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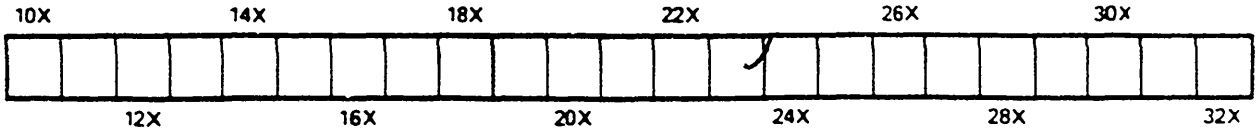

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THE OTTAWA NATURALIST.

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CONTENTS.

OTTAWA, CANADA.
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The Club's Annual Excursion to Chelsea, Quebec, will be held on Saturday, May 21st. The train leaves C.P.R. Depot at 1.30 p.m.

Members—Adults, 25c. Non-Members, 30c. Children, 15c.

THE OTTAWA NATURALIST.

VOL. XII. OTTAWA, APRIL, 1898. NO. 2.

THE CRYPTOGAMIC FLORA OF OTTAWA.

BY PROF. JOHN MACOUN, M.A., F.L.S., F.R.S.C.

Continued from February No.

251. **J. barbata**, Schreb.

On damp limestone cliffs facing the Ottawa River, Rockcliffe Park, May 7th, 1896; on rocks, Gilmour's Park, Chelsea, Que, Sept. 9th, 1889; on rocks near Ironsides and on rocks Meeche's Lake, Que., Sept. 23rd, 1893.

252. **J. attenuata**, Lindenb.

On rocks on damp cliffs, Rockcliffe Park, April 16th, 1891.

253. **J. lycopodioides**, Wallr.

On rocks on the east side of the cliff, close to the old sawmill, Rockcliffe Park, Oct. 26th, 1889.

254. **J. exsecta**, Schmid.

Common on dead wood, Beechwood Cemetery, April 23rd, 1892; on moss on logs in Dow's Swamp, Oct., 1884.

255. **J. incisa**, Schrad.

On rotten wood in Beechwood Cemetery, Sept. 2nd, 1884; also on old logs west of Beaver Meadow, Hull, Que., Oct. 6th, 1885.

256. **J. excisa**, Dicks.

Rather common on rotten wood around Ottawa; in Dow's Swamp, Oct., 1884; also at Meeche's Lake near Chelsea, Que., Sept. 24th, 1893.

257 **J. pumila**, With.

On rocks along Meeche's Lake, north of Chelsea, Que., Sept. 23rd, 1893.

XIX. FOSSOMBRONIA, Raddi.

258. **F. Dumortieri**, Lindb.

On earth subject to inundation close to Leamy's Lake, Hull, Que. Sept. 24th, 1889.

XX. BLASIA, Micheli,

259. **B. pusilla,** (Linn.)

On earth subject to inundation in a gully at Leamy's Lake, Hull, Que., Sept. 24th, 1889 ; on wet clay banks, Meeche's Lake, north of Chelsea, Que., Sept. 23rd 1893 ; also on clay banks at the confluence of the Leivre River with the Ottawa River near Buckingham, Que., Sept. 26th, 1892.

XXI. PELLIA, Raddi.

260. **P. epiphylla,** Corda.

On earth subject to inundation in a gully at Leamy's Lake, Hull, Que., Sept. 24th, 1889.

XXII. ANEURA. Dumortier.

261. **A. latifrons,** (Lindb.) Dumort.

On old logs in the swamp, Glebe property, Bank St., Ottawa, April 27th, 1896 ; on old logs, Beechwood Cemetery, April 23rd, 1892.

262. **A. palmata** (Hedw.)

On old logs and stumps in Dow's Swamp, Oct. 6th. 1885 ; also on logs in McKay's Woods, Oct. 17th, 1890.

263. **A. sessilis,** (Sprengel.) Dumort.

On old logs in a swamp about a mile south-east of Carleton Place ; in fine fruit, May 30th, 1884.

264 **A. pinguis,** (Linn.) Dumort.

Amongst peat moss in the Mer Bleue, near Eastman's Springs, June 15th, 1892.

XXIII. METZGERIA, Raddi.

265. **M. myriopoda,** Lindb.

On damp rocks near Ironsides, five miles north of Hull, Que., Oct. 21st, 1884.

266. **M. conjugata,** Lindb.

On stones in McKay's Woods near the Lake, Oct. 9th, 1884.

XXXIV. ANTHOCEROS, Micheli.

267. **A. Macounii,** Howe (N. Sp.) Torr. Bull. Vol. xxv, page 19 (1898).

Thallus forming small dark green rosettes, 4-10 mm., in diameter, strongly undulate-crisped, subradiately inciso-laciniate or somewhat broadly lobed, rugose, pitted, sometimes slightly lamellate ecostate 6-8

cells thick in axile parts, cavernose, becoming at the margin gradually 3 or 2-stratose, now and then glandular-thickened ; surface cells distinct, translucent, lightly protuberant, subrhombic, trapezoidal, or oblong-pentagonal 35·75 x 30·35 mik. ; *Nostoc* colonies spherical ; monoicous ; antheridia in groups of 3 or 4 ; involucres short, sometimes united in pairs cylindrical oblong, or by contraction at base and mouth dolioform or subglobose, ·85-1·25 x ·5-·9 mm., incrassate except at the thin erose or subentire mouth ; capsule black, erect or a little curved, 3 6 x 3-·5 mm., thick-walled, with numerous stomata, the valves rigid or slightly flexuose when dry, brittle and often broken ; columella sometimes appendiculate ; spores fuscus or black, rounded-tetrahedral densely and rather minutely muriculate on both the inner and outer faces, 48-65 mik. in maximum diameter ; sterile cells short, nearly as broad as long, without spiral thickenings, separate or variously adherent, often shriveled and inconspicuous.

On earth subject to inundation along the discharge of Leamy's Lake, near Hull, Que., Sept. 24th, 1891.

