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THE OTTAWA NATURALIST.

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THE OTTAWA NATURALIST.

VOL. XIII.

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No. 3.

OTTAWA COLEOPTERA—CERAMBYCIDÆ.

By W. HAGUE HARRINGTON, F.R.S.C.

A list of one thousand Ottawa Coleoptera was published in Transactions, Vol. II, pp. 67-85, 1884, but the number of species now known is probably nearly 50 per cent greater. The majority of the additions, however, have been of small or inconspicuous beetles, or of those belonging to groups which require special methods of collecting. In view of the more extended knowledge of our fauna, it is proposed to offer from time to time lists of the families which appear to be most fully determined. The Cerambycidæ have been selected for the first paper of the series, as in the fifteen years which have elapsed but few changes or additions have been made; the number has only increased from 106 to 113, and but few additional species are likely to be found here.

The Cerambycidæ, or Longicorn Beetles, are always favorites with Coleopterists as they vary remarkably in size, structure and ornamentation, and include many very beautiful insects. Our species do not equal either in size or decoration those of more tropical climates, nor even such beetles as *Ergates spiculatus* Lec. and *Rosalia funebris* Mots. which occur in British Columbia, but we have still some large and handsome forms. The Cerambycids are also of special interest from the fact that, in the larval stage, they subsist invariably upon the woody tissues of plants, and that many of the species are, therefore, included among injurious insects. These, however, are such as attack the trees and shrubs of which man desires to appropriate to his own uses the fruit or other products, or which he plants for shade or ornament. Apart from such economic considerations, the work performed by these wood-eating insects contributes largely to

the removal of dead and fallen timber, and to its replacement by a fresh growth. Comparatively few of the species, probably, attack perfectly vigorous plants, but the injured, dead and fallen individuals are soon thoroughly infested. The eggs laid in crevices of the bark, or in incisions made specially therein, soon produce the grubs which, burrowing first in the juicy outer layer beneath the bark, gradually, as they increase in size, penetrate deeper into the wood, and before they reach maturity many of the species bore long tunnels deep into the trunks even of large trees. These tunnels receive and retain moisture and in them fungi find a foothold, and they thus become centres of disintegration and decay.

In the classification of the Coleoptera of North America, by Leconte and Horn, three subfamilies are recognized and are separated as follows :

Frothorax margined, labrum connate.

PRIONINÆ.

Prothorax not margined, labrum free.

Front tibiæ not grooved.

CERAMBYCINÆ.

Front tibiæ grooved.

LAMIINÆ

Of the PRIONINÆ we have only two representatives, viz. *Orthosoma brunneum* Forst. and *Tragosoma Harrisii* Lec. The former is slightly the largest, attaining a length of 1.5 inches. It is a smooth, brownish beetle with stout antennæ, and the short thorax is armed on each side with three teeth. *T. Harrisii*, while hardly so long, is broader and more robust, darker in colour and with densely hairy thorax and striated elytra. These beetles both infest pine, although the grubs of the former at least are occasionally found in other trees.

The second sub-family, CERAMBYCINÆ, contains the majority of our species, although many of its tribes are not represented in our fauna.

Tribe I, Asemini, is represented by three genera, *Aseum*, *Criocephalus* and *Tetropium*, each represented by one species.

These are rather softish beetles of dull black or brownish colour, infesting pines, and probably other conifers. *Tetropium* can be readily recognized by the divided eyes.

Tribe II, Callidiini, has seven genera represented; the eleven

species being of medium or small size. The most conspicuous is *Physocnemum brevilineum* Say, a handsome beetle over one half of an inch long; the thorax is globular, with a conical protuberance on each side near base; the general colour is black, but the elytra are varied centrally with brown and have several short ivory-white lines; the thighs are very conspicuously swollen, as in many insects of this group. The last genus *Callidium* contains two fairly common species of broader shape; the larger, *C. antennatum* Newm., half an inch long, is a fine purplish blue; the smaller, *C. janthinum* Lec., from one-quarter to two-fifths of an inch long, is a bright bronze-green, or occasionally bronze.

