was noted on the morning of October 13. During the afternoon of the 18th, Pine Grosbeaks (*Pinicola enucleator leucura*) were common. The first small flock of Snow Buntings (*Passerina nivalis*) made their appearance the following day. A single Arctic Three-toed Woodpecker (*Picoides arcticus*) was observed on Oct. 21. Ruffed Grouse (*Bonasa umbellus*) was noted but not commonly.

In the preparation of this article I have received many courtesies from Mr. W. E. Saunders, of London, Ont., and Dr. R. M. Anderson of the Geological Survey, Ottawa. The late Mr. James M. Macoun also of the Geological Survey, kindly furnished the proper common and scientific names of the trees known to occur in the region. To Mr. George Visser, of Ridout, I am indebted for many favors extended during the trip.

COMMON EASTERN SHREW, COOPER SHREW, OR MASKED SHREW, *Sorex personatus personatus* I. Geoffroy.

The masked shrew is very common at Ridout, persisting in nearly all situations from low woods and meadows to the wooded ridges.

Nine specimens were taken. Color.—Dorsal surface of the body brownish-gray, the latter barely perceptible; brown deeper on the rump. Sides slightly lighter. Belly, throat and chin ashy-gray, no sharp line of demarkation between color of belly and sides but change taking place rather abruptly. Tail obscurely bicolor, brownish above, paler below. Feet very light brown.

RICHARDSON'S SHREW, *Sorex richardsonii* Bachman.

Only three specimens of this beautiful shrew were collected at Ridout. A fourth was found dead on a trail through the woods but was beyond the stage for proper preservation. One of the three preserved was found lying dead on a trail intersecting a low meadow. No marks of violence were found on either of these animals but probably the pounce of a cat or bird would be sufficient to extinguish life, the aggressor leaving it unutilized when discover-

ing by the unsavory odor of its prey (which characterizes the shrews) the reality of its mistake. Few animals, I believe, devour the shrews on this account, and I have seen dogs that were very reluctant to even kill them for the same reason.

One man whom I talked with in the north firmly believed that every Richardson's shrew that crossed a human trail fell dead instantly; the idea doubtless originating from the appearance of numerous shrews in these places. The two which I found in the traps were in low damp meadows frequented by the Forest Vole (*M. fontigenus*) and the Mole Shrew (*B. brevicauda*). So far as I am aware these specimens represent the second record for Ontario, the other being Miller's two specimens collected at Peninsula Harbor, in 1896.

SMOKY SHREW, *Sorex fumeus* Miller.

Only one specimen of this comparatively rare shrew was collected at Ridout. Its identity among many of the common shrews was for a time uncertain but it has now been referred to this species by both Mr. W. E. Saunders and Dr. R. M. Anderson. It was collected on Oct. 12, 1918 and measured: Length, 108 mm.; tail vertebratae, 44 mm.; hind foot, 15 mm.

Colour:—Bicolor; back, dark brownish; underparts slightly paler rust brownish. Pelage slightly glossy.

MARSH SHREW, WATER SHREW, *Nesorex albarbis* (Cope).

At Ridout I found that the water shrew was uncommon. Three specimens collected may be described as follows: Color—Above very dark, in some lights almost black, in others, faint brownish-black or greyish-black, overlaid almost imperceptibly with silvery tip to some hairs giving it a slight frosted appearance. Belly silvery-grey washed with dusky, heaviest between forelegs. Whitish around lips and chin. Tail bicolored, blackish above and around the tip, white below. Feet, light brown and fringed with silvery, bristle-like hairs, adapted for swimming. All are apparently adult and in winter pelage.

It is perhaps strange that I found the water shrew in only one very limited locality at Ridout. This was along a small brook which flowed down from the timbered hills and entered the Ridout river a short distance east of the station. At intervals its margin was grassy and moss-grown and underneath this by lifting away the growth, the tiny tunnels of the shrew could be seen. In a space about twenty-five yards in length along the western bank of this streamlet I trapped the three specimens mentioned, all in four days, from Oct. 4 to 7, after which no more were taken. Beyond doubt extended diligence would locate other small

families or colonies along other brooks, beside the river or about beaver meadows. The other small mammals taken in the traps set for *N. albibarbis* were *Blarina brevicauda*, *Sorex personatus*, and if I remember rightly the only specimen of *Sorex fumeus* which I collected on the trip.

SHORT-TAILED SHREW, BOB-TAILED OR MOLE SHREW, *Blarina brevicauda* Say.

The eastern shrew is very common at Ridout.

The seven specimens collected average larger than those given by Merriam from type locality* (near Blair, Neb.) and considerably larger than his eastern specimens from Martha's Vineyard, Mass.

The Ridout specimens are also larger than the average of nine specimens taken from my collection at Preston, Ontario.

As is usual within its range, this shrew was found at Ridout in nearly all situations, from low, mossy swamps to wooded ridges. Scarcely a trap in any of these places but sooner or later yielded a *Blarina*. It was uncommonly abundant in low grassy meadows adjacent to dank spruce woods. By pressing the vegetation aside in these places I discovered small feeding pockets beneath, arched over thickly with grass, the bottoms, being covered with varying depths of excrement. Examining these places, the first day at Ridout, I credited the sole ownership to the Forest Vole (*M. fontigenus*) but soon discovered my mistake, for from six traps set in a grassy depression not over fifty feet in diameter, the following morning I took three blarinas and only one *Microtus*. Favoring *Blarina*, the ratio as a whole was even greater than this; in fact it is the most abundant species of mammal in the region and perhaps anywhere in Eastern North America.

Occasionally I found specimens in traps set for *Eutamias* and *Synaptomys* under logs in the deep moss of spruce woods; other times in hill-side sets among the pines intended for *Peromyscus* and just as often in the subterranean tunnels of *albibarbis* along the streams. The grassy sink-holes or meadows dotted with low bushes and shrubs, appear, however, to constitute the over-flowing nucleus from which, radiating, they invade every conceivable surface situation.

BLACK BEAR, *Ursus americanus* Pallas.

The black bear is reported as being tolerably common throughout the region. Although numerous signs both recent and old were observed, no individuals were encountered. The black bear usually eludes the hunter very cleverly, offering comparatively few shots, but large numbers are taken in heavy steel traps every spring. The following brief "experience" was told to us by a trapper on Oct. 30.

In search of good trapping grounds, he came suddenly upon a big black bear feeding, partly concealed behind a low windfall. The trapper carried no fire-arms, only a light axe and a hunting-knife, but was determined not only to discover what the bear was feasting upon but also if chances offered to kill it with the axe. But contrary to the usual custom, bruin preserved a stern front and refused to quit the scene. Several experimental advances on the trapper's part ended with negligible results and the conviction that discretion was here the better part of valor. Several times old bruin waddled a few paces away, but would immediately return with wicked eye, watchful and sullen. After some manoeuvring however the trapper detected the protruding blade of a moose's antler but further critical scrutiny was suspended as impracticable.

The interesting point lies in the fact that a few days previously a bull moose was wounded near the Ridout river five miles to the east, and when last seen was running in a westerly direction. We suppose that the dead moose and the wounded one are identical and before succumbing to injuries had traversed the considerable intervening distance.

GRAY WOLF, *Canis occidentalis* (Richardson).

Wolves are reported as occurring throughout the timbered portions of Algoma and Sudbury, but never numerous. None of recent occurrence at Ridout. Inferring from many wild wolf stories afloat, the tribe seems numerous enough north of Superior and surrounding Lake-of-the-Woods.

COMMON RED FOX, *Vulpes fulva* Desmarest.

The red fox occurs in fair numbers at Ridout judging by reports and the numerous tracks observed in the snow about the wooded hills and over the open ridges. All the freak color phases, black, silver and cross are represented in the pelt collections taken from the country.

MARTEN OR AMERICAN SABLE, *Martes americana* (Turton).

No sign of the marten was seen at Ridout, although I traversed several tracts of very likely looking country. My friend Mr. Visser informed me that three skins were procured by him from Indians coming in from the south, apparently from the region of Wakami, Pike, Trout and Kebaskashish Lakes. It is quite likely that all the old forests in Algoma not visited by fire are inhabited by marten in varying numbers. While on a canoe trip north of the confluence of the Ridout and Walkam rivers in Oct., 1917, I saw what looked like good marten country but had no time to investigate. This was high, heavily-timbered country about a fair sized lake. On the Standard Top. Map (Cartier Sheet) this body of water bears no name.

While exploring some heavily timbered country

* N. A. FAUNA. No. 10, p. 11, 1895.

Miller* remarks: "At Nipigon a trapper told me that martens, wherever they occur in sufficient numbers, so terrorize the red squirrels by constant persecution that the noisy rodents, learning that silence is their best protection, stop chattering. Hence an abundance of silent squirrels is—according to my informant at least—a certain indication that marten fur is plenty. According to this, there are no martens at all near Ridout.

FISHER, *Martes pennanti* Erxleben.

Consensus of opinion admits this animal as commonly occurring in all the wooded country. An ex-forest-ranger with whom I talked said that while existing in fair numbers, they never became abundant, according to his observations. On Oct. 18, I took one in a bear trap set at the offal of a moose, near the Ridout river. This was several miles north of the railway and in a comparatively heavy belt of spruce timber. The specimen was a well matured male and according to numerous published measurements exceeded the usual size. Total length, 36½ inches; tail, 14½ inches; foot, 5 inches. The ground color over all was a brown of medium depth very liberally besprinkled dorsally with hoary greyish-golden guard hair; the posterior portion more suggestive of gray.

The fisher is regarded as one of the few successful enemies of the porcupine from the frequency of "porky" javelins somewhere in its anatomy, which as a rule produce no bad effects. Although my specimen was apparently an old adult, no evidence of this was to be seen. Probably the general scarcity of *Erethizon* would account for it.

SHORT-TAILED WEASEL, *Mustela cigognanii* Bonaparte.

