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CONTENTS.

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THE OTTAWA NATURALIST

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RAIN AND SNOW.*

By Frank T. Shutt, M.A.,

Chemist, Dominion Experimental Farms.

The speaker, at the outset, said that if the title upon the programme had led his hearers to imagine that his remarks were to be upon the weather, they were mistaken. There were weather-wise people, official and unofficial—the former constituted the staff of the Dominion Meteorological Service, the latter, the rest of the population. Weather prediction, according to the best authorities, must be based on data of temperatures, pressures, etc., taken over wide areas—and such data can only be obtained through the recognized, official channels. Again, safe predictions can only be made for a period of 48 hours ahead. Of course, some people may possess the gift of prophecy; one cannot deny it, but judging from results as regards weather, one is forced to the conclusion that the days when the spirit of the lying prophet entered into man are not passed.

Considering rain and snow from the utilitarian point of view, the lecturer said it was his desire to offer one or two thoughts on the rôle of these elements in the economy of Nature, their influence upon the industries, the agriculture and the health of the world.

The first fact to be pointed out—and it is one of fundamental importance—was that there was a constant circulation (though that word scarcely describes the process) of the moisture, the water of the world. Continuously, by day and by night, summer and winter, there ascends from sea and lake and river and moist land aqueous vapour. This evaporation is, of course, due to the heat of the sun, though direct sunlight is not necessary for the operation. Water gives off vapour at all temperatures and there is the direct conversion of snow and ice into vapour.

* This is a condensed report of an address delivered before the Ottawa Field Naturalists' Club in the Normal School, Ottawa, Dec. 10th, 1907.—Ed.

This evaporation, of course, varies constantly with the temperature, pressure, winds, etc. It has been computed that the area of the United States, on an average, evaporates from its surface 0.4 (four tenths) inches every 24 hours. This vapour ascends until its temperature is reduced to the "dew point" and thus clouds are formed. Fogs and mists are clouds on the surface of the earth, condensations to minute watery particles due to reduction in temperature. Rain and snow result from further condensation and the formation of larger particles. This ascension and descension of the world's moisture is an essential, fundamental factor in the maintenance of vegetable and animal life on the earth.

IN THE INDUSTRIAL WORLD.

The flow of our streams and the immense volumes of water that pour over our numerous water-falls are dependant for their supply upon the annual precipitation, *i. e.* upon rain and snow. Possibly no country in the world has such wealth of power in her water courses as Canada. It has only been partially developed as yet, but from Niagara Falls alone—and it is only one of many, though the largest—there is a total power chartered for of 850,000 H.P. Of this, 299 H.P. are at present developed. These figures include the product of the works on both sides of the river. The three works generating electricity on the Canadian side can to-day furnish 154,000 H.P., and their ultimate output will be 425,000 H.P. Data might similarly be given for a score of other water-falls being utilized to-day. This water-power converted into electrical energy is employed for a thousand useful purposes. It carries us through the streets of our cities, and in many parts of Western Ontario from town to town. It lights our houses, and in the realm of manufacture has already largely replaced coal as a source of power. To tell of all its usefulness would be to give a catalogue of well nigh all our manufactures. Carbide, itself a source of light, is made through the assistance of electricity directly obtained through the power of the water-fall. Phosphorus, wood pulp, paper are similarly prepared, and so the list might be continued almost *ad infinitum*. It would indeed be difficult to estimate the value from the commercial standpoint of our precipitation and of our water-falls—they constitute one of Canada's most important natural assets.

IN THE AGRICULTURAL WORLD.

It is, of course, to agriculture that the greatest benefit comes from our rain and snow. Vegetable life requires large

quantities of water for its maintenance. Our crop yields depend not only on the amount of plant food in the soil, on a proper texture of the soil, but also on certain climatic conditions, prominent among which, and one might say of first importance, is an adequate supply of available moisture.