Tribe III. Cerambycini is here represented by the solitary genus *Elaphidion* with two species considered by some authorities identical. These are cylindrical beetles, reddish or brownish, and more or less clothed or mottled with pale pubescence. These beetles are known as Oak-pruners, because the grubs which live in the twigs and branches of the oaks so form their burrows as to cause the portion of the limb in which one lives to break off and drop to the ground in autumn; the beetle emerging the following season.

Tribe IV, Obriiini, is represented by three species belonging to as many genera. *Obrium rubrum* Newm. is a delicate yellowish-red beetle about one-fourth of an inch long. *Morlorchus bimaculatus* Say and *Callimoxys sanguinicollis* Oliv. are readily recognized by their abbreviated elytra; the latter is the larger and usually has a red thorax.

Tribe IX, Trachyderini, contains here only *Purpuricenus humeralis* Fab., which is one of our handsomest beetles. It is nearly three-fourths of an inch long; colour rich velvety black, with a triangular vivid red patch on the shoulder of each elytron.

Tribe XI, Clytini, represented by nine genera with thirteen species, contains some of our finest longicorns. The most conspicuous is *Plagionotus speciosus* Say, a well-known Mapletorer. This fine insect is about an inch long and of robust shape;

rich black with bright yellow markings ; one of the yellow bands across the elytra is shaped like a W ; the legs are also yellow but the antennæ are black. When flying this beetle much resembles a big wasp and I have seen persons, near whom one has happened to circle in its flight, very much afraid of being stung by it. *Calloides nobilis* Say is almost as big, but is more sombre in appearance, being entirely black, except the markings on elytra, which sometimes are reduced to a few yellow spots. *Cyllene robinia* Forst., slightly smaller, is a very wasp-like looking species with numerous transverse yellow bands, and red legs and antennæ. It is one of our most obnoxious cerambycids, as its grubs bore and tunnel in the Locust-trees to such an extent as to have killed nearly all such trees in the city. *Arhopalus*, *Xylotrechus*, *Neoclytus* and *Clytanthus* contain species of moderate size with more elongated thorax, and more cylindrical in shape. They are generally more or less banded with white or yellow. *Microclytus*, *Cyrtophorus* and *Eudercus* are somewhat ant-like in form, especially the second, whose representative, *C. verrucosus* is a common species.

Tribe XIII, *Atimiini*, has one representative of rare occurrence, viz. *Atimia confusa* Say, a pale brownish beetle about one-third of an inch long, mottled with pale pubescence.

Tribe XV. *Desmocerini*, has as its representative here *Desmocerus palliatus* Forst., perhaps the most brilliant of our longhorns, although, unfortunately, it loses in the cabinet a certain degree of its beauty by fading. When sunning itself upon the elder-bushes in midsummer it is a very striking and beautiful insect. Its general colour varies from a rich purplish-blue to steel-blue, and a broad yellow band across the base of the elytra gives to it the appropriate name of the Cloaked Beetle.

Tribe XVII, *Encyclopiini*, contains one slender bluish species, *E. cæruleus* Say, which is very rare in this locality.

Tribe XVIII, *Lepturini*, is the one best represented, as we have ten genera with thirty species. These are usually of moderate size, and none are very small. *Rhagium lineatum* Oliv. differs from most of our cerambycids in having the antennæ quite short,

reaching only to the base of the wing-covers. It is a greyish beetle, rather stoutly built, with costate elytra and a spine on each side of the thorax. The most attractive species is *Anthophilax malachiticus* Hald., of a brilliant green. It is usually very rare, but Dr. Fletcher had the good luck to capture five examples one day last summer, and stray individuals have been taken on other occasions at Buckingham and Chelsea. Another pretty green beetle, smaller and more highly polished, is *Gaurotes cyanipennis* Say, which is at times quite common. The majority of our species belong to the genus *Leptura*, some of which are prettily banded with yellow, or otherwise ornamented. A common species is *L. canadensis* Fab., which is black with red shoulders. The forms of this species with all red or all black elytra (*erythroptera* and *cribrata*) have not yet been found here. One of our largest and most abundant species is *L. proxima* Say, a robust black beetle with yellow elytra tipped with black. *L. chrysocoma* Kirby is smaller and easily distinguished by its golden pubescence.