XXV. MARCHANTIA, Marchant.

268. **M. polymorhpa,** Linn.

Quite common around springs and on earth along the borders of swamps around Ottawa. On earth, by the lake in McKay's Woods, April 28th, 1896.

XXVI. PREISSIA, Nees.

269. **P. commutata,** Nees.

Under dripping limestone rocks under the cliffs near the old mill, east side of Rockcliffe, May 7th, 1896.

XXVII. CONOCEPHALUS, Necker.

270. **C. conicus,** Neck.

Quite common on old logs and earth by brooks around Ottawa. In a swamp on the rear of Cowley's Farm, west of Hintonburg, April 18th, 1896.

XXVIII. GRIMALDIA, Raddi.

271. **G. rupestris,** (Nees.) Lindenb.

On calcareous earth in crevices of rocks near Governor's Bay, Rockcliffe Park, May 20th, 1884.

XXXIX. RICCIA, Micheli.

272. **R. arvensis,** Aust.

On damp earth covered by the spring floods around the east side of Leamy's Lake, Hull. Que., Sept. 24th, 1889.

273. **R. fluitans,** Linn,

Very abundant in Patterson's Creek, Bank St., Ottawa ; also in the Beaver Meadow Creek, west of Hull, Que., Oct. 9th, 1896.

274. **R. natans,** (Linn.) Corda.

In stagnant pools east of Beechwood Cemetery, April 23rd, 1892.

Forma terrestris.

Grows late in the season where pools had been in the spring. On earth along the Ottawa and Lievre rivers, near Buckingham, 20 miles below Ottawa, Sept. 18th, 1892 ; also along the discharge of Leamy's Lake, Hull, Que., Oct. 16th, 1893.

LICHENES.

I. RAMALINA, Ach.

275. **Ramalina calicaris** (L) var. **fastigiata,** Fr.

On old rails, old logs and trunks rather rare. On bark of young red maples at Britannia, April 20th, 1895 ; rare on old logs near Ottawa River, Hull ; on a pine tree, Pine Hill, Rockcliffe Park, rare on old stumps and rails in a fence one mile south-east of Billing's Bridge ; also on red maples Leamy's Lake ; on trees in a swamp in Stittsville ; old logs King's Mountain, west of Chelsea.

Var. **farinacea,** Schaer.

On trees, old fence rails, and ledges of rocks. Rare on bark along the C.A.R. in Stewart's Bush, April 12th, 1895 : on old fence rails West End Park ; on limestone ledges on the face of the cliff, opposite Gatineau Point, Rockcliffe Park.

Var. **canaliculata,** Fr.

On a balsam fir in a swamp a little east of Stittsville, May 14th, 1897.

276. **Ramalina pusilla** (Prev.) Var. **geniculata,** Tuck.

On twigs of spruce tress near Ironsides, Que., Oct. 6th, 1891.

II. CETRARIA, (Ach.) Fr.

277. **Cetraria ciliaris,** (Ach.)

On old fence rails and boards and occasionally on pine stumps and trees. On old fence rails, West End Park, April 16th, 1892 ; on old board fencing at Buckingham, Que. ; on an old pine stump one mile above Britannia ; on tamarack trees in a swamp at Stittsville, May 14th, 1897.

278. **Cetraria sæpincola**, (Ehrh.) Ach.

Rare. Occasionally in swamps. On branches of black spruce in the Mer Bleue, Eastman's Springs, June 16th, 1891.

279. **Cetraria lacunosa**, Ach.

Rare in the Ottawa district. ; on trees and rails. On old fence rails and boards at Buckingham, Que., May 14th, 1896.

280. **Cetrartia Oakesiana**, Tuckerm.

Very rare in Canada. On the base of living pine trees and at the base of pine stumps, Rockcliffe Park, April 17th, 1895 ; on the base of a pine stump by a swamp at Stittsville : old pine log, King's Mountain, west of Chelsea, May 22nd, 1897,

281. **Cetraria juniperina** (L.) Var. **Pinastri**, Ach.

Rare in the Ottawa district. On dead branches of black spruce and old logs in the Mer Bleue, at Eastman's Springs, June 16th, 1801 ; on branches of tamarack in a swamp at Stittsville, May 14th, 1897.

III. EVERNIA, Ach.

282. **Evernia prunastri**, (L.) Ach.

On trees, stumps and old fences ; rare. On old pine stumps at Britannia, April 10th, 1884 ; on old rails along the Richmond Road above Hintonburg ; on an old fence, Ottawa East ; on trees in the swamp west of Hull Station ; on branches of tamarack trees in a swamp at Stittsville, May 14th, 1897.

IV. USNEA, (Dill.) Ach.

283. **Usnea barbata**, (L.) Var. **hirta**, Fr.

On trunks south of the Aylmer Road, west of Hull, Que., April 26th, 1891 ; on a spruce tree, Rockcliffe Park ; on pine stumps at Britannia ; on spruce and tamarack trees in the Mer Bleue, at Eastman's Springs ; on tamarack trees in a swamp at Stittsville ; old log, King's Mountain, west of Chelsea, May 22nd, 1897.

V. ALECTORIA, (Ach.) Nyl.

284. **Alectoria jubata**, (L.) Var. **chalybeiformis**, Ach.

Rare on dead wood or on the earth. On old pine stumps at Britannia, April 20th, 1895 ; on tamarack trees in a swamp at Stittsville, May 14th, 1897.

Var. **implexa**, Fr.

Quite common in tamarack and other swamps, hanging like black hair from the branches. On black spruce and tamarack in the Mer Bleue, at Eastman's Springs, June 16th, 1891.

VI. THELOSCHISTES, Norm.

285 **Theloschistes polycarpus,** (Ehrh.)