We are all aware, no doubt, that the food taken from the soil by plants is absorbed by the young rootlets in the form of a very dilute solution. This dilute food solution—non-elaborated sap—passes up through the tissues of the stem or trunk and reaches the leaves where chemical changes (metabolism) takes place, elaborated sap is formed and the excess of water, after the deposition, as it might be termed, of mineral and nitrogenous matter, passes off as vapour through the stomata of the leaves. In this way enormous amounts of soil moisture are required for our crops. For every 1 lb. of dry matter stored up in the plant, at least 300 lbs. of water pass through its tissue and escape into the atmosphere. Thus, a crop of Indian corn requires, per acre, during its season of growth more than 1,000 tons of water. This must be supplied, in addition to that lost by evaporation from the surface of the soil, if a maximum crop is to be obtained. By certain methods of cultivation, soil moisture may be conserved for crop use, and thus protect our crops against seasons of drought. Indeed we now know how to keep over large amounts of soil moisture from one season for the next year's crops. This is practised in the wheat fields of our Northwest by fallowing, followed by frequent cultivation—the earth mulch so prepared checks surface evaporation. In districts of sparse precipitation, provision for the crop's need is made by irrigation. This leads us naturally to a consideration of the precipitation in various parts of Canada. In a country or district to be settled the question of the rainfall is a very important one to have some information upon, and in this connection the data that are being obtained and tabulated by the Meteorological Service of Canada are of inestimable value. The precipitation, as observed for three consecutive years at a few important points across the Dominion, is recorded in the following table. The data are taken from the published records of our Meteorological Service.

Precipitation is measured in inches. One inch of rain means 113 tons 601 lbs. of water per acre. Ten inches of snow are considered the equivalent of one inch of rain. The average rainfall at Ottawa for the past 16 years is 25.56 inches, and the average snowfall for the same period is 90.06 inches. This latter fact means that we have had, per acre, during the winter, approximately 1,000 tons of snow water.

TOTAL PRECIPITATION IN INCHES.

	1902	1903	1904
Charlottetown, P.E.I.—As rain	23.03	33.88	28.50
—As snow	6.78	9.00	9.22
	29.81	42.88	37.72
Halifax, N.S.—As rain	46.81	53.07	46.71
—As snow	5.72	6.05	10.81
	52.53	59.12	57.52
St. John, N.B.—As rain	36.08	37.55	36.84
—As snow	4.76	9.41	8.19
	40.84	46.96	45.03
Montreal, Que.—As rain	35.54	24.88	32.40
—As snow	11.22	11.27	12.32
	46.76	36.15	44.72
Ottawa, Ont.—As rain	27.46	24.68	26.40
—As snow	8.50	6.92	10.63
	35.96	31.60	37.03
Toronto, Ont.—As rain	26.11	25.63	30.04
—As snow	4.92	5.00	5.65
	31.03	30.63	35.69
Winnipeg, Man.—As rain	15.10	13.01	16.37
—As snow	5.12	3.91	6.63
	20.22	16.92	23.00
Indian Head, Sask.—As rain	10.71	15.55	11.96
—As snow	5.30	3.40	8.13
	16.01	18.95	20.09

TOTAL PRECIPITATION IN INCHES—*continued*

	1902	1903	1904
Calgary, Alta.—As rain	29.63	16.62	11.82
—As snow	4.54	3.71	3.06
	34.17	20.33	14.88
Lethbridge, Alta.—As rain	24.45	8.30	8.37
—As snow	3.68	6.52	3.03
	28.13	14.82	11.40
Edmonton, Alta.—As rain	16.88	15.26	12.71
—As snow	3.74	5.80	6.16
	20.62	21.06	18.87
Kamloops, B.C.—As rain	8.28	8.82	5.33
—As snow	3.72	1.45	5.45
	12.00	10.27	10.78
Nicola Lake, B.C.—As rain	8.73	11.51	4.76
—As snow	4.65	2.51	6.12
	13.38	14.02	10.88
New Westminster, B.C.—As rain	59.73	54.28	53.42
—As snow	3.51	3.29	5.67
	63.24	57.57	59.09
Victoria, B.C.—As rain	24.84	24.42	25.60
—As snow	1.61	1.85	.99
	26.45	26.30	26.59