Numerous tracks of weasels were noted especially during the autumn of 1917. No specimens were secured, but the trails and a single medium sized weasel hastily observed near the station were referred to this species.

MINK, *Mustela vison* Schreber.

The mink is fairly common at Ridout. The lavish distribution of streamlets, rivers and lakes throughout the region should prove a very congenial home for it. After a light fall of snow in November, 1917, I saw signs of one along the border of a small brook. A trainman saw one running along the Ridout river on October 25, 1918.

CANADA SKUNK, *Mephitis mephitis* Schreber.

Skunks are found in varying numbers throughout the region, but their distribution is governed locally by favorable situations. Much of the country is clothed heavily with conifers, and where this exists

with low, damp, mossy ground the skunk could scarcely be looked for. The poplar covered ridges with warm southern slopes form a congenial habitat for the species and many occur in the region. In a sandy slope covered with low deciduous trees north of Ridout I found two dens which I think belonged to this species; both had every indication of recent occupation. Mr. Visser has observed the animal on but two or three occasions at Ridout but informs me that its occurrence is more frequent about the higher ground at Lake Pishkniogama a short distance west of Ridout. The first week in November, 1917, we saw one cross the rails near the station and disappear in the woods.

CANADA OTTER, *Lutra canadensis* (Schreber).

Mr. Visser informs me that although the region yields a number of skins each year, the species is not very common. Where, as at Ridout, the nature of the rivers are such that no alluvial material is deposited along their courses, evidence is scant in determining the occurrence of terraqueous species such as the other. Personally I observed no signs.

After ice forms, and there is a surface of light snow, the long excursions of the otter marked by its conspicuous trails are commonly seen. They delight at this time in the fair open expanses of river and lake and enter into long nocturnal journeys. Once, on ascending the Hay river in Alberta, a fresh otter trail of the night before preceded me all day and was still in evidence when I camped for the night, headed strong into the mountains. The distance traversed by this animal before and after my own day's journey of about fifteen miles, and added to it would, if known afford a very interesting and perhaps surprising figure.

The usual mode of travel at such times is the alternate jump, and slide, peculiar to the species, with the latter five or six feet in length and maintained in untiring regularity by the momentum received from each quasi-double bound. Each river riffle on these journeys are unfailingly explored, with varying success. If compensated the evidence is plain enough—a few flecks of blood, probably a fin, or a number of scales, and a yellowish stain in the water-soaked snow at the lip of the ice-hole. A corpulent male shot in November while feeding on a wild duck at one of these holes, was rankly "fishy" and loaded with fat.

CANADA LYNX, *Lynx canadensis* Kerr.

According to all accounts the lynx is at present the commonest furbearer in Algoma, and the Indian's specialty. The recent annual "catch" I understand has been large but the diminution of hares may soon cause a change of local fortune in lynx skins. Lynx snares of former date were frequently noted along the Ridout and Wakami rivers,

*Miller, Jr., G. S., Mammals of Ontario, Vol. 28, No. 1, p. 42, 1896.

indicating the animal's habit of travelling in such places. Winter or summer they seem to have a regular route, usually at the forest's fringe; about rivers, lakes, or natural meadows rather than in the extreme depths. In western Alberta I learned that the Indians know these routes so well that snares at peculiarly favorable places are maintained in season, from year to year and are handed down as a heritage from father to son. The general topography of a region usually suggests to the experienced man, the favorable disposition of snares. Lynxes do not confine themselves to the lowlands for they possess an inherent love of expanse that betakes them regularly to breezy heights or the lip of yawning space.

One day, in November, I happened upon a young Indian preparing a snare for lynx on a semi-forested elevation hundreds of feet above the Hay river. Expressing surprise at the choice of such a place for a snare the young Cree answered in broken English "Him good; much go." I took his word for it. Passing by a few days later while moose hunting, sure enough a big cat was there, choked to death and apparently by his own effort, for both front feet were stiffly braced against the toggle to which the snare-thong was tied.

It is perhaps interesting to note that the inevitable "beaver castor" so alluring to many animals, is equally so to the big cat. He simply cannot resist it. To purr and rub his neck against the concoction is apparently the one unsatisfied ambition,—unsatisfied because the snare acts first. An Indian that I entertained in my cabin one night loosened up enough to tell me that the Crees' common brown "lynx dope" was simply a mixture of boiled rabbit liver and beaver castor. As beaver were protected in Alberta at that time, we are permitted to guess where they got the "castor."

DUSKY WHITE-FOOTED MOUSE, *Peromyscus maniculatus maniculatus* (Wagner).

The white-footed mouse is fairly common at Ridout, having collected it in nearly all high situations both semi-barren and timbered.

By measurements (actual and relative) nine specimens taken come well within the limits of *P. m. maniculatus* (Wagner) = *Peromyscus canadensis umbrinus* Miller, recorded from Peninsula Harbor, Ont. (Notes on the Mammals of Ontario).

"These specimens do not seem to show any intermediate characters in measurements or coloration with *P. maniculatus gracilis* (Le Conte) = *P. canadensis canadensis* Miller." R. M. Anderson.

All but one have tails slightly less than half the total length. All have under-sides of hind-feet

haired except on the pads and spaces between—length 20 mm. or greater.

This northern variety of the white-foot, was found in nearly all of the greatly diversified surface situations. Include *Blarina* and the two cover the territory very well. On the very edge of low mossy woods I have taken them in traps set for *Eutamias* (Red-backed Vole) and likewise in "sets" made on high ground intended for other mammals. One afternoon while crossing a small barren plateau I noticed a neat little hole driven deep into the soil beside a log. Miller's incident with *Phenacomys* was immediately recalled, wherefore through a little inductive reasoning I expected next morning to catalogue one of those voles, but alas, the trap held only a lonely *Peromyscus*. That was the closest I got to *Phenacomys*—in all probability rather remote.

The places of commonest occurrence for *Peromyscus*, were about the fringe of woods bordering natural meadows or rocky tree-interspersed land. While trapping for Hoy's shrew (*Microsorex hoyi*) on dry wooded hill-sides, though failing to get that animal, I never wanted for deer mice. North of the station a small glaciated and striated ridge of granite ran east and west, covered with conifers wherever enough till or mould had accumulated in its hollows to support them. On the south side several small wooded terraces sloped down, alternating with rock which often formed low precipitous back-grounds for the former. At the foot of these among the trees I set a number of traps because in the individual character of the situations they seemed to offer good opportunities for intercepting any small mammal that ran the ledge. But, again, though taking a number of the Masked Shrew (*S. personatus*), *Peromyscus* inevitably paid the greater price. And incidentally, this was one place that I failed to get *Blarina*—a genuine relief. Twice I trapped the dusky mouse in low grassy creek borders but the dainty white-foot usually haunted higher ground.

NORTHERN LEMMING MOUSE, *Synaptomys fatuus* (Bangs).

This lemming is uncommon at Ridout. Only two specimens were collected. These are identical in appearance, except for the smaller size of No. 353 which is evidently juvenile or adolescent. They are similar to adult *Microtus p. fontigenus* but the pepper and salt effect on the back is noticeably coarser. These examples were taken in the same strip of swamp. Though persistent trapping in most favorable places was conducted for several weeks, no further specimens were observed. Only a few yards separated the two traps which captured them, both beside decayed, moss-covered logs in the sphagnum of a spruce woods north-east of the station.

The situation is only a couple of feet above the Ridout river's highest water mark. Their preference for cool, mossy, damp woods is clearly evident. No trails made by these animals or any other small mammal could be found; evidently all ranging indiscriminately over the forest floor. The other animals found associated with *Synaptomys* were *Evotomys gapperi*, *Sorex personatus*, and *Microtus p. fontigenus*.

RED BACKED MOUSE, *Evotomys gapperi gapperi* (Vigors).

Though experiencing no particular difficulty in collecting red-backed voles at Ridout, their numbers were evidently much less than were found by Miller north of Lake Superior.

The six specimens taken are all of the red phase. Two individuals are somewhat larger than the others. An examination of the teeth seems to indicate that all are young, with the exception of two which are noticeably inclined to the double-rooted molar of the adult. These were not, however, deep and distinct, better described perhaps as half-rooted.

This was found in two distinct surface situations, the deep mossy woods and the comparatively high ground adjoining them. The first specimen I trapped was on a low pine ridge with an elevation of about forty feet above the contiguous spruce woods. Another was captured in a similar situation but lower in elevation, sparsely wooded, and strewn with rocks. The remainder were taken in deep forests. Nowhere was the species common.

FOREST MEADOW MOUSE; FOREST VOLE; HUDSONIAN MEADOW MOUSE, *Microtus pennsylvanicus fontigenus* (Bangs).

The forest vole appears to be rather uncommon at Ridout; though traps well baited and in favorable places remained set throughout the full time of the trip, only four examples were secured. This seems to suggest a scarcity of the species at least locally. All were taken in natural grassy meadows in the vicinity of the Ridout river. Particulars of the habitat will be found under *Blarina brevicauda*.

I had hopes, after making dental and cranial examinations of these four specimens of finding a *Phenacomys* among them but in this I was disappointed. It is reasonable to suppose that a colony exists in the vicinity of Ridout since Miller took them at Peninsula Harbor and as their range extends east to Labrador.

The blackish-brown, and smaller size of two of the individuals indicate their immaturity. The two other examples, both adults are dull chestnut-brown above, darkened along the back with coarse black hairs. Underparts in one silvery-plumbeous, in the other plumbeous gray tinged with pale buff. All have feet brownish and tails indistinctly bicolored.

MUSKRAT, *Ondatra zibethica* Linn.

Mr. Visser informs me that formerly the muskrat was common in the region but exceptionally high water, I think a couple of years ago, nearly exterminated them. The extensive and elaborate water-system of the country should be very favorable for this animal. Only a couple were seen while canoeing on the Ridout river; while of the usual "sign" on partly submerged logs, little was in evidence. No houses were observed.

CANADA PORCUPINE, *Erethizon dorsatum* Linn.