A common species on living trees and dead wood. On black ash and white cedar trunks and balsam poplar branches in Stewart's Bush, April 12th, 1895 ; common on willow, red ash and alder at Britannia ; on balsam poplar and white ash trunks, at Hintonburg ; and on ash and rock elm in Beechwood ; on old fence boards at Billing's Bridge ; on red maple and ash at Leamy's Lake ; rare on trees at Stittsville ; on trunks, King's Mountain, west of Chelsea, May 22nd, 1897.

286. **Theloschistes concolor,** Dicks.

On ash trees west of West End Park, April 16th, 1892 ; on white cedar bark by the C.A.R. in Stewart's Bush ; quite common on willow, ash, maple and alder at Britannia ; common on bark of trees, Aylmer Road, west of Hull ; on trunks of black ash in woods west of Hintonburg ; also on basswood trees at Carleton Place ; on a black ash log, Ottawa East, and on ash trees in Beechwood : on old fence boards at Billing's Bridge ; on various trees in woods, Leamy's Lake ; on trees at Stittsville ; on trunks, King's Mountain, west of Chelsea, May 22nd, 1897.

VII. PARMELIA, (Ach.) De Not.

287. **Parmelia perlata,** (L.) Ach.

Not uncommon on trunks in wet woods or swamps. A fine species but seldom found in fruit. On ash trees by the C.A.R., Stewart's Bush, April 12th, 1895 ; on a spruce trunk in Rockcliffe Park ; on birch trees, Skead's Farm, Richmond Road ; on white cedar, black ash, and cherry birch in the swamp near Beechwood Cemetery ; on a birch tree in Dow's Swamp ; on trees in woods at Chelsea, Que. ; also on trees at Carleton Place ; on trees in the swamp west of Hull Station, Oct. 9th, 1896.

288. **Parmelia tiliacea,** (Hoffm.) Floerk.

Rather uncommon except in deep, cool woods. On birch trees on Skead's Farm, Richmond Road ; on beech and other trees, Rockcliffe Park ; on young spruce trees in woods, Beaver Meadow west of Hull ; on a beech tree in woods one mile south-east of Billing's Bridge ; on red maple at Leamy's Lake ; on beech trunks, King's Mountain, west of Chelsea, May 22nd, 1897.

289. **Parmelia Borreri,** (Turn.)

Apparently rare in the vicinity of Ottawa. On trunks in woods north of Beechwood Cemetery, April 23rd, 1891 ; on trees in a swamp at Stittsville, May 14th, 1897.

Var. **rudecta**, Tuckerm.

Very common on old rails and dead wood, around Ottawa. On dead wood and old rails in Stewart's Bush, April 12th, 1895 ; on dead wood, living spruce trees and boulders, Rockcliffe Park ; on dead wood at Britannia ; on dead pines, Aylmer Road, west of Hull ; on white cedar north of Beechwood ; on dead trees at Carleton Place ; on a beech tree in woods one mile south-east of Billing's Bridge ; on large trees in woods, Leamy's Lake ; on old rails and logs, King's Mountain, west of Chelsea, May 22nd, 1897.

290. **Parmelia saxatilis**, (L.) Fr.

On trunks, dead wood, and rocks. On trunks in woods at Leamy's Lake, May 7th, 1897 ; on tamarack and other trees in a swamp at Stittsville, May 22nd, 1897.

Var. **sulcata**, Nyl.

On trunks, dead wood and rocks. On the branches of a dead spruce, Rockcliffe Park, April 17th, 1895 ; on boulders along a fence, Ottawa East ; on red maples in woods near Leamy's Lake, Hull, Que. ; on old logs and rails east of Stittsville ; on rocks and trunks, King's Mountain, west of Chelsea, May 22nd, 1897.

291. **Parmelia physodes**, (L.) Ach.

On dead wood, old fence rails, boards and rocks. On the branches of dead spruce, Rockcliffe Park, April 17th, 1895 ; on pine stumps at Britannia ; on old fence rails and boards at Buckingham, Que. ; on old fence rails and tamarack trees at Stittsville ; on old logs and rails, King's Mountain, west of Chelsea.

292. **Parmelia colpodes**, (Ach.) Nyl.

Not rare, chiefly on tamarack trees. In a swamp a little east of Stittsville, north of the Can. Pac. Railway, May 14th, 1897 ; on trunks, western slope King's Mountain, May 22nd, 1897.

293. **Parmelia olivacea**, (L.) Ach.

On trees and old rails. On alders, red maple and red ash at Britannia, April 20th, 1895 ; rare on pine trees west of Hull ; on old rails, Ottawa East ; on old rails at Dow's Swamp ; and on young pines at Carleton Place ; on old pine stumps, Leamy's Lake ; common on tamarack trees in a swamp at Stittsville, May 14th, 1897.

Var. **aspidiota**, Ach.

Same habitat as the species. On alder bushes at Britannia, April 20th, 1895 ; on alder bushes near Leamy's Lake, Hull, Que. ; on tamarack trees in a swamp at Stittsville, May 14th, 1897.

Var. **sorediata,** (Ach.) Nyl.

On trees and rocks ; rare. On maple trunks north of Aylmer Road, west of Hull, Que., April 26th, 1891.

294. **Parmelia caperata,** (L.) Ach.

On trunks, dead wood, and stones ; common. On old rails and pine trees, Clemow's Woods, Bank St., April 12th, 1895 ; common on dead and living trees at Rockcliffe, Beechwood and Ottawa East ; abundant on old rails and dead wood at Britannia ; common on dead pines Aylmer Road and by the Beaver Meadow, Hull ; old fence rails, west of Hintonburg and West End Park ; on rails in Dow's Swamp ; and on trees at Carleton Place ; on old fences around Billing's Bridge ; on trees of all kinds at Leamy's Lake ; on old stumps and fences at Stittsville ; very common, King's Mountain, Chelsea, Que.

295. **Parmelia conspersa,** (Ehrh.) Ach.