Another phase of the subject is the fertilizing value of rain and snow. This is a matter that has received attention during the past two years at the Experimental Farm laboratories. A sample from every rainfall and snowfall is analysed and the nitrogen compounds determined. The atmosphere contains many gases in addition to those two which make up its general composition, oxygen and nitrogen. The combustion of fuel, the oxidation of food in animals, produce gases which find a natural home in the atmosphere. From such sources, and also, no doubt, to some extent from electric discharge, the air receives gaseous nitrogen compounds. The air also contains much dust and in the neighbourhood of cities a considerable quantity of soot. The rain and the snow falling through the atmosphere dissolves these gases and washes out the dust and soot and thus bring not inconsiderable amounts of fertilizing material to the soil. The nitrogen compounds are chiefly ammonia, ammonium salts and nitrates. All these are valuable agriculturally, because they furnish available plant food. During the winter of 1906-07, 85.5 inches of snow fell and this was found to possess nitrogen compounds equivalent to 1 lb. (approximately) nitrogen per acre. Similarly, analyses of last season's rain show that it furnished 3.5 lbs. (approximately) of combined nitrogen per acre. As nitrogen suitable for plant food is worth in a fertilizer about 17 cents per lb. we find that the rain and snow together furnish, in the neighbourhood of Ottawa, about 75 cents worth of plant food per acre.

The soot and dust present in what appears to us the whitest snow is readily made evident by collecting some snow immediately after a fall and allowing it to melt in a clear glass jar—as the snow liquifies the soot will be seen clinging to the sides of the vessel and there will probably be also a deposit at the bottom of the jar.

Snow benefits the farmer and fruit grower in other ways besides fertilizing the land. Thus it lies as a blanket protecting the roots of our fruit trees against excessive cold.

How Rain and Snow Affect the Health of the World.

The filtering of the atmosphere, the washing of the atmosphere by the rain and snow, have already been referred to; they purify and cleanse the air of both gaseous and solid impurities and further, no doubt, rid it of many microbes. The large amount of absorbent and filtering surface presented by the flakes of snow as they fall perform this useful function to a wonderful degree. In a very large measure the exhilarating character, the crispness, the clarity of our winter air is due to this action of the snow.

In this connection it was stated that from recent analyses of the rain as it fell on the Strand, in the heart of the City of London, it had been computed that no less than 3,738 tons of impurities (soot, salts of ammonia, etc.) had been washed out of the atmosphere above London (greater London comprises about 75,000 acres) in less than a week. Of course, the air of our Canadian cities is much cleaner than that of London—one reason being that we burn anthracite, whereas in London soft coal is used—but these figures are significant in indicating what rain can do in purifying the atmosphere.

The relative humidity of the air plays an important part in the maintenance of health. The humidity of the air is, of course, directly regulated or controlled by the temperature, but the source of the moisture which furnishes the air with aqueous vapour is in the water that falls as snow and rain and rises again by evaporation.

Water supplies, both large and small, from lake, river and well, must all depend on the fall of rain and snow. A season of drought means not only poor crops, but wells almost dry. In country villages, especially, does this low water mean typhoid fever. Over and over again has it been observed that an excessively dry autumn reduces the crop yield of the following year, unless the average precipitation is brought up by heavy rains the next spring—and not only this, but that sickness follows quickly in the train of drought. Stagnant water is impure water; the rain and the snow, as part of the cycle which the water of the earth performs, serves not only to give us our water supplies, but to keep them pure and wholesome.

ARCEUTHOBIUM PUSILLUM (PECK).

Arceuthobium pusillum is apparently widely spread throughout Ontario, and in some places is doing serious mischief. Wherever it occurs it is to be found in abundance, most of the branches of the agrasitized tree being covered with it. Specimens of *A. pusillum* on *Picea* nigra were first brought to me for identification by Mr. C. G. Fraser, one of my students. They were collected at Wilcox Lake, York County, by Messrs. S. R. Thompson and C. G. Fraser. Later further collections of staminate and pistillate plants were secured at Snelgrove by Messrs. Jas. and J. H. White, by myself at Wilcox Lake and at several points in and near Algonquin Park, and by Mr. Bartlett, the Superintendent in Algonquin Park. The presence of this dwarf mistletoe is at once evident by the "witches' brooms" it occasions. It is likewise very destructive to the life of the tree.

J. H. FAULL.

KAWARTHA MUSHROOMS.

By CEPHAS GUILLET.