The porcupine occurs sparingly throughout the region. Although spending several weeks during two autumns in the forests about Ridout only one individual was seen. This one was curled up and asleep under a big spruce in the midst of an extensive coniferous forest. Little trails running out in several directions from the cozy hibernal retreat, showed plainly in the deep moss as they lead up to numerous trees upon which the porcupine fed. The scarcity of the species in the locality may be a reflection of similar conditions throughout the county. Preble¹ found them nowhere abundant on his Hudson Bay trip and remarks: "In a country where the life of the native is a constant struggle for food, the ease with which this animal may be taken, is sufficient reason for its scarcity."

CANADA WOODCHUCK, *Marmota monax canadensis* Erxleben.

I could get no information concerning this animal at Ridout. The season was already too far advanced when I arrived for any collecting, as the animals hibernate in mid-September. Some small burrows observed on sandy southern slopes and credited to *Mephitis mephitis* may have belonged to *monax*.

Miller² reported the woodchuck common at Peninsula Harbor so they may be expected to occur at Ridout. Preble³ also alludes to specimens recorded by Allen from James Bay and Nelson River.

LAKE SUPERIOR CHIPMUNK, *Eutamias quadrivittatus neglectus* (Allen).

This small form is only of moderate abundance at Ridout. Miller found it "excessively abundant" on the north shore of Lake Superior but these superlatives would not apply in this instance.

Regarding these specimens collected, Dr. R. M. Anderson remarks: "These specimens differ principally from *Eutamias quadrivittatus borealis* (Allen), Northern Chipmunk, in having the sides much redder; typical *borealis* having the sides pale

(1) Preble, E. A., Mammals of Keewatin; N.A. Fauna, No. 22, p. 59, 1902.

(2) Miller, Jr., G. S., Mam. of Ont., Vol. 28, No. 1, p. 26, 1896.

(3) Preble, E. A., Mam. of Keewatin, N.A. Fauna, No. 22.

yellowish-brown. Occasional specimens of *borealis* from Saskatchewan and Alberta approach these specimens in reddish tint of sides, but have the backs averaging much paler."

In a state of nature, the smaller size of this chipmunk combined with the relatively longer tail carried stiffly erect when travelling, serves readily as a means of differentiation from the larger species *striatus* which shares this same region. At a glance too, it appears much darker, perhaps because of the comparatively closer grouping of the dorsal stripes and the absence of chestnut or deep reddish-brown on the rump which characterizes the big chipmunk.

Neglectus lives not only on the hillsides among the open boulders but also frequents remote places in the tangled wilderness. Twice I found them on slight declivities far in the forest surrounded by a maze of fallen trees, boulders and brush and other things which vex the tired traveller. Thoughts of fatigue, however, disperse when a trim little chipmunk shrills at your elbow, and disappears like a buffy streak with twinkling feet curiously attached to a long tail. In a moment if all is quiet, he may reappear, but most likely scolds and protests from a deep retreat until you leave. One observed in mid-afternoon comfortably hunched in the October sun was discovered later to have been doing some "fall threshing," the grain, so called, having been removed from low shrubs among the boulders.

In favorable places along the railway I found this chipmunk much commoner. Many birds and a few mammals are attracted there by slight grain leakages from passing trains. One "little chipmunk" I could count on seeing nearly every fine day near a pile of boulders bordering the highway; scraps from a near-by boarding car furnishing his meals *de luxe* without further anxiety, and extending his available time for frolic. Sometimes when I wandered by and interrupted this sumptuous pastime he would scramble with great concern over the sloping ballast and leap into a truck beneath the car. Once there I never could discover him, although meanwhile I must have been under constant surveillance as manifested by his prompt return to *terra firma* the moment I was gone.

Neglectus enters traps readily and is successfully retained by almost the smallest sizes. Once I found one dead in a small Victor mouse-trap, (the smallest size) set for a shrew at the base of a mossy stump in a pine woods. This species is said to be harder than the larger chipmunk, remaining above ground much later in the season. In this respect I found only a few days' difference but the forepart of the month (October) which was so favorable to *striatus* terminated in weather unsuited to either, so that the equalizing effect in favor of

striatus terminated in weather unsuited to either, so that the equalizing effect in favor of *striatus* in this instance, diminished the difference between them. Miller, (Mammals of Ontario) found that on the north shore of Lake Superior the big chipmunk hibernated about the end of September. At Ridout, I last saw it on October 12; the two following days were cold and on the 15th it snowed, probably hastening its hibernation. So far as I am aware *neglectus* disappeared for good on October 14.

EASTERN CHIPMUNK, *Tamias striatus lysteri* (Richardson).

The Eastern Chipmunk occurs in about equal numbers with the smaller species *neglectus*. Apparently not nearly so numerous as was found by Miller at Peninsula Harbor and Nipigon. (sub-species *griseus*).

Dr. R. M. Anderson after examining three specimens collected at Ridout reported: "Our museum specimens of eastern chipmunk (*Tamias s. lysteri*) are not strictly comparable with these as to season, being early summer specimens, and averaging lighter in color. The Ridout specimens being in autumn or early winter pelage, show a markedly grayer cast; they also have a much deeper shade of brownish red on the rump than is found in our twenty-five specimens (from Gulf of St. Lawrence, Point Pelee, Lorne Park, Ottawa, and Algonquin Park, Ontario). The Ridout specimens, however, are similar in size to the eastern specimens and are very much smaller than our only specimen from farther west, *Tamias striatus griseus* Mearns, Gray Chipmunk, from Shoal Lake, Manitoba, and unlike the typical *griseus* do not have the dorsal stripes running back on the rump."

While in the Ridout specimens there are no marked separable characters from true *lysteri*, a slight approximation to *griseus* doubtless exists, since Miller's specimens (though typical *lysteri* from North Bay) approached *griseus* more closely than *lysteri* at Peninsula Harbor and Nipigon. Ridout is roughly mid-way between North Bay and the former point.

These large chipmunks inhabit the same general localities as *neglectus* but I believe are more favorably disposed to the deeper woods. Around Ridout, their choice was semi-wooded, boulder-strewn situations near the skirts of the forest and always on high ground. A place of this description, east of the station I visited on October 7. The forenoon was bright and warm and the chipmunk population everywhere in evidence, the calm forest resounding with their hollow *tuck-tuck-tuck* until careful restraint was necessary to prevent an undue impression of their numbers. They were there in conspicuous numbers, however, each "calling" his

best, evidently to emphasize the beauty of the morning.

NORTHERN RED SQUIRREL, *Sciurus hudsonicus hudsonicus* (Erxleben).

The red squirrel occurs in abundance throughout the region.

"The specimens submitted (three) seen to be typical *S. h. hudsonicus*, showing little difference from specimens from Algonquin Park, Kewatogama Lake (St. Louis Co., Minn., near the Inter. Boundary), and Edmonton. The Minnesota specimens approach to the range of *Sciurus hudsonicus minnesota* Allen, but are probably *hudsonicus*. Hollister (Bull. Wis. Nat. Hist. Soc.) places specimens from Two Harbors, north of Duluth, Minn., as *S. h. hudsonicus*." (R. M. Anderson).

The specimens reported upon by Dr. Anderson show a gradual advance from summer to winter pelage—discarding the dark brown of the back, ochraceous-white of the underparts and the black lateral stripe of summer, for the greyish ground color of the back, reddish dorsal band and neutral plumbeous-white of winter. Examination of the specimens seems to indicate a complete moult in about three weeks: Sept. 25-Oct. 14.

It will be interesting to note here in regard to the shedding of *Sciurus* that in one individual the summer coat was being shed uniformly from rear to front, the line of demarkation between the two conditions being plainly evident. In a specimen of *loquax* taken at Preston, Ont., May 13, the same uniformity of shedding prevailed only exactly reversed; the moult beginning at the head and advancing backward. The demarkation in this specimen is very pronounced. The process affecting the new coat seems to be confined chiefly to the active edge of the renewing area, where apparently the old hair drops out and the new replaces it in a gradual advance, each portion maintaining simultaneously the pure color of the respective seasonal pelages, with but little scattered shedding. This unusual manner of assuming a new pelage may be likened (permitting the simile) to an ice sheet, slowly enveloping a continent with the principal physical changes devolving from the active forces of its advancing border.

CANADIAN BEAVER, *Castor canadensis* Kuhl.

I found the beaver common on all the rivers and many of the lakes in the locality. Abundance of signs on the Wakami above its junction with the Ridout river and the absence of lodges indicates the "bank nest" as the permanent abode. Along the latter stream, where dams and lodges are common, the shores for the most part are low, sometimes marshy, and fringed with willows. The Wakami river on the other hand is bordered with compar-

atively high banks and heavily timbered. At present, the trapping of beaver in Algoma is restricted to ten animals each year, per trapper. Each skin must be accompanied by a government "beaver coupon" (each 50 cents) before sale or shipment. This should have a beneficent result toward their conservation.

HUDSON BAY VARYING HARE, *Lepus americanus* Erxleben.

The hare, as is commonly known has its septenary ebb and flow of abundance. At Ridout, conditions pointed to a low ebb; only a few signs, mostly old, were observed, and but one or two animals. A female taken on October 4, 1918, was beginning to change very slightly into the winter pelage over the buttocks and ears. Its two measurements were: Length, 17 inches, (434 mm.); foot, $5\frac{3}{4}$ inches, (145 mm.)

During October, 1917, the hare was scarce everywhere, although numerous old signs indicated a former abundance. A specimen collected on the 29th had affected a substantial change from the summer coat. Color: Ventral region extending to the throat and including the legs, buttocks, ears, and line anteriorly from eye to ear, nearly pure white. Ring around the neck and on the lower cheek, dirty-brownish white, darkest on the latter. Dorsally, conspicuous brown from shoulders to rump, much suffused with whitish. Fur over nasal and entire frontal, brown, mixed sparingly with white. Upper fringe of the ear, black. Length of hair on the back, 25 mm.