Abundant on boulders in all old fields and fences around Ottawa. Collected in Rockcliffe Park, Ottawa East, by Dow's Swamp, fields at Hintonburg, and along the Aylmer Road west of Hull ; on boulders around Billing's Bridge ; on boulders at Brigham's Creek, near Leamy's Lake ; on boulders at Stittsville ; on boulders and other rocks, King's Mountain, Chelsea, Que.

VIII. PHYSICA, DC.

296. **Physcia speciosa,** (Ach.) Nyl.

On trees and mossy rocks in woods. On trees at Ottawa, 1884 ; on trees in Beechwood Cemetery ; on trunks, Pine Hill, Rockcliffe Park, April 16th, 1896 ; on a hemlock trunk in woods north of Beechwood Cemetery ; on a beech tree in woods one mile south-east of Billing's Bridge ; on the bases of basswood trees in woods at Leamy's Lake, May 7th, 1897.

297. **Physica granulifera,** (Ach.) Tuckerm.

On trunks. On bark of trees north of Aylmer Road, Hull, Que., April 26th, 1891 ; on ash trees, Cowley's Farm, west of Hintonburg ; on large trees in woods at Leamy's Lake, May 7th, 1897.

298. **Physcia pulverulenta,** (Schreb.) Nyl.

On trunks and rocks. On black ash trunks, Stewart's Bush, April 12th, 1895 : on ash trees at Britannia ; on living and dead trees, Skead's Farm, Hintonburg ; quite common on ash and other trees along the Aylmer Road west of Hull ; on ash trunks in Dow's Swamp, Ottawa East, Beechwood and Rockcliffe Park ; on large trunks in woods, Leamy's Lake ; on trees at Stittsville ; on trunks and rails, King's Mountain, Chelsea, Que., May 22nd, 1897.

WINTER LECTURES, 1897-8.

A novel and most interesting feature of the lecture course of the past winter was a series of three practical demonstrations given by the President, of the three most important divisions of the Animal Kingdom, illustrated by A Fish, a Bird, and a Mammal. All who were fortunate enough to attend these lectures were charmed at the skill shown by the lecturer in dissecting the specimens and explaining the uses of the various organs exposed by the dissecting knife at the same time that they were pointed out on enlarged charts hung on the walls. At all of these lectures, specimens and a fine selection of lantern views were shown, which added largely to their educational value.

I "A FISH."—In his first lecture (Feb. 8th) Professor Prince described the main features in the form and structure of such a typical fish as the Pickerel or Doré. The pointed head, the tapering tail and the powerful fins, especially the breast fins, were referred to. The teeth are sharply hooked and not adapted for mastication, but rather for seizing and holding the prey selected for food. Digestion, on account of the powerful solvents secreted in the alimentary canal, is rapid. In the main fold or bend of the intestine the ductless spleen lies. It is an organ probably connected with the formation of blood. There is no pancreas (or sweetbread) in fishes, but the bunch of finger-like organs attached to the stomach, called the pyloric cæca, performs the same function in connection with digestion. By means of the red gills, through which the blood circulates, the pure air dissolved in water is breathed and oxygenates the blood The circulation in fishes is very simple. The two-chambered heart, situated far forward, almost beneath the chin, drives the blood by the central aorta and afferent branchial arteries to the gills, where it passes along the fine comb-like filaments and returns to the dorsal aorta, which carries it along the underside of the backbone and thence all over the body. It collects again in the two large veins which empty into the ductus cuvieri, and thence into the auricle of the heart. There is thus no separated double circulation in fishes. The hearing of fishes

is far more acute than the sense of smell, as is proved by the delicate structure of the ears in the hind part of the skull. But the most sensitive structure in fishes is the lateral line, a series of openings in the scales along each side of the body. Temperature, water pollutions and other external conditions, affect the lateral line, the microscopic structure of which shows that its importance has apparently been over-looked by naturalists. The brain is of the simplest kind, merely six rounded lumps or lobes, the first pair being the olfactory lobes, the second the optic, and the third the cerebral hemispheres, which are very small. The optic lobes, whence spring the nerves of sight, are by far the largest. Behind all is the cerebellum, which continues into the spinal cord. The eggs, larval condition, and other interesting features, were detailed in the concluding part of the lecture.

II. "A BIRD."—In contrast with the fish, Professor Prince drew attention in his second lecture to the skull of the bird, which in the adult is very compact and soldered together, whereas in the early stages the bones (or cartilages) are separate, like the separate elements in the fish's skull. A single knob or joint, called the occipital condyle, projects from the back of the skull and unites it to the atlas or first joint of the neck. The fore-limb is not a fin, but a wing consisting of two fingers and a thumb. In the penguins the wings are used as fins for swimming and bear scale-like feathers. The heart is four-chambered and one great artery (the right aortic arch) carries the blood all over the body. Two pulmonary arteries carry blood from the right ventricle to the lungs. The lungs open by air-tubes into large sacs, which often penetrate the bones and increase the buoyancy of the body. The ribs of birds bear projections called uncinate processes, which are also found in reptiles. Birds and reptiles have many points in common. The concluding part of the lecture dealt with the egg and the embryonic development of a bird. The growth of the skeleton, of the feathers, &c., was described in full detail.

III. "A FOUR-FOOTED ANIMAL" formed the subject of the last lecture, and it was shown that the complex structure of mammals, or highest animals, admitted of a description of only

the main features. As characteristic of these highest animals, Professor Prince stated that two condyles, or projections behind the skull, the possession of hair at some period of life, the existence of the left aortic arch (not the right as in birds) and a perfectly separate lung and body circulation of the blood, were named. The diaphragm, practically absent in birds, forms the floor of the chest and aids in respiration. The brain shows an enormous enlargement of the cerebral lobes proportionate to the increased intelligence exhibited by mammals. All, or nearly all, suckle the young, and the organs of sense (sight, smell, hearing, &c.) are highly developed. Some, like bats, have the hand expanded like a wing, covered with an expansion of thin skin, others, like the sloth, have huge hook-claws, as the animal spends its life hanging, back downwards, from the branches of forest trees, while hoofs, padded feet (like the camel's) and other modifications, point to the varied life of the group amongst which man stands as the highest and most specialised.