In addition to the 71 species of fungi from the Kawartha Lakes recorded in the July issue of THE OTTAWA NATURALIST, the writer found eleven species in September, 1907, all at Stony Lake. These also were identified by Dr. Charles Horton Peck, and are given below. One of them, the "fly agaric," *Amanita muscaria*, L. is very poisonous. According to Underwood the decoction of this plant is used by the Russians in Siberia for producing hilarious intoxication. It owes its name to its use by country people as a fly-poison. Quite a number of these brilliant yellow and pumpkin-colored mushrooms were found on Horseshoe Island scattered about over the ground in open "second growth."

Lycoperdon gemmatum, Batsch. (A puff-ball).
Boletus spectabilis, Pk. (Edible).
Boletinus paluster, Pk.
Boletinus pictus, Pk. (Edible).
Hygrophorus conicus, (Scop.) Fr.
Lactarius vellereus, Fr.
Amanita muscaria L. Dr. Peck adds, "approaching *A. formosa* G. and R., from which it appears to differ only in having the centre of the cap orange color."
Cortinarius pulchrifolius, Pk.
Cortinarius cœrulescens, Fr.
Cortinarius mucifluus, Fr.
Cortinarius rimosus, Pk.

Four new species discovered by the present writer in the Kawartha region are described by Dr. Peck in the Bulletin of the Torrey Botanical Club, 34; 1897, ps. 97, 98, 345 and 346.

WAXWINGS AT GALT.

Cedar waxwings are wintering around here in fairly large numbers. On December 29th, several flocks were observed feeding upon the berries of the wild holly (*Ilex verticillata*, Gray) which borders our many ponds, the fruit being very abundant this season. When taking the fruit they would always carry it to the higher trees to devour. Slate-colored juncoes were also plentiful during the latter days of December. None of our irregular winter visitants from the north have been observed so far.

Galt, December 3rd, 1907. W. HERRIOT.

NOTES ON TWO RECENT ADDITIONS TO THE ZOOLOGICAL COLLECTIONS IN THE MUSEUM OF THE GEOLOGICAL SURVEY OF CANADA.

By J. F. WHITEAVES.

The additions are two specimens that were presented by the Rev. J. H. Keen, of Metlakatla, B.C., per Dr. James Fletcher, on the 24th of December, 1907. They are as follows:—

(1). MICROTUS MACRURUS, Merriam.

(*The Olympic Vole*).

"Parturiunt montes, nascitur ridiculus mus."

Skin of a female of this species. The animal was captured by Mr. Keen at or near Metlakatla, on the 28th of August, 1907.

Under the auspices of the U. S. Department of Agriculture, Mr. Vernon Bailey has published a "Revision of American Voles of the Genus *Microtus*" in 1900, and Mr. David E. Lantz, "An Economic Study of Field Mice (Genus *Microtus*)" in 1907.

"Field mice, of the genus *Microtus*," writes Mr. Lantz, have "stout bodies, blunt, rounded muzzles, small eyes, and short ears—often completely concealed in the fur. The tail is short and hairy; the soles of the feet are naked or clothed with short hairs, and have five or six foot pads (plantar tubercles). The incisors are broad and not grooved.

"The molar teeth, in all members of the genus, like the incisors of all rodents, grow continuously throughout the life of the animal and do not develop roots. They are prismatic in form, and the crowns show triangular dentinal spaces surrounded by lines of harder enamel. These curious enamel patterns are of great importance in the classification of the animals, as they are but slightly affected by age and wear and are remarkably constant for each species.

"About 165 living species and subspecies of *Microtus* have been recognized (1904), of which about 78 are North American."

And of these 78, it may be added, about 30 are now known to occur in Canada. In the Museum of the Survey there are about 100 skins of Canadian voles or field mice of this genus, representing at least 10 species or subspecies, and including a fine series of skins of *M. Drummondii* from Alberta and British Columbia.

The "Olympic Vole" was first described by Dr. C. Hart Merriam, under the name *Microtus macrurus*, in the Proceedings of the Academy of Natural Sciences of Philadelphia for August, 1898. The English name proposed for it by Mr. Bailey in 1900, is intended to recall to the memory the circumstance that the specimens upon which the species was originally based, were collected at Lake Cushman, in the Olympic Mountains, State of Washington.

As its specific name implies, *M. macrurus* belongs to the "Longicaudus Group" of the genus, which, according to Mr. Bailey, is characterized by the "long tail and gray color."

(2). CERATORHINA MONOCERATA (Pallas) Cassin.

(*The Rhinoceros Auklet*).