NORTHERN VIRGINIA DEER, *Odocoileus americanus borealis* Miller.

Deer occur, but are not common at Ridout. Whether the moose which are numerous there, exert a positive detrimental influence against the increase of the former is problematical. Probably the general arboreal conditions are not highly favorable to the deer. East of Ridout in all the country surrounding Metagama, Forks, Fluorite and Pogma, I understand the deer are extremely common, supplanting the moose almost entirely. After a fresh snowfall in November, 1917, I saw two deer trails north of Ridout but in October, 1918, none were seen. A trainman reported seeing a fine big buck in the C.P.R. ballast pit a short distance west of the station.

MOOSE, *Alces americanus* Jardine.

Moose are very common in the general vicinity of Ridout and reported in numbers at all points from Cartier to the north shore of Lake Superior. The past fall (1918) was exceptionally favorable for observing these animals. If the weather is mild they frequent the waterways comparatively late in the season. During the past season individuals could

be seen almost any day until the beginning of the last week of October. Previous to that time I saw nine individuals and secured a young bull. As cold weather approaches they retire to the higher woods. On traversing this same general region on about a forty-mile canoe trip commencing Oct. 22, 1917, we failed to see a single animal and attributed it to the very early formation of thin shore ice, which caused the moose to leave for higher situations.

Although individuals of *americanus* from northern Ontario are not recognized as the largest variety, some attain a very respectable size. Some heads taken out of that country I was told, had an antler spread of from fifty to sixty-two inches. Two bulls observed at fairly close range from the canoe could I believe closely approximate those figures.

Mr. Visser and I were afforded a splendid opportunity for hearing a cow "call" during the afternoon of Oct. 8. The canoe had just silently rounded a bend in the river when we noticed indistinctly, a cow, standing among low growth upon the bank; first revealed by the whitish lining of the ears. Meanwhile the canoe with scarcely a ripple drifted nearer and nearer but she made no move, apparently overcome by curiosity. With ears cocked forward and long pendant muzzle slightly projected, she surveyed perhaps the first human being in her life. When within a distance of about thirty yards she lifted her muzzle slightly and called softly; the

effect was peculiarly pleasing—low, tender, pleading, a single syllabled bleat of strange, but soft quality, quaveringly inflected, that seemed vaguely in keeping with the vast hush of the solitude. The next moment a young bull was seen slipping silently away among the spruces, where until this time he had remained discreetly hidden. Even then the cow seemed in no hurry to depart.

WOODLAND CARIBOU, *Rangifer caribou* (Aud. & Bach).

The woodland caribou is only a straggler at Ridout according to all I could learn. Mr. Visser told me of one killed in the vicinity a few years ago but says they are rare. The great number of moose in the country has a tendency, I believe, to drive the caribou from this range. Preble¹ alludes to similar circumstances on information received during his Hudson Bay expedition.

The range of the moose and caribou seems to be gradually shifting of late years. Miller² says of the caribou "very abundant on the north shore of Lake Superior" and regarding the moose "occasionally found, but as a straggler only." In respect to this and information received from different parties in the north, the condition now seems to be exactly reversed.

(1) Preble, E. A., N.A. Fauna, No. 22, p. 40, 1909.

(2) Miller, G. S., Jr., Mam. of Ont., Vol. 28, No. 1, p. 40, 1896.

CANADIAN SPHAERIIDAE.

BY THE HON. MR. JUSTICE LATCHFORD.

(Continued from Volume XXXIV, p. 34.)

12. *SPHAERIUM MODESTUM* Prime has been considered by Prime himself to be a synonym of *S. striatum*. Monograph Am. Corbiculidae, 1865, p. 37.

The rapids in the Rideau above Billings' Bridge, along the right bank, contain in no small numbers a shell which Dr. Sterki regards as *S. modestum* or distinct. He says: "It is certainly not identical with *S. striatum* Lamarck. Annals Carneg. Mus. Vol. X, p. 436.

If the *sphaerium* which occurs so abundantly at Duck Island is Lamarck's *striatum*, the Rideau shell is not that species. The latter is shorter, more robust, more inflated, and higher at the umbones. The average of ten full grown shells is 10.4 x 8.33 x 6.38—100: 81.62.

The only member of the family found associated with *S. modestum* in the Rideau is the much longer *Musculium transversum*.

13. *SPHAERIUM TUMIDUM* Baird was described from specimens found by John K. Lord in the Fraser at Sumas Prairie, British Columbia. It is stated to be dark olive in color externally and strongly ribbed. "Within the shell is bluish; long, half an inch; lat. rather more than half an inch."

14. *SPHAERIUM SPOKANI* Baird is another of the shells found by Lord. It is said to be smaller than *tumidum*; more rounded, and with less distinct striae or ribs; color pale horn, shining; white within. Habitat, "Rivers Spokane and Kootanie."

Referring to Osoyoos Lake, Lord says: "The shore is sandy like a sea beach, and strewn thickly with fresh water shells along the ripple line, has quite a tidewater aspect."

(9) The Naturalist in Vancouver Island and British Columbia, by John Keast Lord, Vol. II., p. 75.

I have not seen any true *sphaerium* from British Columbia, though a number of *musculia* and *pisidia*—several of which proved to be undescribed—were collected there for me by the Revd. Mr. Taylor. From Baird's description of *S. spokani* it appears not improbable that the shell is a *musculium*.

It should not be difficult for some member of the Club resident in British Columbia to procure specimens of the shells found by Mr. Lord. His *physa* would be of especial interest. I have examined the types of *Physa lordi* in the British Museum, and they appeared to me to differ not a little from the shell commonly designated by that name found near Ottawa, in Meach and Harrington lakes.

15. *SPHAERIUM PATELLA* Gould is listed by Dr. Sterki as occurring from Northern California to British Columbia. In Vol. XIII of the report of the Harriman Alaska Expedition, p. 138, Dr. Dall mentions that *S. patella* was found in the crop of a duck taken at Pender Island, which is in the southern part of the Strait of Georgia.

16. *SPHAERIUM TENUE* Prime. This little shell resembles *occidentale*. Some systematists have separated the two species from the other members of the family under the sub-generic name *Corneola*. I have not met with it anywhere; but it has been recorded from Ontario and Yukon Territory by Dr. Sterki. Dr. Dall (loc. cit. p. 139) states that it has been found in the Souris river (doubtless in Saskatchewan) and in the Upper Mackenzie, at old Fort Simpson.

What is supposed to be a variety of *S. tenue* has been described by Dr. Sterki as *Walkeri*. The types were obtained in Lake Michigan in water twenty four meters deep. The same shell was found by Mr. McInnes in the Attawapiscat river.

17. *SPHAERIUM VERMONTANUM* Prime has probably a wide distribution in the more southerly parts of the Province of Quebec. Prime states that it occurs in Lake Champlain and Lake Mephragog. A shell very like *vermontanum* is found in the County of Ottawa, near the Village of Ste. Cecile de Masham. Dr. Sterki says (loc. cit. p. 434) "Specimens which may belong to *S. vermontanum* have been seen from Maine, Quebec and Ontario."

18. *SPHAERIUM SOLIDULUM* Prime must occur in many localities in Ontario. It is widely distributed in the State of New York, and is listed by Dr. Dall (loc. cit. p. 136) from Brandon, Manioba, and Egg Lake, Alberta.

Iowa specimens received in 1883 from Professor Shimeck are pale horn color, shining, and deeply striated. Each adult bears a single dark red band, near the margin in most cases, but varying much in position. Prime gives the dimensions in hun-

dreths of an inch as 56 x 43 x 31. My largest specimen is shorter—12 x 9¾ x 6.7 mm.—but the proportions are identical, 100:77:56.

Other described *sphaeria* which have not, so far as I am aware, been found in Canada, though they doubtless occur here, are in the east, *S. fabale* Prime; and in British Columbia, *S. nobile* Gould, and *S. primeanum* Clessin, both of which are recorded from the State of Washington.

In Dr. Richardson's Fauna Bor. Americana, Vol. III, p. 316, written after his return from Sir John Franklin's Second Expedition, a list of the shells collected includes two *sphaeria* from "Methy Lake, Athabaska" under the names *Cyclas medium* and *Cyclas stagnicolum*. No description is given of either species. All that is stated is that the shells were submitted to James De Carle Sowerby, who was the second in line of a family whose members for nearly a century and a half have been distinguished as artists and conchologists.

The Methy Lake mentioned by Richardson is no doubt the lake on the portage between the Saskatchewan and the Athabasca, east of Fort McMurray, about lat. 56-40 N. and lon. 109-40 W. Dr. B. B. Woodward of the Natural History Department of the British Museum informs me that they do not appear ever to have had Dr. Richardson's shells. *S. tumidum* and *S. spokani* have however been traced by his colleague, Mr. G. C. Robson, who is in charge of the molluscan collection; and figures may be ordered from Miss G. M. Woodward for publication in The Naturalist.

MUSCULIUM.

Musculium is the name now commonly applied to a number of small bivalves formerly classed with *cyclas* or *sphaeria*, but distinguishable by reason of little cups or calyces—the nepionic shells—which project markedly beyond the later grown portions of the valves. The shells, except in one of our species, are thin, pellucid and fragile. All are pale in colour. The striae are fine, and the cardinal teeth small or obsolete. Everywhere in the vicinity of Ottawa they abound in ponds and quiet bays, and occasionally, though rarely, in rapid water. The smaller species are much more alert in their movements than their relatives of the genus *sphaerium*; and the facility with which they single-foot up the sides of an aquarium or the stems of waterplants is little short of marvellous. Every observer of molluscan life should maintain a fresh-water vivarium, even if it consists of no more than the ordinary gold-fish globe. But if small shells are to be studied, gold-fish must be excluded; otherwise the molluscan inhabitants will soon be exterminated.