The thanks of the Club are due to the President, Professor Prince, for this valuable series of lectures, and we feel confident that should a similar course be given next year, the room will be filled to overflowing on every occasion. No teacher, student, school-boy or school-girl should miss such an opportunity of acquiring much valuable knowledge in so pleasant a manner.

IN THE BERMUDAS.

Written for THE OTTAWA NATURALIST.

Although the Bermudas or Sommers Islands are so far from Canada that the Field-Naturalists' Club is debarred from an excursion thereto, they possess as far as the birds are concerned a certain amount of interest to the more northern parts of the adjacent continent, as a stopping or resting place in the spring and autumn migratory flights. During the summer months the regular amount of bird life is limited, but in the autumn and spring almost every variety of bird met with in Canada has been noticed here. Dr. Hart Merriam made this

a special object of enquiry during his stay here. The most conspicuous regular bird is the Cardinal Grossbeak, and there is a bluebird of about the same size, of the most cærulean blue; the two flitting in and out of the monotonous evergreen juniper which clothes the hillsides add a brilliancy to the foliage, the brighter by contrast. A law of the Islands prohibits the killing of birds, and as a consequence bird life is very abundant. In the vicinity of the towns and settlements the English sparrow has managed to drive off to a great extent the native birds, but in the country their number makes up for the town's loss.

The fauna of the Bermudas as far as mammals and butterflies are concerned, is excessively limited. Two or three species of rats, a rare occurrence of bats, and a very limited number of butterflies constitute all there is. The fauna, excepting the rats, has been pronounced exotic, and inblown by storms.

To the botanist the Islands are a veritable garden of Eden. Most of our hot-house flowers waste their fragrance on the desert air, and the flowering shrubs clothe the hillsides with a beauty which the North cannot conceive. Everywhere may be seen the Oleander in every shade of colour, from white to crimson, while Cacti, Aloes, Bamboo, Night-blooming Cereus, the Passion flower and Honeysuckle find a foothold in the crumbling coral rocks or on the old stone walls which here take the place of Canadian fence rails. Very few of the numerous plants found here are indigenous, but so kindly do importations take to the soil and climate and escape from cultivation, that it is a hard matter to say what is a wild plant. Fain would I dwell on the beauty of the palms and palmettos, on the foliage of the Tamarind or the grand flowers of the Loquat, but space will not allow of this. Adding greatly to the semi-tropical appearance of the islands is the Banana, generally growing in every garden, and its successive bunches of fruit keep on ripening all through the year.

The climate may be styled that of a perpetual spring, the temperature never exceeding 90, and never nearing the freezing point. The air is heavily charged with moisture, and vegetation

is mainly sustained by the dew, which may be seen at sunrise dropping off the leaves. The porosity of the coral rocks retains like a half dry sponge moisture enough for growth. There is everywhere here a remarkable plant known as the Life plant (*Bryophyllum calycinum*), a leaf of which pinned up against a wall throws out rootlets and young plants from each indentation of the margin, these are nourished apparently by the air alone, for which reason the plant is sometimes called the Air Plant.

I have compiled a work entitled "In the Bermudas" dealing with all the fauna and flora of the islands, and containing a large amount of interesting history which will give details of use to naturalists. I only wish the O. F. N. C. could get an outing here, but I fear many of them after a day among the flowers here would feel loath to return to a northern clime.

H. B. SMALL.

Hamilton, Bermuda,
April 12th, 1898.

THE CRETACEOUS OF ATHABASCA RIVER.

By J. B. TYRRELL, M.A., B.Sc., F.G.S., F.G.S.A.

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In the spring of 1893 the writer descended the Athabasca river from Athabasca Landing to Athabasca Lake, on his way to unknown portions of the Barren Lands west of Hudson Bay. The descent of this river was only a preliminary part of the work of the season, to be accomplished with as little delay as possible, so that no stoppages were made except such as were necessary for preparing the meals, pitching camp, examining rapids or making portages.

Besides, Mr. McConnell, of the Geological Survey, had carefully examined the river a few years before, and had given an excellent account of the character and thickness of the rocks which compose its banks.

The rocks first met with below Athabasca Landing are all

of Cretaceous age, and in describing them Mr. McConnell gives a section as follows :

La-Biche Shales, upper	700	Montana.
La-Biche Shales, lower	225	
Pelican Sandstone	40	
Pelican Shales	90	Colorado.
Grand Rapids Sandstone	300	
Chearwater Shales	275	
"Tar Sands"	220	Dakota.

The upper parts of the La Biche shales are thus correlated with the Montana terrane, which corresponds to what is usually known as the Fox Hills and Pierre formations in most of the reports of the Geological Survey of Canada. The lower portion of the La Biche shales, the Pelican sandstone and shales, the Grand Rapids sandstone and the Clearwater shales, were correlated with the Colorado (Niobrara and Benton) terranes, while the "Tar Sands," in which no fossils were found, were provisionally classed with the Dakota.

The observations which it was possible for the writer to make were chiefly confined to the examination of a few horizons in this section and to the collection of fossils at occasional localities, and while they do not add anything to the accuracy of the section in itself, they may add something to our knowledge of the correlation of the beds with those along the Manitoba escarpment in western Manitoba, and they besides indicate the existence in this rather remote northern region of a Dakota fauna of distinctly marine type.

For the provisional generic or specific determination of the fossils, thanks are due to Mr. J. F. Whiteaves, Palæontologist to the Geological Survey, but since many of the species, though determinable, are as yet undescribed, letters of the alphabet have been added to them to designate them more exactly, where it is necessary to speak of their range through different beds.

Sixteen miles below the mouth of La Biche river the Cretaceous shales contain, along with crystals of selenite, many rounded calcareous grains, apparently foraminifera, associated with *Ostræa congesta*, *Baculites ovatus* and fragments of a small gasteropod and of a large aviculoid. They also contain bands of nodules of limestone, many of which are mottled like the

calcareous bands in the Niobrara shale of Manitoba, and contain foraminifera, oysters, gasteropods, &c.