"Rara avis in terris."

One egg, which is believed to be that of a bird of this species. This egg, Dr. Fletcher writes, was brought to Mr. Keen in June, 1907, by an English sailor, who keeps a lighthouse on Lucy Island, about 7 miles west of Metlakatla. At the same time he brought an auklet, which he said he had trapped at the mouth of the hole at the end of which he found the egg. Mr. Keen says: "I can answer for the correct identification of the bird, but have, of course, only the man's word that the egg is that of a rhinoceros auklet." The egg certainly agrees very well with Dr. Coues' description of that of *Ceratorhina*, which is as follows: "Egg single, colorless or nearly so, but more or less obscurely marked, as in *Lunda* and *Fratercula*; size, 2.70 x 1.80. The egg presented by Mr. Keen measures 2.70 x 1.75. Eggs of this species would appear to be rare in collections, as they are not listed or offered for sale in any egg dealer's catalogue that the writer has seen.

The rhinoceros auklet (formerly called also the unicorn auklet or horn-billed auklet) is the only known species of the genus *Ceratorhina*. One of the most marked peculiarities of birds of this genus is the horned bill, which is thus described by Coues:—"Bill smooth, base of upper mandible with a large upright horn, and under mandible with an accessory horny piece lying between its rami; this piece and the horn deciduous, when base of mandible covered with a soft cere." Coues also says that the species inhabits "both coasts and islands of the north Pacific to Lower California and Japan;" that it is "not specially Arctic;" and that it has bred as far south as the

Farallone Islands. Lord says that it has been "found in the Gulf of Georgia," and that it "breeds on the islands around Vancouver Island." R. Brown also says that it occurs on the "coasts of Vancouver Island."

This auklet belongs to the Alcidæ or Auk family, and to the subfamily Phaleridinæ, which includes the auklets, murrelets, and black guillemots. As Coues says, the "Phaleridinæ all belong to Pacific and Polar waters, excepting some species of *Cepphus*."

Six species of auklet are recorded by Professor Macoun in his "Catalogue of Canadian Birds." In the Museum of the Survey five of these species are represented, either by mounted specimens or by eggs, and in two cases, by both. The rhinoceros auklet is represented in it only by the egg recently presented by Mr. Keen; and Cassin's auklet by a mounted specimen from Queen Charlotte Sound. The paroquet auklet is represented in it by two mounted specimens from St. Paul Island, Behring Sea; the crested auklet by two mounted specimens and one egg, from St. Paul Island; and the least auklet by three stuffed specimens and four eggs, from St. Paul Island.

COUNCIL MEETING.

The regular monthly Council Meeting for November was attended by the following members: The President, Mr. W. J. Wilson, Messrs. A. E. Attwood, A. Halkett, A. Gibson, J. M. Macoun, H. H. Pitts, E. E. Lemieux, and T. E. Clarke; Miss A. L. Matthews, Miss Q. Jackson, and Miss I. Ritchie.

Six persons were elected as ordinary members, viz.:

W. A. Johnston, M.A., B.Sc., Geological Survey.
Chas. N. Robertson, Ottawa.
J. Létourneau, Experimental Farm.
R. F. Fleming, Normal School, Ottawa.
John Blackhall, 45 Dewson St., Toronto.
C. Camsell, B.A., Geological Survey.

MARL SHELLS FROM COBALT.

The following species were found in a small lot of marl from Cobalt, recently received from Mr. George H. Clapp, of Pittsburg, Pa. Though not extensive, it is of interest, not only as from that locality, but for comparison with the shells from similar deposits in Michigan and elsewhere.

I am indebted to Dr. V. Sterki for the identification of the *Pisidia* and the notes accompanying them.

Zonitoides arborea Say. Apparently recent.

Pyramidula cronkhitei anthonyi Pils. Apparently recent.

Physa heterostropha Say.

Planorbis bicarinatus striatus Baker. The specimens are not only spirally lineate, but also transversely corrugated, very like the var. *corrugatus* Currier.

Planorbis campanulatus Say.

Planorbis exacuous Say.

Planorbis parvus Say.

Planorbis deflectus Say.

Planorbis hirsutus Gld.

Ancylus parallelus Hald.

Valvata tricarinata Say.

Sphærium simile Say.

Sphærium striatinum Lam.