Our remaining forty odd species belong to the sub-family LAMIINÆ, in which again we find many tribes unrepresented in our fauna.

Tribe V, Psenocerini, contains only one species, *Psenocerus supernotatus* Say, a little cylindrical brownish beetle, with four oblique white marks on elytra, it varies in length from one-tenth to one-fourth of an inch; its larvæ feed in the stems of currant-bushes, etc., and it is known as the American currant-borer.

Tribe VI, Monohammi, is represented by three genera with seven species. Of the four species of *Monohammus* which infest our pines, *M. confusor* Kirby, is probably familiar to all Ottawa citizens, and it is sometimes referred to as the "Ottawa Cow." It is over an inch long, and while the antennæ of the female are not much longer than the body, those of the male reach the length of three inches. These long antennæ and the long legs make of one of these beetles a very conspicuous object. This species is very destructive to pine timber or logs; the grubs being very large and with their powerful jaws bur-

rowing rapidly through the wood. On a still day, in the vicinity of logs infested by these grubs, one can hear at a considerable distance the noise they make in driving their tunnels. *M. scutellatus* Say, a smaller black species, is also very common and destructive. *Goes pulverulenta* Hald. is a fine brownish beetle, with sparse whitish pubescence, of which I have beaten a few specimens from hickory. *G. oculata* Lec. is much smaller and has a black spot on each elytron.

Tribe VII, Acanthoderini, offers seven genera with fifteen species, principally small insects of rather flattened appearance and with long slender antennæ. Their general colour is greyish, varied with markings or tufts of white or dark pubescence. None of the species are so conspicuous as to attract attention from non-entomologists.

Tribe IX, Pogonochri, is represented by three genera with six species which are also all rather small and inconspicuous, though showing somewhat more variety in their colour and decoration.

Tribe XIV, Saperdini, has only one genus, but this contains ten species, including some of our most important longicorns. *Saperda calcarata* Say, fully an inch long and prettily mottled with yellowish pubescence, is known as the Poplar-borer. *S. candida* Fab., with two bold longitudinal white stripes, is the Apple-borer so destructive in some parts of America, but which here occurs usually on Hawthorn or Shadbush, and, curious to say, seems confined to the Quebec side of the river. *S. vestita* Say, clothed with dense yellowish pubescence and usually with six small black dots on elytra, is the common Basswood-borer. One of the prettiest species is *S. puncticollis* Say, in livery of black and yellow, with four conspicuous black spots on the yellow thorax. This species bores in the stems of Virginia Creeper, and last season Mr. Fletcher obtained numerous specimens and found that the beetles, after emerging from the stems, fed upon the leaves, which they riddled with holes.

Tribe XV, Phytæciini, concludes our series with two genera. *Obera bimaculata* Oliv., an elongate cylindrical beetle, black with

reddish thorax and short legs, is the well-known Raspberry-girdler. It deposits its eggs in the tops of raspberry canes and causes them to wither and die. Our last beetle, *Tetraopes tetraophthalmus* Forst., has a name whose pronunciation might form a good test of a man's sobriety. It is a bright red beetle with black legs and antennæ, and with four black spots on thorax and six on elytra. It occurs abundantly upon milk weeds, and its larvæ find their subsistence in these plants. The following species which appeared in my former list have been dropped.

Elaphidion incertum Newm. A mutilated specimen, found in my wood-shed, but as head and thorax are missing its identification is uncertain.