A few miles lower down the stream another outcrop of hard gray mottled shale was observed. It contained, besides the little calcareous dots representing foraminifera, fragments of fish bones, and a few specimens of *Ostræa congesta*, and was thus precisely similar in general appearance to the Niobrara shale of North-Western Manitoba.

The presence of this foraminiferous horizon, with its association of other sossils, would go to confirm Mr. McConnell's conclusions that these lower beds of the La Biche shales are of Niobrara age.

The Pelican sandstones and shales were not closely examined, but as they are evidently poor in fossils, Mr. McConnell having found none in them, they would in that respect, as well as in position, correspond closely with the Benton shales of Manitoba, in which fossils are very rare.

In the Grand Rapids sandstones, at Grand Rapids, a large ammonite was seen, which seemed to be clearly *Hoplites McConnelli*, but it was found impossible to get it out.

An Burnt Rapids the interesting glauconitic band described by Mr. McConnell as occurring in the Clearwater shales (which are everywhere very arenaceous) was carefully examined, and found to be very similar to some rather persistent green bands in the upper portion of the Dakota sandstone along the banks of Red Deer river, and in exposures in the adjoining area of North-Western Manitoba, and the whole bank had very much the general appearance and character of many of the Dakota beds.

At the foot of the bank the following fossils were collected, some of which had already been collected by Mr. McConnell from the same vicinity : *Ostræa congesta*, *Camptonectes* sp. *a*, *Modiola* sp. *a*, *Nucula* like *N. Coloradoensis*, Stanton, *Yoldia* sps. *a* and *b*, *Callista tenuis ?*, *Protocardia boreale ?*, *Panopæa* sp. *a*, *Chemnitzia* like *C. Coalvillensis* Meek, *Actæon* sp. *a*, a gasteropod of uncertain affinities and a conical tooth like that of *Teleosaurus*.

Eleven miles lower down the stream the Clearwater shales were again searched for fossils and the following were found :

Camptonectes sp. *a*, *Yoldia* sp. *a*, *Callista tenuis?*, *Panopæa* sp. *a*, *Dentalium* sp. *a*, *Lunatia* sp. , *Hoplites* like *H. McConnelli*, but with much stronger ribs.

At Boiler Rapids, where the "Tar Sands" first crop out from beneath the Clearwater shales, many masses of rotten ferruginous limestone were lying on the beach, apparently derived from the top of the "Tar Sands." From these were collected *Pecten* sp. *a*, "large, four inches high, and higher than broad, nearly smooth, one valve convex, the other flat" (Whiteaves). A small gasteropod, and a small ammonite. perhaps a form of *Hoplites McConnelli*.

At middle rapid a large number of fragments of ferruginous limestone were lying on the beach, derived from bands in the "Tar Sands." From these were collected specimens of fossil wood· *Pecten* sp. *a*, *Camptonectes* sp. *a*, *Inoceramus* sp., *Modiola* sp. *a*, *Cytherea* or *Cyprina* sp., *Panopœa* sp. *a*, *Dentalium* sp., *Hoplites McConnelli*, and fragments of large dinosaurian bones.

At the head of the bend above Crooked Rapids, a thin band of ferruginous limestone outcrops at the very base of the Tar Sands and from it were obtained a number of specimens of *Pecten* sp. *a*, and fragments of a minute gasteropod.

From the list of fossils above enumerated it will be seen that the fauna of the arenaceous Clearwater shales continues downwards into the conformably underlying "Tar Sands," and as far as could be determined from the few traces of fossils seen in the Grand Rapids Sandstone, it also contains essentially the same fauna.

It is to be noted, that the fauna is marine, and not fresh water, as in the original Dakota of the States to the south.

In lithological character, also, as well as in stratigraphical position, all these beds are very similar to the Dakota Sandstones of Western Manitoba.

The palæontological evidence thus appears to show that it is necessary to modify Mr. McConnell's correlation of the Cretaceous of the Athabasca river to the extent of taking all the beds below the base of the Pelican Shales out of the Colorado Group, and of grouping together the Grand Rapid Sandstone, the Clear-

water Shales, and the "Tar Sands" as one formation. This is a marine formation, stratigraphically equivalent to the Dakota, the fossils of which are practically the same throughout, and although no corresponding marine fossils are known elsewhere in the west, it appears to represent the marine conditions of the Dakota Period.

BIRD MIGRATION 1898.

To the Editor of the Naturalist.

The bird migration of the present spring, so far as it has yet progressed, has developed some features which I think are worthy of note.

The usual course of the migratory movement of the earlier part of the season may be described somewhat as follows:—As soon as the March thaw has made sufficient progress to lay bare a good part of the surface of the ground—say one-third—the earliest of the true migrants begin to arrive. The song sparrow and the robin are generally first, but they are followed in three or four days, if not actually accompanied, by the bluebird and several species of grackle. These are all ground-feeders, at least at this time, for the winter visitants and the storms have stripped the trees and shrubs of the last remains of last season's fruits and seeds, so that the only food supply is that which has lain all winter under the snow. Should the warmth of the sun bring out a few winged insects in sheltered nooks, an odd phœbe will be found looking after them; but he may be considered a venturesome pioneer, while all the other flycatching birds still linger in their winter homes. Probably every individual of these first arrivals will have spent, at least the latter part of the winter in Southern New York or Pennsylvania, for the first two species regularly winter there while the others, though retiring somewhat further south at the commencement of the cold weather, begin to push northward early in February.