Musculium securis Prime.

Pisidium kirklandi Sterki. "Like typical examples, but with finer striæ."

Pisidium contortum Prime.

Pisidium rotundatum Prime.

Pisidium noveboracense Prime. "Small."

Pisidium mainense Sterki. "Striae extremely fine and regular."

Pisidium medianium Sterki. "Small."

Pisidium pauperculum Sterki. "Small."

Pisidium tenuissimum Sterki. "Small".

Pisidium vesiculare Sterki. "A small northern variety, seen from Canada and Minnesota, very oblique and shape different from that of the types."

Pisidium scutellatum Sterki. "Small, juvenile."

"Not a specimen was seen that might be referred to *P. abditum*.

"It is interesting to note that most of the species are represented by small, and, in some cases, specifically northern forms especially that of *vesiculare*. *Scutellatum*, if mature, would probably show the same." BRYANT WALKER.

NOTES ON WINTER BIRDS IN MONTCALM COUNTY, QUEBEC.

By L. McI. TERRILL.

During each December of the past two winters I have spent a fortnight camping north of Lac Tremblante, Montcalm County, Que. The weather from Dec. 8th–20th, 1906, was excessively cold, with the exception of two or three days, the thermometer dropping as low as 35° below zero, though the average was about 12° below. This was probably the cause of the appearance of large packs of wolves from the north, which in turn drove the deer closer to civilization.

This year, during the same period, we had rain or snow for several days (so mild in fact that at least one bear, one chipmunk and two specimens of a species of hibernating moth, had been induced to leave their winter quarters). The wolves had not put in an appearance, and the deer were more scattered. In 1906 the ice on Lac Tremblante was a foot or more in thickness on Dec. 9th, whilst this year it had not taken on the day we left, Dec. 21st.

Of the birds observed the woodpeckers outnumbered all others, five species being noticed; namely, downy, hairy, Arctic three-toed, American three-toed, and pileated woodpeckers. I have named them in order of abundance, only a few specimens of the pileated being observed each year. I did not record the American three-toed woodpecker in 1906, but probably overlooked it.

When drilling for larvae the pileated woodpecker can be heard at a much greater distance than any of the others. Then in turn the three-toed woodpecker makes more noise than the hairy and downy. If one had a fine perception of sound he might in time almost name the different species by the sound made in drilling.

The American crossbill and pine grosbeak were noticed daily, and both were feeding principally on the seeds of coniferous trees. I heard a grosbeak singing on three or four occasions. Pine siskins were noted abundantly, and less commonly the redpoll, (*A. linaria*) brown creeper, white and red-breasted nuthatch, whilst the ever present black-capped chickadee was everywhere. The difference in the abundance of the jays was notable. I have no record for the blue jay in 1906, though there may have been a few, while in 1907 they were numerous. Compare this with an abundance of Canada jays in 1906, and a scarcity in 1907 almost corresponding to that of the blue jay

in 1906. A few pairs of northern ravens were seen. Perhaps they are attracted by the deer that are shot in the district, as they feed on the entrails.

Of the Raptores the hawk owl appeared the most numerous at least in 1907, perhaps because my walks in 1907 led me over large areas of burnt mountain land, for the hawk owl seems to prefer an open space in the woods, where, from some stumps, it can see to a considerable distance. One of the hawk owls was engaged in devouring a Canada ruffed grouse. I heard the great horned owl hooting on dark days and in the evening, also saw one snowy owl in 1906, and a bald eagle in 1907.

This completes the list of birds noticed, with the exception of the Canada ruffed grouse. These birds were fairly common, but were not very noticeable in 1907 on account of the prevalent dark weather, keeping hidden beneath windfalls and in the thick of coniferous trees. In sunny weather only would they venture into the birch trees to feed on the buds.

A friend camping in the vicinity during November, 1906, gave me the following notes:—

Nov. 20, 1906—Snowy owl seen with hare.
Nov. 23, " —Black ducks still at Lac Tremblante.
Nov. 28, " —Loons seen on Lac Tremblante.

He has had occasion to be in the locality a great deal during the summer and fall and says that black ducks and loons usually remain until the lake is frozen; also that bald eagles and ravens are permanent residents.

Lac Tremblante is only a short distance from Mt. Tremblante Station, one of the highest points in the Laurentian Mountains.