19. *MUSCULIUM TRANSVERSUM* Say. This is our largest, and, in certain localities, our commonest

species. It appears to be intermediate between the two genera, but bears in most cases the little cupped beaks distinctive of *Musculium*.

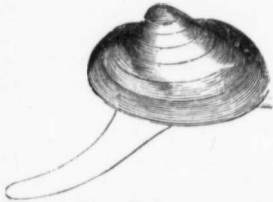


Fig. 3. *Musculium transversum*.

M. transversum abounds in the Rideau Canal, along the right bank, immediately above the by-wash at Hartwell's Locks, and in the by-wash itself. This is the only *Sphaerium* or *Musculium* I have noticed until the discharge is reached, when a few *S. simile* may be found. Lower down the river, it is not uncommon in the rapids near Billing's Bridge. In the Ottawa I have found it along both shores of the lower third of Duck Island. It seems to prefer mud to sand in that locality, and comparatively quiet waters; but it withstands strong currents over clay in the by-wash, and over coarse gravel in the Rideau River.

The number of shells of this species disclosed at Hartwell's Locks when the canal is unwatered is really phenomenal. Nearly all must perish annually, but in many successive summers no lessening of the multitude had been observed.

20. *MUSCULUM TRUNCATUM* Linsley. This shell was first noticed in Nepean Bay, near the Broad Street Railway Station. It has since been found in many other localities. In fact it is a very common shell on the Ontario side of the Ottawa, and in the Ottawa itself, at Duck Island, below the sand bars. The Duck Island shells (No. 2371 of my collection) are thought by Dr. Sterki to be "possibly distinct." In Nepean it occurs in great profusion in a wayside pool four or five miles south of Britannia, and west of the road between the third and fourth concessions fronting on the Rideau. East and West of Britannia village it is to be found in early summer in ponds formed by the overflow of the river, and to the south of the Grand Trunk Railway, in the "hole in the hill" on the the Honeywell farm. Later in ordinary seasons, all these ponds become dry; but year after year no diminution in the numbers of these and other species has been observed. Many shells must survive because either deeply buried, or like *S. occidentale* immune to dessication.

I have not found the shell in the Province of Quebec, though it doubtless occurs there in suitable localities. Dr. Dall (Harr. Expd. Vol. 13, p. 140)

records it as occurring in Methy Lake, Athabasca. One of the Richardson *sphaeria* from the same locality is probably *M. truncatum*.

M. truncatum is very thin, pellucid, and but slightly inflated, the posterior margin is longer in a straight line than that of any other shell of the genus. Exteriorly the shell is straw coloured; interiorly a very pale blue. The average size is 13.2 x 11.15 x 4.5 mm., or 100:87:56.

The anatomy of *M. truncatum* has been most carefully worked out by Mr. Ralph J. Gilmore of Cornell University: *Nautilus*, Vol. 31 p. 16 *et seq.* His figure, which may be regarded as applicable to the entire genus, I am enabled to reproduce through the courtesy of Dr. Walker. The margins, anterior and posterior, of the shells ordinarily found near Ottawa are much less rounded than those of the shell figured.

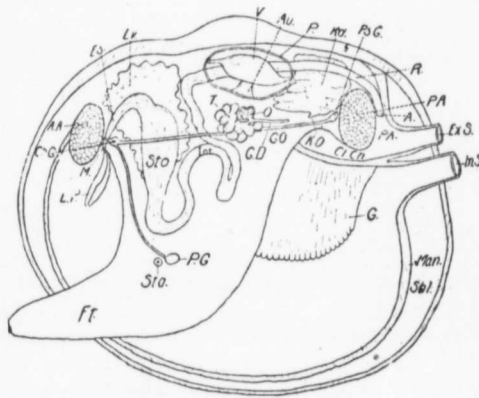


Fig. 4. *Musculium truncatum* Linsley.

- M.—Mouth.
- Lp.—Labial palps.
- Es.—Oesophagus.
- Lv.—Liver.
- Sto.—Stomach.
- Int.—Intestine.
- R.—Rectum.
- A.—Anus.
- Cb. G.—Cerebral ganglion.
- Ps. G.—Parieto Splanchnic ganglion.
- P. G.—Pedal ganglion.
- Sta.—Statocyst.
- V.—Ventricle.
- All.—Auricle.
- K. O.—Kidney opening.
- T.—Sperm follicles.
- O.—Egg follicles.
- G. D.—Genital opening.
- AA.—Ant. adductor muscle.
- Pd.—Post. adductor muscle.
- Ft.—Foot.
- Cl. Ch.—Cloacal chamber.
- Ex. S.—Excurrent siphon.
- Int. S.—Incurrent siphon.
- G.—Gill.
- Man.—Mantle.
- Shl.—Shell.
- Kd.—Kidney.
- P.—Pericardium.

(To be continued).

NESTING OF THE RUBY-CROWNED KINGLET AT GUELPH, ONTARIO.

By J. DEWEY SOPER.

A very pleasing situation, both unique and rare in the history of Ontario birds has befallen the lot of the O.A.C. campus at Guelph, Ontario. That this happens to be the favored locality for the nesting of the Ruby-crowned Kinglet, (the absorbing topic in question) will be received by local bird students, I am assured, with a certain satisfaction. So far as a careful search of literature on the subject is concerned, it seems that this is the first authentic record for the species in the southern portion of the province. The Ruby-crown, a bird typical of northern forests, pursues its role of nidification usually far beyond the pale of civilization, where even there to find a nest would be a marked event to any ornithological enthusiast. Consider now, the singular opportunity of studying the home life of these sprightly northerners on the college campus of the O.A.C., at Guelph. Granted, this seems to tax credulity, but we have the indubitable evidence to cheer a bird lover on his way.

Before proceeding further it gives me pleasure, in relation to the discovery of this nest, to announce Prof. Crow of that institution as the recipient for full honors. Some time after the rearguard of the Kinglet migration had passed on north, his attention was attracted to the singing of a Ruby-crown for several days in a clump of spruces opposite the museum. Shortly the singing ceased here but was later detected again in the spruces a few hundred yards to the north. At this time the nest was discovered with both birds in attendance and is believed to be the same as earlier noted near the museum. Evidently they had been loitering about the college grounds all spring.

In attempting to frame an analogical reason for this exceptional occurrence in relation to the spring migration I was about to describe the latter in point of numbers as one above the average. In fact it appealed to me as an unusual one. It is possible, however, that this impression is merely relative, because of my removal from a point twelve miles west, where during the spring and summer of five years I was accustomed to take notes, and where as fruitful a line of migration does not obtain perhaps as up the valley of the Speed, via Guelph. However true this conjecture may be, there assuredly was no dearth of Kinglets during the past spring; and in the strength and duration of the vernal flight the pair under discussion have evidently been lured from their ordinary design by the close approximation to their ancestral home in the vigorous spruces of the campus.

Reference to my migration records shows the species very common from April 25 until May 3, after which their numbers gradually diminished, with two noted on May 9 and the last one on the sixteenth. To this one I instinctively bade silent farewell as the last of the season. A month later came the surprise when word reached me that Prof. Crow had made the discovery. Together on June 25, we visited the scene. Both birds were readily detected in the immediate vicinity. With the aid of the binoculars we watched their actions as they passed to and fro from feeding the young, examined as best we could the high suspended nest by the same means, and were treated frequently to the consummate song of the male.

On the following morning I visited them again for an hour and also during the afternoon of July 1st. Upon this latter occasion with abundance of rope and an extension ladder I scaled to their pretty domicile and gleaned most of the particulars herein concerning their domestic life. Balanced twenty precarious feet in the air opposite the nest and attempting the successful manipulation of a camera was also a part of the engrossing programme.

In view of the paucity of information concerning the life-history of the Ruby-crown, I conceive it as pardonable to digress somewhat from that brevity which is the soul of wit, in favor of that greater detail which it was my privilege to obtain.

The nest, composed entirely of moss and lined with feathers, was discreetly and beautifully hidden among the drooping branches of a large white spruce. Semi-pensile of construction, and swung twenty feet from the ground, it enjoyed all the advantages of unrestricted space. It was placed at that point where the foliage massed itself the heaviest on the bough, in this instance about four feet from the drooping tip and ten from the trunk. The shaggy pendant foliage so effectually concealed it that visibility was certain only from below. Contrary to most structures of this kind no use was made of the main horizontal limb but was welted directly beneath it to numerous thin, dead, flexible twigs which had been denuded of their needles. These passed vertically down the outside walls of the nest at intervals about its full circumference, undergoing a flexion beneath it where the tips touched and were well secured. Thus it will be seen that the nest actually reposed within a wicker basket entirely free of the main branch. The latter was about two inches above the rim of the nest—just enough to admit the ready passage of the birds. The nest was

perfectly globular in form and incurved sharply at the top. This produced an effect seldom met with in bird architecture. Instead of the usual interior perpendicularity or even an outflare to the walls, the rim rapidly converged, causing its equatorial circumference to bulge bowl-fashion with the throat but half the diameter of the latter. It would be improbable or quite impossible for the wildest tempest to dislodge the young from this cunning chamber. In point of real beauty of materials it yields to many warblers that I know, but like its voice is of remarkable strength and volume for a bird so small.

As near as I could ascertain on July 1st, the nest contained five young. These in certain similitude to that of chickadees were so closely packed in the nest that it seemed folly to entirely disturb them; for having done so for the purpose of making certain on this point left me doubtful as the possibility of having the nest contain them all again. They were a general olive color similar to that of the parents and about two-thirds grown. Both tail and wing quills were well advanced.

Having secured myself in the tree, on June 26, at a point level with the nest, it became a matter of ease to watch the actions of the birds. The nest became less visible from this position, though only a few impassible feet distant, but in comparison to observation from the ground was much superior. During the half hour which I clung to the tree the male visited the nest with food three times and the female twice. The former upon deposition of the food vacated the nest promptly but the female on the contrary, often remained with the young until the return of her mate, when she then slipped quietly away. In this manner the young were left alone for certain periods but sheltered again for longer ones when the female returned.