Some 10 or 15 days later, say when the snow has almost entirely disappeared from the open fields, we are generally able to record two of our commonest meadow-sparrows, the vesper and the savanna ; and about the same time the whitebellied, or tree, swallow. This latter is the second to arrive of the flycatching birds, and usually appears in compact flocks, even before the ice has entirely withdrawn from the ponds and rivers over which it loves to sport. The three last mentioned species spend the winter in a much more southerly clime than the robin, song sparrow and their companions. According to Chapman (Birds of Eastern N.A.) the tree swallow winters from South Carolina southward, the vesper and savanna from Virginia southward ; and all three usually put in their first appearance at New York city during the first 10 days of April. My own note book, running back to 1889 shows first appearances at Ottawa to range between the following dates :— Robin, 20 March to 7 April ; song sparrow, 24 March to 7 April ; tree swallow, 1 to 22 April ; vesper sparrow, 11 to 22 April ; savanna, 7 to 27 April. Now, the peculiarity of the present year is this : The migratory movement opened rather earlier than usual ; robin, song sparrow and grackle were recorded, as stated in your notes for March, before the middle of that month and by the 20th all were quite common. During the 3 or 4 following weeks the weather was almost continuously warm and springlike, so that by 8th April snow or ice could hardly be found, and winged insects were quite abundant. All conditions seemed to call for the second contingent of migrants ; but one looked in vain for either tree swallow, savanna sparrow or vesper.

The pioneers of the tree swallows only began to be seen on 13 April, those of the savannas on the 16th and the vespers not until the 19th, and even yet (30 April), they cannot be said to be common.

If we search for an explanation of the long delay in the arrival of these somewhat southerly species, I believe it will be found in the peculiar weather conditions of the country immediately north of their winter home. While we in Ontario and Quebec, in common with the state of New York, have been enjoying unusually mild weather through March and April, the people

living 500 miles south of us have had a season of marked severity. On 5th and 6th April, a snowstorm followed by frost visited Maryland, Virginia and Tennessee, and inclement weather seems to have prevailed in that region, more or less, throughout the spring. This state of things has no doubt formed a barrier which southern birds have not cared to pass through, although the weather further north was such as they would have delighted in had they only pushed on far enough and fast enough.

In this connection let me allude to one item in your notes for March which, with due regard for the observer, seems to me almost incredible. I refer to the record of a wood pewee on 28th March by Dr. Fletcher. This species spends the winter in Central America ; Chapman gives 10 to 20 May for its usual arrival at New York. Ottawa records since 1890 vary between 13 and 24 May. In view of the late arrival of all other insect-feeders this year, one cannot help doubting the identification of this solitary wood pewee.

A. G. KINGSTON.

Ottawa, 30th April.

ORNITHOLOGY.

Edited by W. T. MACOUN.

The weather during most of the month of April has been cool, the nights being especially so, with the result that the birds did not arrive in large numbers and those that came did not show themselves very openly. Many birds which, after a warm night, are so full of song in the early mornings at this time of year, are almost silent. On the 19th of April there was quite a chorus of melody from a flock of vesper sparrows at the Experimental Farm, but they must have caught cold for they have been very quiet ever since. A few purple finches, during the last week of the month, helped to dispel by their full, sweet notes, the almost universal gloom which seems to have fallen over bird life.

BIRDS' NESTS.—Northern Shrike *Lanius borealis.* Two

nests of this bird were found by Mr. Richard Shillington at City View. There were four eggs in each nest. Eggs probably a week in incubation. Nests were in cedars, about seven feet from the ground. The eggs were presented to the Geological Survey by Mr. Shillington.

BROAD-WINGED HAWK.—Nest seen by Miss Harmer on the 22rd, in an elm tree thirty feet, from the ground. She was unable to discover whether eggs had been laid.—W.T.M.

SEMI-ALBINO SONG-SPARROW.—Mr. C. H. Young, of Hurdman's Bridge, has shown me a very beautiful specimen of a male song-sparrow, which he shot this spring (March 26th) near his house. The head and shoulders are white, as is the whole lower surface with the exception of the patch of feathers on the breast, In this specimen these feathers are darker than usual. The wing coverts and secondaries are beautifully and symmetrically marked with brown and white Primaries white. Tail and tail coverts brown. The specimen has been beautifully mounted by Mr. Young, who is a skilful taxidermist, and will be exhibited at one of the evening meetings next winter.—J.F.

NOTE.—Owing to lack of space "Bird Notes for April" have been held over till the next number.—EDITOR.

SUGAR: ITS CHEMISTRY AND MANUFACTURE.

The honour of delivering a popular lecture at the recent convocation of Queen's University was conferred upon Dr. Adolf Lehmann, who for several years was Assistant Chemist of the Experimental Farms, and therefore personally well known to many of our Ottawa members. Since his return from Leipzig, Dr. Lehmann has been lecturing on organic chemistry and allied branches at Queen's University, and the esteem in which he is held there is evidenced by the fact that he was this year chosen to give the annual lecture in connection with the closing exercises.

Dr. Lehmann took for his subject, Sugar, treating it historically, commercially and chemically. His special research work

on sugars in Louisianna and subsequent investigation pursued in the laboratories at Leipzig, eminently qualified Dr. Lehmann to speak with authority on this interesting and important subject. The Toronto *Globe* of 26th April, devotes two columns to an account of the lecture, which evidently was a most successful effort and one highly appreciated by the large audience that greeted this talented Canadian Chemist.

THE WALKER GRAND HONORARY PRIZE.

The members of the Ottawa Field-Naturalists' Club will learn with pleasure of the great honour which has just been conferred upon our friend Dr. S. H. Scudder, the eminent Entomologist and Palæontologist of Cambridge, Mass., by the Boston Society of Natural History unaminously awarding to him the Walker Grand Honorary Prize. The following data with reference to this prize have been kindly supplied by Mr. Samuel Henshaw, of Cambridge, Mass.:

"The Walker Prizes are awarded from funds given in 1864 to the Boston Society of Natural History by the late William Johnson Walker of Newport, R.I. In addition to the annual prizes given for memoirs or subjects proposed, the Walker foundation allows the Council of the Society to award not oftener than once in five years a Grand Honorary Prize. For this Grand Honorary Walker Prize the Council may award the sum of five hundred dollars for such investigation or discovery in natural history as may seem to deserve it, provided that such investigation or discovery in natural history shall have first been made known and published in the United States of America, and at the time of said award shall have been made known and published at least one year; if, in consequence of the extraordinary merit of any such investigation or discovery, the Council of the Society shall see fit, they may award therefor the sum of one thousand dollars.