BOTANICAL NOTE.

Cassia chamæcrista. I have received from Mr. P. M. Thompson, the Science Master of the Collegiate Institute, St. Thomas, Ont., a specimen of the partridge pea which was collected by one of his students in the vicinity of St. Thomas. It grew in a meadow near to the Wabash Railroad, and Mr. Thompson suggests that this may possibly explain its occurrence at St. Thomas. However that may be the finding of the specimen of this annual plant growing in Canada is worthy of being recorded, although of course it is a common plant in sandy fields in the southern States.

JAMES FLETCHER.

AN INTERESTING OBSERVATION ON THE FOOD HABITS OF THE YELLOW-BELLIED SAPSUCKER (*Spyropicus varius*).

While visiting Mr. R. W. Shepherd, Como, Que., on July 20th, 1907, the writer was attracted by the large number of leaves which were lying on the ground beneath a specimen of the Cottonwood (*Populus deltoidea*, Marsh) which was growing near the house.

The leaves were green and healthy looking from a distance, and as there had been no storm to blow them off we were puzzled at first to know what had caused them to fall. On enquiry we were informed that the dropping of the leaves was caused by birds. The leaves were examined and it was discovered that on every petiole, close to the blade of the leaf, there was a gall of the species known as the Poplar Stem Gall (*Pemphigus populicaulis*, Fitch). Each of these galls when perfect is the home of a colony of slate-colored plant lice, the species being known as the Poplar Stem Gall Louse. These galls had been opened and not an insect was left inside. On looking up into the tree a Yellow-Bellied Sapsucker (*Spyropicus varius*) was seen busily engaged in picking holes into the galls and evidently eating the insects which were inside. The galls grew, as described above, on the petioles of the leaves and the tearing apart of these by the bird caused the leaves to fall. Almost every leaf on the tree was affected by this gall, and we were informed by Mr. Shepherd that the almost constant falling of the leaves on the ground had made this bird a very undesirable visitor, as it was practically impossible to keep the lawn in order. This note is published in the OTTAWA NATURALIST as it is believed there have been few records of this kind made before.

W. T. MACOUN.

ASPLENIUM RUTA-MURARIA, L.—This plant was recorded in THE OTTAWA NATURALIST, Vol. XX., p. 135 from Southampton, Ont., as new to Canada. The Rev. W. A. Burman has since shown me specimens collected by him at Banff, Rocky Mountains, in July, 1893. It must be very rare there, as few places in Canada have been so well botanized as Banff, during the past ten years, and no one else has reported it.

J. M. M.

BOOK NOTICE.

"Farm Weeds of Canada," by George H. Clark, B.S.A., and James Fletcher, LL.D., F.R.S.C., F.L.S., with illustrations by Norman Criddle: Dominion Department of Agriculture, Branch of the Seed Commissioner.

This long looked for, beautifully illustrated bulletin, quite recently made its appearance. In his letter of transmittal to the Honourable the Minister of Agriculture, Seed Commissioner Clark draws attention to the enormous losses which are every year caused by noxious weeds, and mentions briefly some of the many means by which they become disseminated. It is pleasing to note that the three men who prepared this bulletin are all active members of the Ottawa Field-Naturalists' Club. The text of the bulletin is written by Dr. James Fletcher, our leading authority on the subject. In the introductory chapter the importance is pointed out of knowing a weed when seen, and calling it by its true name, not necessarily the botanical name, but the name it is known by and written about in agricultural publications. Under each botanical family the chief Canadian weeds are treated of with remedies, and a coloured life-sized plate is given of each. In all there are 56 plates, 51 of the most important weeds, 1 showing three grasses attacked by ergot, and 4 of the chief weed seeds found in commercial grains. On these latter 4 plates, 80 weed seeds are shown in colours, at natural size and enlarged so as to show each seed as it appears under the ordinary pocket magnifying glass used by farmers and seedsmen. The bulletin is beautifully printed and gotten up, and much credit is due to all concerned in its preparation. It will be of immense value to the farmers of Canada in acquainting them with the pernicious weeds on their farms and how to eradicate them. To the botanist too it will be a welcome addition to the literature. As a government publication it stands in a class by itself, and is undoubtedly one of the very best contributions on the subject which has yet appeared.

A. G.

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