Neoclytus caprea Say. Incorrectly determined specimens of our common *Xylotrechus undulatus* Say.

Leptura abdominalis Hald. A beetle given to Dr. Leconte and doubtfully so named by him; probably a form of *L. plebeja* Rand; or *L. subhamata* Rand.

Monohammus maculosus Hald. Through a clerical error this name was inserted instead of *M. titillator* Fab.

Lepturges facetus Say. The beetles so determined belong to *L. quercu* Fitch.

Liopus cinereus Lec. This species is now placed with *L. alpha* Say.

The following species represent the additions made to this family during fifteen years, and a large proportion of them are captures of Mr. W. Simpson.

Rhopalopus sanguinicollis Horn.

Phymatodes amoenus Say.

Xylotrechus quadrimaculatus Hald.

Encyclops cœruleus Say.

Anthophilax malachiticus Hald.

Gaurctes abdominalis Bland.

Typocerus zebtratus Fab.

Leptura lineola Say.

Leptura biforis Newm.

Leptura sanguinea Lec.

Leptostylus collaris Hald.

Saperda puncticollis Say.

Although, as previously stated, but few additional species are likely to reward the collector, many of those on the list are so poorly represented in our cabinets that additional material is most desirable. We are also ignorant of the plants attacked by many of these beetles and the life-histories of even the commoner

species are often but poorly known. Records of the trees and shrubs upon which the beetles occur are always valuable, and especially so if it be ascertained that they have emerged from such plants, or if they are bred from them. By carefully examining injured or fallen trees these beetles may often be found, or their larvae and pupæ be obtained. Many species also occur during the summer upon flowering plants, especially trees and shrubs, such as Elder, Sumach, Goldenrod, Spiræa, etc. The smaller species, as well as some of the larger, may be most successfully obtained by using a beating-net under the branches of such trees as they infest. While nearly every tree and shrub is attacked by one or more species, the Maples, White Pine and Hickory are most subject to their depredations.

The following is a catalogue of our species:—

OTTAWA CERAMBYCIDÆ.

1. *Orthosoma brunneum* Forst. Rather common; infests Pine logs and stumps.
2. *Tragosoma Harrisii* Lec. Rarer; also infests Pine.
3. *Asemum moestum* Hald. Abundant; in millyards and about Pine timber.
4. *Criocephalus agrestis* Kirby. Very common; also a Pine-borer.
5. *Tetropium cinnamopterum* Kirby. Rare; probably infests conifers.
6. *Gonocallus collaris* Kirby. One specimen.
7. *Physocnemum brevilineum* Say. Not common; bred by Dr. Fletcher from Elm.
8. *Rhopalopus sanguinicollis* Horn. One taken on Apple at Kingsmere by Mr. Simpson.
9. *Hylotrupes ligneus* Fab. Common; inhabits the Cedar.
10. *Phymatodes thoracicus* Muls. Several bred one year by Dr. Fletcher from hoops of wine cask; possibly not native.
11. *Phymatodes amœnus* Say. One specimen received from Dr. Fletcher.
12. *Phymatodes dimidiatus* Kirby. Not common; occurs upon the White Pine.
13. *Merium proteus* Kirby. Rare here; appears to be more common northward.
14. *Callidium antennatum* Newm. Rather common; infests the Pine.
15. *Callidium janthinum* Lec. Less abundant; is a borer in Cedar.
16. *Callidium æreum* Newm. One specimen, from Dr. Fletcher.
17. *Elaphidion parallelum* Newm. Rare; this beetle is an Oak-pruner.
18. *Elaphidion villosam* Fab. One specimen. Some authors make this a form of the preceding.