"The award of the maximum sum, one thousand dollars, on

the 20th of April last, to Dr. Scudder for his contributions to entomology, is the fifth award made.

"The prize was first given in 1873 to Dr. Alexander Agassiz for his work on the embryology, geographical distribution and natural history of Echinoderms; second in 1880, to Prof. Joseph Leidy for his prolonged investigations and discoveries in zoology and palæontology; third in 1884, to Prof. James Hall for his work on North American palæontology; and fourth in 1892, to Prof. James D. Dana for his distinguished services in natural history."

ZOOLOGICAL NOTES.

Edited by Prof. E. E. PRINCE.

THE FIRST BAT OF THE SEASON.—On March 1st, at about 9 o'clock in the evening, a small bat was seen flying at the corner of Elgin and Sparks Streets, high above the heads of the crowd that had collected there to hear the results of the Ontario elections. The day had been bright and mild, but so early an appearance of a bat may have been due primarily to the unusual noise and light in the street below.—LAWRENCE LAMBE.

FIRST GENERAL EXCURSION OF THE SEASON.

The Council have arranged to hold the first General Field-Day of the season at Chelsea, the date and time being announced on the cover of this number. We feel sure from past experience of a large attendance. The charms of this lovely locality, so prolific in all objects of interest to naturalists, have always had a special attraction for our members and their friends. Most of the leaders have expressed their intention of being present, so there will be plenty of assistance for those desirous of it, for the naming of specimens, etc. Students of the Normal School and other educational institutions in the city are warmly invited to join the Field-Naturalists on this occasion, when as usual, all students and teachers will be supplied with tickets at club rates. The train leaves C. P. R. Depot at 1.30 p.m.

SUB-EXCURSIONS.

No. 1. The first Sub-Excursion of the season was held on Saturday afternoon, April 16, to Rockcliffe. The President Prof. Prince and Messrs. Wilson, Halkett and Fletcher, were present as leaders. The party was rather small, but a most enjoyable and instructive afternoon was spent in the woods at Rockcliffe, around Hemlock Lake and at Beechwood. Flowers were few but on sheltered warm knolls, particularly near the gates of Beechwood cemetery, several kinds of flowers were found. Mr. Wilson explained the nature of the rocks found *in situ* as well as of the various boulders observed. Mr. Halkett captured many a hapless insect, spider, or reptile, and descanted admiringly on their beauties. Dr. Fletcher drew attention to the staminate and pistillate flowers of the hazel, poplars and red maples. On one tree of aspen both staminate and pistillate flowers were found. This is an unusual occurrence. Owing to the remarkably early season, many plants were found in blossom which, as a rule, do not occur till much later in the season. The swamp alder, the silver and red maples, the American elm, the aspen and the large-toothed aspen were in full flower. The hazel catkins were shedding their pollen and the little crimson tufts of pistillate flowers were very conspicuous. At Rockcliffe, fresh green fronds were found of *Polypodium vulgare* and *Aspidium marginale*, which had passed the winter beneath the snow. *Capsella Bursa-pastoris* caught by the winter before it had expanded its flowers, now pushed up its head again, to go on with its work of life after 6 months' sleep. On the sunny knoll near Beechwood, *Hepatica acutiloba* with pink, blue, and white flowers was found in profusion, together with *Claytonia Caroliniana*, one or two fully expanded flowers of *Erythronium Americanum* and sturdy clumps of *Caulophyllum thalictroides*. One or two less advanced but open flowers of *Uvularia grandiflora* and *Dicentra Cucullaria* were also found and red and white trilliums just opening. In the swamp at the foot of the hill *Salix discolor* was in full bloom. In all 18 different plants were collected in flower, a surprising number for the 16th of April.—J. F.

No. 2.—To the Beaver Meadow, Hull, was held on Saturday, April 23. About forty members and their friends were present at this excursion, under the leadership of Prof. Macoun, Mr. Kingston, Mr. Sinclair and Mr. Wilson. Mr. Sinclair was accompanied by quite a number of Normal School students. The weather was very fine, but the season was found to be considerably later than on the warm bank at Beechwood a week earlier. Very few flowers were found, except hepaticas, which were at their best. About five o'clock the excursionists met on the top of the hill, and Prof. Macoun spoke on the flowers of trees, showing that those with pistils and stamens on different trees were passing away, while those with perfect flowers were geologically young. He also said a few words on lichens, fungi and mosses. Mr. Kingston was asked to speak on birds, but said that he had seen practically nothing during the afternoon worth mentioning. The afternoon's ramble through the woods was thoroughly enjoyed by all present. There is never a lack of objects of interest to lovers of nature, The trees with their various branching habits, the formation of the swelling buds and and gnarled trunks can be studied to better advantage at this time of the year than at any other.—M. I. W.

No. 3.—To Beechwood, April 30. Upwards of 40 ladies and gentlemen took part in this Sub-Excursion. *Erythronium Americanum* was found profusely in perfect condition, as well as most of the the flowers found April 16. The new arrivals since that date were *Viola Selkirkii*, *Waldsteinia fragarioides* and *Dicentra Canadensis*. *Dentaria laciniata* had been found by Miss Marion I. Whyte a few days earlier. Beechwood is one of the two localities where this plant, locally so rare, is found.—J. F.

SUB-EXCURSIONS FOR MAY

No. 1.—May 7. Bank Street Bridge, for Dow's Swamp and Billings Bridge.

No. 2.—May 14. New Edinburgh.

May 21—GRAND GENERAL EXCURSION TO CHELSEA, 1.30 p.m.

No. 3.—May 28. Aylmer.

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