During observation from the top of the ladder on July 1st, when it was balanced only three feet distant from the nest, many points of interest became known. The detention of the female at the nest I observed, was due to her habit of regularly cleansing the nest of all the sac-like excrement; due to the rapid digestion of the hungry infants, her obligations in this respect seemed never to cease. The matter was probed for with scrupulous care, some consumed by her, and the remainder dropped overboard at some distance from the nest. In this the male never assisted. Candor bids me remark however, that his tireless assiduity in harvesting for the young more than offset this disparity.

In respect to their disposition I discovered the greatest satisfaction. Imagine these two creations, inexpressible in modest beauty, incomparable in

graceful deportment, ineffable in euphony of song, passing to and fro in the execution of their poetic labor destitute entirely of fear or suspicion. With my face only a couple of feet distant from the nest the pair continued their work scarcely conscious of my presence. True, at first they hovered above me with sweet queries in their throats and entered the nest from the opposite side of the bough but soon this discretion was forsaken for perfect freedom. Twice, the male warbling an undertone alighted within two feet of my hand on the supporting guy rope of the ladder. A pretty performance and employed only by the male was to flit from the nest and become suspended on whirring wings before me, like a hummingbird before a flower. It seemed like a feathered phantom surrounded by a halo of changing light, supported by some strange and magic force of gravitation. Having satisfactorily examined me in this aerial fashion he would flit easily away perhaps singing as he went. Thus, without sign of timidity each came near with advances of delightful piquancy, the male engaged in melody and the other quaintly moving about in silence. The first time she uttered any note in my presence was when tapping the limb gently during one of her protracted visits to the young, she flitted with great celerity from the nest calling petulently in a single sweet querulous note identical in pitch and quality to the prelude of the male. She later, on one or two occasions, voiced the same call. There was no suspicious and labored advances; no unconsolable, strident and satirical calls, but conversely, uttering no protest, slipped demurely from limb to limb with sweet-tempered curiosity suggesting certain concessions of welcome.

Only two distinct species of insects were observed to attract the attention of the Kinglets at this time. One, a delicate, winged gnat composed only occasional offerings to the young. The other, a dull whitish insect apparently without wings, was freely and regularly given. The offerings of the female were identical. The male persisted in song near and far during the gleaning of food and ranged for this purpose from ten to fifty yards at least from the nest.

The song of this species has attracted no little comment during its spring migrations, when it is available to so many whom fortune otherwise would never favor. It is of unqualified distinction. For strength and beauty of tone in comparison to its size I regard it as peerless. No poor words of mine can express the supernal sweetness of this production. It wavers and trills in such exquisite tone color, such transparent delicacy, such distilled freshness—what superlatives can do it justice?

DEADLY POISONOUS MUSHROOMS.

By R. E. STONE, M.Sc., Ph.D.

Department of Botany, Ontario Agricultural College.

Nearly every year, especially in the late summer and early autumn our woods and fields bear a crop of mushrooms. Many people would enjoy collecting and eating them, but since some of these fungi are deadly poisonous, many are deterred from gathering them because they are unable to tell with absolute certainty the edible from the poisonous forms.

In Ontario there are at least two hundred (200) kinds of fleshy fungi of which sixty (60) occur in abundance, and are large enough to collect for eating. Unfortunately a few of these are deadly poisonous and sometimes occur in quantity. Some of these are also very attractive and always clean.

is edible. Unfortunately some of the deadly poisonous kinds will peel beautifully. Others say, collect only those that are pink underneath; this although good advice, unfortunately limits one's choice to but a few of the edible kinds. Still others say, never collect mushrooms in the woods but only in the fields, yards and gardens. This is again, excellent advice but also limits our choice and eliminates many of the very best. There is no simple rule that can be applied; one must learn to know the poisonous forms the same as he knows other plants. In order to enable mushroom lovers to avoid the dangerous forms, the most dangerous forms are described and figured below.

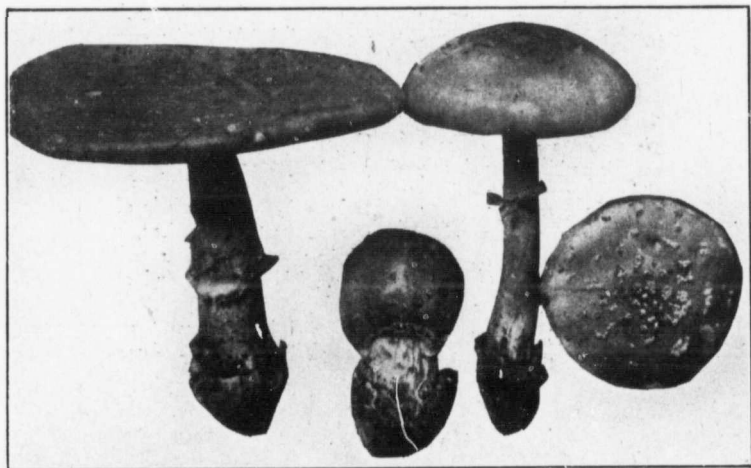


Fig. 1.—Fly Agaric (*Amanita muscaria*, Linn). Deadly Poisonous.

From Bulletin 263, Ontario Department of Agriculture, Ontario Agricultural College.

The question is often asked—"How do you tell a mushroom from a toad stool" meaning by toad stool a form that is either inedible or poisonous. There is no simple rule. Occasionally one sees published the old silver test. This is an old idea and still prevalent in some places, especially Italy. In olden days silver was accredited with many magic properties, especially that of turning black in the presence of malign influences, hence, silver would turn black in the presence of poison. This test can not, of course, be relied upon. Another test often spoken of is the peeling test. Some of our mushroom gatherers say that if the outer skin of a mushroom can be peeled off readily, that the mushroom

FLY AGARIC (*Amanita muscaria*, Linn). Deadly poisonous.

This fungus appears in July and August in groves and open woods or along roadsides near trees, usually preferring rather poor soil. (Fig. 1.) It is called "Fly Agaric" because an infusion of the plant was at one time used as a fly poison. The plant is typically large and handsome.

The cap is 3 to 5 inches broad, rounded when young, nearly flat when old, yellow or orange or even bright red in color, and covered with numerous angular scales, which are white or light yellow in color and can be easily brushed off. As the cap becomes old it fades out, so that it may become

nearly white and the scales may be washed off by rains.

The stalk is 4 to 6 inches long, about half an inch thick, usually white but often yellowish in color, hollow in age. The bottom of the stalk is enlarged into a prominent bulb which is more or less rough and shaggy or scaly. The lower part of the stalk above the bulb is also shaggy.

The gills are white or slightly tinged with yellow and do not become pink or brown as do those of many edible mushrooms.

weakening of the heart action. Of course, when symptoms such as these appear after eating mushrooms a physician should be sent for immediately.

The system should be freed of the undigested fungus as soon as possible. Strong emetics such as zinc sulphate, apomorphine or warm mustard and water should be used. If these are lacking or produce no effect tickle the throat with a feather or the finger to cause immediate and violent vomiting. This should be followed by a strong dose of castor oil.

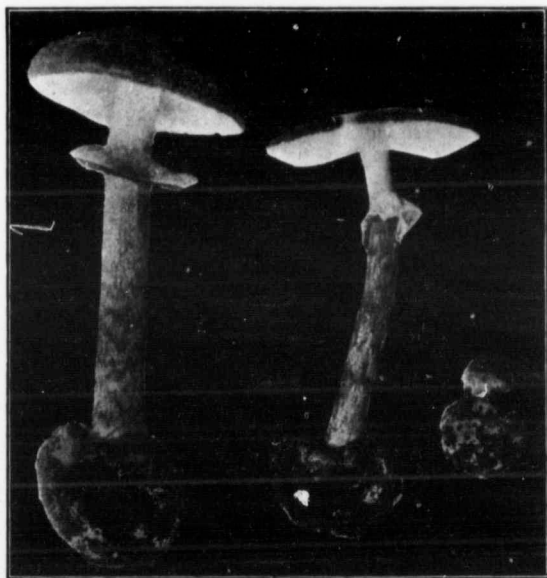


Fig. 2.—Deadly Agaric (*Amanita phalloides*, Fr.) Deadly Poisonous.
From Bulletin 263, Ontario Department of Agriculture, Ontario Agricultural College.

The ring is quite large, white, and firmly attached to the stalk.

The main points to remember about this fungus are:—The yellow or orange cap with loose white scales. Gills white, never becoming pink or brown. Ring large, white, firmly attached to the stalk. The stalk enlarged at the base into a prominent shaggy or scaly bulb and the stalk shaggy between the bulb and the ring.

The poison in this mushroom is known as muscarin. This substance fortunately has an unpleasant bitter taste, so that the plant is seldom eaten even if collected by mistake. The poison does not act immediately, but the symptoms appear in from $\frac{1}{2}$ to 2 hours, and are: vomiting and diarrhoea, with a pronounced flow of saliva, suppression of urine, giddiness, uncertainty of movement, derangement of vision. This is followed by stupor, cold sweats and

THE DEADLY AGARIC (*Amanita phalloides*, Fr.) Deadly poisonous.

This fungus is called the Deadly Agaric because it is extremely poisonous and there is no known antidote for the poison. (Fig. 2).

The plant usually grows in the woods or along the borders of woods, but has also been known to appear in lawns. It generally appears in July and August. It is quite variable in color, varying from pure white through yellowish to olive.

The cap is 1.5 to 5 inches broad, at first bell-shaped, finally nearly flat, fleshy, viscid or slimy when fresh, smooth, often with a few loose white scales. The color varies from white, through yellow to olive green, the dark forms being more common in Ontario.

The stalk is 2 to 8 inches long, $\frac{1}{4}$ to $\frac{1}{2}$ inch thick, hollow, white or colored like the cap, but

lighter in shade, becoming discolored on handling. It ends in an abrupt bulb which generally has a sharp rim standing up around it, forming a sort of cup, called poison cup or volva. This poison cup is usually deeply buried in the soil, so that in order to find it it is necessary to dig the plant up.

Gills white and remain white, never becoming pink or brown.

The ring is white, prominent and is high up on the stalk close to the cap. The ring is attached to the stalk, not loose as in the smooth white mushroom or parasol mushroom.

The poison in the Deadly Agaric is phallin. This poison, unfortunately, has no pronounced taste or odor and gives no warning of its presence. Unfortunately, also, the symptoms of poisoning do not manifest themselves until 9 to 14 hours after the fungus is eaten. There is then considerable abdominal pain, and there may be cramps in the legs accompanied by convulsions and even lock-jaw and other tetanic spasms. The pulse is weak and abdominal pain is rapidly followed by vomiting and extreme diarrhoea, the intestinal discharges assuming the rice-water condition characteristic of cholera. These later symptoms persist, generally without loss of consciousness until death ensues, which happens in from two to four days.

There is no known antidote for phallin. The undigested portions of the fungus should be removed from the stomach and intestines by methods similar to those suggested under Fly Agaric. If the poison already absorbed is not too great, it may wear itself out and the patient recover. Of course, when symptoms of poisoning appear a physician should be sent for immediately.

THE DESTROYING ANGEL (*Amanita verna*, Bull). Deadly poisonous.

This fungus is probably the cause of more cases of mushroom poisoning than any other. (Fig. 3).

The plant is pretty, clean, pure white and attractive.

It usually occurs in the woods or near them, but may grow in lawns newly made from forest soil. It is generally found in June and July.

The cap is 1.5 to 4 inches in diameter, at first bell-shaped, later becoming nearly flat; pure white, shining, viscid or slimy when fresh.

The stalk is 2 to 6 inches long, $\frac{1}{4}$ to $\frac{1}{2}$ an inch thick, pure white, hollow in age. The stalk ends in an abrupt bulb, with a free border closely surrounding the base of the stalk and forming the poison cup or volva. This may be seen in even young specimens. This poison cup is buried in the soil, so that in order to see it it is usually necessary to dig up the plant. For this reason wild mushrooms growing in the soil should always be dug, not pulled up or broken off.

The gills are pure white and remain white, never becoming pink or brown.

The ring is broad and high up on the stalk, just under the cap. It is firmly attached to the stalk and is not loose, as in the smooth white mushroom.

Since this is our most poisonous mushroom its main characters should be thoroughly learned and remembered.

The cap is pure white, shining and slimy when fresh. The stalk is pure white, ending in a distinct poison cup or volva. Gills pure white and remain white. Ring white, broad, high upon the stalk to which it is firmly attached.



Fig. 3.—Destroying Angel (*Amanita verna* Bull.) Deadly Poisonous. From Bulletin 263, Ontario Department of Agriculture, Ontario Agricultural College.

The poison in this fungus is the same as that in the Deadly Agaric and the symptoms of poisoning and treatment are the same.

SCARLET CAP (*Russula emetica*, Fr.) Reputed to be mildly poisonous.

This fungus occurs very commonly in the woods from summer till autumn. It gets its name from the bright scarlet cap. (Fig. 4). It is hot and peppery to the taste and some report it to be mildly poisonous, while others say that it is edible.

The cap is 1.5 to 3 inches wide, thin, brittle, deep pink to rich red; furrowed near the edge,

rounded when young, depressed in the centre when old.

The stalk is 2 to 3 inches long, white or tinged with yellow. Very brittle. There is no ring and no volva or poison cup.

Besides the scarlet cap, some of the forms with milky juice are mildly poisonous. They are very hot and the milk is not reddish, as with the Orange Flow (*Lactarius deliciosus*).

There are some mushrooms which have tubes in place of gills. Some of these are edible and others poisonous. The poisonous ones have a flesh that changes color when cut or broken or have tubes with red mouths. There are a few mushrooms that have clay-colored gills and a cobwebby veil that should also be avoided.

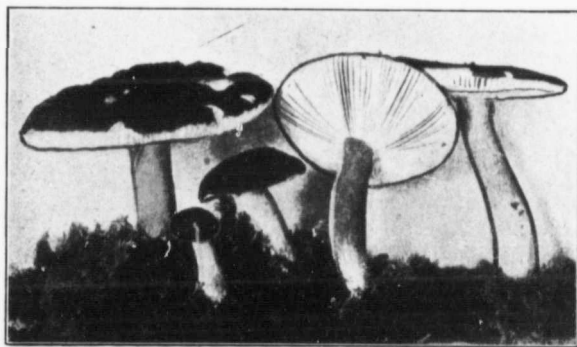


Fig. 4.—Scarlet Cap (*Russula emetica* Fr.) Mildly Poisonous.

From Bulletin 263, Ontario Department of Agriculture, Ontario Agricultural College.

Many mushrooms are wholesome when fresh but become dangerous when they begin to decay, or show evidence of the work of insects or worms.

JACK-O-LANTERN, False chantarelle. (*Clitocybe illudens* Schw.) Mildly poisonous.

This is a large mushroom growing in clusters on decaying wood. At first the plants are a clear yellow but later become brownish. When seen in typical clusters it is very attractive but is mildly poisonous. Fresh specimens when placed in the dark give off a pale yellowish light, i.e. they are phosphorescent.

The cap is from 4 to 6 inches broad and more or less funnel-shaped, yellow; stem 6 to 8 inches long, solid, yellow, tapering towards the base. Gills yellow and running down on the stem. There is no ring and no poison cup or volva.

Some people can eat this mushroom but to most it is distinctly poisonous, producing nausea, vomiting and diarrhoea.

When these symptoms occur, following the eating of mushrooms, the digestive system should be cleared by purgatives and a physician sent for.

GATHERING WILD MUSHROOMS.

When one is gathering wild mushrooms a basket is the best receptacle for carrying them, as different compartments may be made for holding the various kinds, and thus keep from crushing and spoiling the more tender ones.

When collecting mushrooms for the table they should never be pulled up or broken off. In the deadly poisonous mushrooms the most marked characteristic, the poison cup or volva, is deeply buried in the soil. If the plant is pulled up or broken off the poison cup is lost and it is impossible to distinguish the poisonous kinds from certain edible ones. After a mushroom has been carefully dug up and examined and the collector is certain that it is edible, the lower part of the stalk may be cut

off to get rid of the dirt. It is often very difficult to determine mushrooms from the young or button stage, so that unless buttons are accompanied by mature plants, they should generally be avoided. In case of doubt the fungus should be discarded or the complete specimen shown to one who knows mushrooms very thoroughly.

RULES TO BE OBSERVED IN GATHERING WILD MUSHROOMS.

It is impossible to give a simple rule or test for detecting poisonous mushrooms. Care must be taken to observe the characteristics of each mushroom gathered.

The following rules, if carefully followed, will enable one to avoid the poisonous forms:—

- (1) Avoid fungi when in the button or unexpanded stage; also those in which the flesh has begun to decay, even if only slightly.
- (2) Avoid all fungi which have stalks with a swollen base surrounded by a sac-like or scaly envelope, especially if the gills are white.

- (3) Avoid fungi having a milky juice, unless the milk is reddish.
- (4) Avoid fungi in which the cap is thin and very brittle, and in which the gills are nearly all of equal length, especially if the cap is bright-colored.
- (5) Avoid all tube-bearing fungi in which the flesh changes color when cut or broken, or where the mouths of the tubes are reddish and in the case of other tube-bearing fungi experiment with caution.
- (6) Avoid fungi having clay-colored gills and a spider web or woolly ring on the stalk.
- (7) In case of doubt discard the plant.

MUSHROOMS WHICH MAY BE GATHERED.

The foregoing rules are given as a warning against comparatively few plants; the edible mushrooms are more numerous and those that may be gathered are as follows:—

All the puff balls and coral fungi; any of the hedge hog or spiny fungi and the morels; also any mushroom whose gills become brown; mushrooms having reddish or orange milk; all mushrooms that melt down into an inky liquid when mature; many mushrooms with white gills, but care must be taken to be absolutely certain that they have no poison cup or volva.

LEARN TO KNOW THE MUSHROOMS.

Before attempting to eat a large number of mushrooms one should learn to know them by their individual characters, the same as he would learn to know berries or other wild fruit. The best way to do this is to secure a book describing the various

kinds and then gather the different ones and compare them with the descriptions and illustrations. Another way is to go out into the woods and fields with someone who knows the mushrooms and have the different kinds, both poisonous and edible, pointed out and the characters explained.

Still another way to learn the mushrooms is as follows. Carefully dig up the mushrooms so that all the fruit body including the very base of the stem is present. Wrap in dry paper, taking care not to crush the specimen, attach a note describing where the plant grew, i.e. fields, woods or road side; whether it grows in the ground, or wood and the color of the fresh specimen. The specimen should then be enclosed in a strong cardboard carton or wooden box and sent in to the Department of Botany, Ontario Agricultural College, Guelph, Ont.

If the specimen is carefully packed, it will arrive in fair condition and the name and properties of the mushroom will be sent to you by the next mail.

BOOKS THAT DESCRIBE MUSHROOMS.

McIlvaine, Chas.—One Thousand American Fungi.

Hard, M. E.—Mushrooms, Edible and Otherwise.

Atkinson, Geo. G.—Mushrooms, Edible, Poisonous, etc.

Marshall, Nina L.—The Mushroom Book.

Gibson, Hamilton—Our Edible Fungi.

Murrill, W. A.—Edible and Poisonous Mushrooms.

Stone, R. E.—Mushrooms of Ontario: Ontario Department of Agriculture, Bulletin No. 263.

NOTES ON THE SUMMER BIRDS OF THE GASPE PENINSULA, PROVINCE OF QUEBEC.

BY CHARLES W. TOWNSEND, M.D., BOSTON.

In planning a trip to any spot in North America, one naturally turns to the indices of the Auk and the Bulletin of the Nuttall Ornithological Club in order to learn what ornithological work has been done in that region and what birds one may expect to find. As far as I can discover there has been no list published and no mention made of the birds of the Gaspé Peninsula in these journals. The only notes of this region published by ornithologists elsewhere that I can find are by Mr. Wm. Brewster,¹ Mr. Frank M. Chapman² and Mr. P. A. Taverner³. In none of these notes is there any attempt to list the birds of the region, and it therefore seems worth while to present the following preliminary list. The gen-

erosity of Mr. Taverner in putting his notes, made chiefly at Percé in the summers of 1914 and 1915, at my disposal has made this list of much greater value than if my own notes alone were to be drawn upon.

I feel sure that Mr. Taverner's work in these regions has had the greatest influence in determining

(1) Notes on the birds observed during a summer cruise in the Gulf of St. Lawrence. Proceedings, Boston Society of Natural History, Vol. 22, pp. 364, 412; 1883.

(2) Bird studies with a camera, New York, 1900, pp. 128-145. Gannets of Bonaventure, Bird Lore, Vol. 1, 1899, p. 71.

(3) The Gannets of Bonaventure Island, The Ottawa Naturalist, Vol. 32, 1918, pp. 21-26.

the Provincial Government to make Percé Rock, Bonaventure Island and Bird Rock near the Magdalens, bird reservations. This splendid piece of work was accomplished in 1918 and the wonderful colonies in these three localities are now protected for all time. These reservations are of great value and interest not only to ornithologists but to the general public and they will become more and more known and visited. Both Percé Rock and Bonaventure Cliffs have a beauty and grandeur of size and form and coloring that is unequalled along our Atlantic Coast, but their wonderful charm is increased manifold by the variety and abundance of the bird life that adorns them. The Provincial Government, which has made them reservations, together with Bird Rock off the Magdalens, is to be greatly congratulated, and it is to be hoped that this is but the beginning of their work and that other reservations may be added elsewhere, especially along the Labrador Coast where they are so much needed. The splendid work of the Audubon Society in the United States may well be taken as a model.

The Gaspé Peninsula projects like a lower lip at the mouth of the St. Lawrence River into the Gulf of St. Lawrence. It lies north of New Brunswick from which it is separated by the Bay of Chaleur and the Restigouche River. A single track railway runs along the southern shore nearly to the end of the peninsula at Gaspé, and for a few miles along the northern shore as far as Matan. A carriage road follows the shore of the whole peninsula and there are a few short side roads extending but a mile or two into the interior which is an uninhabited region of forest and mountains. Villages inhabited for the most part by fishermen of French and Channel Island descent, are scattered along the coast.

The geology of the Gaspé Peninsula is most interesting and complicated. At Percé, for example, are outcrops of Cambrian, Silurian and Devonian limestones with strata almost vertical, overlaid in places with a great mantle of horizontal red sandstones and conglomerates. The mountains near the north coast are of gray Silurian limestones and serpentines. At the places visited there was no evidence of general glaciation, but only of slight and local glaciation. There are few lakes and the streams are deeply cut.

The vegetation is of the Hudsonian type,—the forest is largely of spruce,—black and white, and balsam fir. *Arbor vitae*, canoe birches and aspens are common. A few white pines, larches, yellow birches, mountain ashes and sugar maples are to be seen. The avifauna is largely Canadian with a number of Hudsonian and also of Transition forms.

The itinerary of my trip was as follows:—

Crossing on July 5th, 1919 from Campbellton,

New Brunswick, where the Restigouche River meets the Bay of Chaleur, I spent two days at Cross Point in the Township of Mann, and had an opportunity to observe the birds in the woods and fields there. July 7th was occupied in travelling the 150 miles to Cape Cove, from which I was taken by automobile nine miles to Percé. The railroad journey was such a leisurely one, with so many breakdowns of the engine that I was able to see something of the birds and flowers of the region. At Percé, a quaint little French fishing village with beautiful setting of rock, cliff and mountain, I stayed until August 6th and explored the neighborhood including Bonaventure Island, Corner of the Beach and Barachois. On the latter date I went by motor boat some twenty-eight miles to Grande Grève near the eastermost tip of the Forillon, the narrow peninsula that stretches between Gaspé Bay and the Gulf of St. Lawrence. Here I stayed until August 25th and explored the neighborhood including a walking trip through Cape Rosier and Griffin Cove to Fox River, and back through the "portage" to Peninsula, and along the southern coast of the Forillon to Grand Grève. A day was spent in the neighborhood of Douglstown on the southern side of Gaspé Bay and another at Gaspé and on the lower waters of the York River.

Before presenting the annotated list I would say a few words about the two new bird reservations at Percé.

Percé Rock is an isolated mass of nearly vertical strata of Devonian limestone some 1500 feet long, and 288 feet high at its highest point and 300 feet wide at its greatest breadth. It is connected with the shore only at low tides by a bar two or three hundred yards long. At the outer end stands a smaller isolated mass or pinnacle. The main rock is pierced by an arch with a span of about eighty feet and from this the rock receives its name. Percé Rock is an object of exceeding beauty not only on account of its striking shape and great size, but also on account of the brilliancy and variety of its colouring. Its beauty and interest are greatly enhanced by its bird inhabitants which through its inaccessible summit and form a circling cloud. Breeding Kittiwakes to the number of about 400, occupy the shelves and niches of the northern face over the arch. Double-crested Cormorants, a thousand or more and Herring Gulls to the number of 2,000 breed on the flat surface of the summit. A few Black Guillemots nest in some of the holes and corners on the sides of the rock.

I was enabled to make a fairly intimate study of the home life of these birds of the summit through the kindness of Miss Frederick James, whose late husband was the beloved artist of the little village of Percé. At her invitation I spent many interest-

ing hours looking through her powerful telescope from the piazza of her house on Cape Cannon.

Bonaventure Island, is three miles distant from Percé and is of still greater value and importance. It is about three miles long and a mile and a half broad. The outer side faces the sea in sheer cliffs of horizontal strata of red conglomerate and sandstone four and five hundred feet high. On the cliffs and niches and along the shelves, tier above tier nest a very large and notable collection of water birds. The most important of these in size and numbers are the Gannets which are most numerous towards the southern end. Mr. Taverner has estimated their numbers to be 8,000. Herring Gulls breed on the cliffs to the number of several hundreds if not thousands. A smaller number of Kittiwakes nest near the northern end of this outer side of the island on vertical cliffs that possess but few and small niches. Murres and Razor-billed Auks, perhaps 500 pairs of the former and 100 of the latter also lay their eggs on the cliffs. A small number of Puffins and a few Black Guillemots are also breeders there, while in the holes and crevices on top of the cliffs Leache's Petrels nest. No Cormorants breed here but visitors from Percé Rock may often be seen.

I visited Bonaventure Island three times, passing in a motor boat close under the cliffs and camping and spending two days on each of the first two occasions; the last time I spent only the day. It is possible to take up a position on the edge of the cliffs where one can sweep with a glass, tier on tier of nesting Gannets and be within thirty feet of the nearest. As they fly by they are almost within arm's reach. With an eight power prismatic binocular and a thirty power telescope I spent many hours watching these birds. With the expert aid of Willie Duval, descendant of of Captain Peter John Duval the original owner of the island, I was able to climb a hundred feet or more up the cliffs from below and crawl along a ledge close to Puffins and Murres. Mr. Taverner¹ has vividly described such an adventure.

ANNOTATED LIST.

1. *Gavia immer*. Loon.
One flying by Bonaventure Island. Mr. Taverner reported a few.
2. *Fratrercula arctica arctica*. Puffin.
Thirty or forty pairs of these birds breed in the deep clefts or holes in the cliffs of Bonaventure Island, mostly at the northern end of the eastern cliffs.
3. *Cephus grylle*. Black Guillemot.
Common and very tame all along the rock shores, breeding in holes and in the clefts be-

tween the strata of the rocks. Young were first seen in the water August 1st.

4. *Uria troille troille*. Murre.

About five hundred pairs breed at Bonaventure Island. I met with them at other places on the coast, but do not know whether they breed away from the island or not. Several times I saw Gannets that had alighted in the same niche in the cliffs drive the Murres out. Mr. Taverner reports seeing a number of *ringvia*.

5. *Alca torda*. Razor-billed Auk.

Perhaps a hundred pairs breed at Bonaventure Island. They were to be seen singly, sometimes among the Gannets and in companies of two or three often with Murres in clefts or ledges smaller than those frequented by the Gannets. Flocks of ten or fifteen Murres on the water generally included one or two Razor-billed Auks.

6. *Rissa tridactyla tridactyla*. Kittiwake.

About 400 breed on the northern face of Percé Rock near the arch and about as many on the cliffs of Bonaventure Island.

7. *Larus marinus*. Great Black-backed Gull.

A few seen in July. More common in August. No evidence of breeding.

8. *Larus argentatus*. Herring Gull.

Abundant. Breeds on the top of Percé Rock to the number of about 2,000, on the cliffs of Bonaventure Island and the Murailles at Percé, on the sea cliffs below Mt. St. Albans and on the Bon Ami cliffs near Grand Grève and doubtless on many other cliffs of the Peninsula.

Cod fishing is the chief industry of the coast and the fish are cleaned and split at tables on the beaches or on fishing stages. The heads and entrails are left where they fall and are eagerly sought by Herring Gulls, who gather when the fish are brought in, and do important work as scavengers. They are very tame and may often be seen searching for scraps on empty boats riding at anchor. I have counted as many as 30 on one boat. Until the young are on the wing none but full plumaged adults are to be seen; no birds with black tips to their tails were found in these flocks. The young appeared in the air the last week in July.

A cloud of Herring Gulls, was constantly flying about Percé Rock and their cries were always to be heard by day and frequently by night. The bugle-like courtship song frequently resounded and fighting among the adults on the Rock was frequent.

(To be continued.)

(4) Ottawa Naturalist, XXXII, 21-26.