19. *Obrium rubrum* Newm. One on Hickory and one on Scented Raspberry.
20. *Molorchus bimaculatus* Say. Abundant; infests Hickory and Maple.
21. *Callimoxys sanguinicollis* Oliv. Rare; no record of habits.
22. *Purpuricenus humeralis* Fab. One female taken on fence under Oak-tree near Rideau Hall and one male picked up on Sparks St. Two specimens have also been taken by Mr. Simpson at Kingstmere.
23. *Cyllene robinia* Forst. Abundant; a borer in Acacia and exceedingly destructive to that fine ornamental and shade tree.
24. *Plagionotus speciosus* Say. Not very common; bores in Maples.
25. *Calloides nobilis* Say. More abundant; also a borer in Maple.
26. *Arhopalus fulminans* Feb. Rare; no observation on habits.
27. *Xylotrechus colonus* Fab. Not common; occurs on dead Hickory.
28. *Xylotrechus sagittatus* Germ. Rare; probably also infests Hickory.
29. *Xylotrechus quadrimaculatus* Hald. One specimen captured upon Beech.
30. *Xylotrechus undulatus* Say. Abundant; probably infests Pine and Spruce.
31. *Neoclytus muricatus* Kirby. Two specimens; one of which was taken upon an old Pine.
32. *Neoclytus erythrocephalus* Fab. Common; upon felled Hickory, end of July.
33. *Clyanthus ruficola* Oliv. Common; upon Basswood stumps.
34. *Microclytus gazellula* Hald. One specimen upon Sumach flowers.
35. *Cyrtophorus verrucosus* Oliv. Abundant on flowering shrubs in May and June; occurs on Oak and Hickory and one was found under bark of Beech.
36. *Eudermes picipes* Fab. Rare; on Hickory and on Sumach blossoms in July.
37. *Atimia confusa* Say. Rare; upon White Pine.
38. *Desmocerus palliatus* Forst. Common; bores in stems of Elder.
39. *Eucyclops cæruleus* Say. Very rare; no record as to habitat.
40. *Rhagium lineatum* Oliv. Not common; lives under bark of Pine.
41. *Centrodera decolorata* Harr. Two specimens upon Oak. Mr. Simpson has also beetles taken in an orchard at Kingstmere where they occurred in abundance upon Apple.
42. *Toxotus Schaumii* Lec. Two specimens; one was upon Beech.
43. *Toxotus vittiger* Rand. Common at Casselman upon Oaks in June.
44. *Pachyta monticola* Rand. Not common; taken upon Elder flowers, etc. in May at Kingstmere and other places in the hills.
45. *Anthophilax malachiticus* Hald. Rare; seems to occur upon Birch and Beech.
46. *Anthophilax alternatus* Hald. Two specimens; one in a decaying Beech.
47. *Achmæops proteus* Kirby. Very abundant in Lumber-yards and upon Pine.
48. *Achmæops pratensis* Laich. Also abundant in similar conditions.
49. *Gaurotes cyanipennis* Say. Abundant; especially on Sumach flowers in July; infests Butternut.

50. *Gaurotes androminalis* Bland. One specimen captured at Kingsmere by Mr. Simpson; evidently very rare and as far as I know not recorded from Canada.
51. *Bellamira scalaris* Say. Rare; observed ovipositing in Maple Stumps, and also dug from burrow in old poplar log.
52. *Typocerus zebratus* Fab. Common on Goldenrod and Spiraea in August.
53. *Typocerus velutinus* Oliv. Abundant on flowering shrubs in early August, and has also been taken upon Hickory.
54. *Leptura plebeja* Rand. Very rare.
55. *Leptura subhamata* Rand. Rare; occurs on Beech and Oak.
56. *Leptura lineola* Say. Four specimens captured at Kingsmere by Mr. Simpson.
57. *Leptura capitata* Newm. Common; on flowers of Spiked-maple, etc.
58. *Leptura exigua* Newm. *Leptura saucia* Lec. of former list. Common; on Sumach and other shrubs in blossom.
59. *Leptura zebra* Oliv. Only three or four specimens.
60. *Leptura sexmaculata* Linn. Rare; on flowers of Spiraea, etc.
61. *Leptura nigrella* Say. Rare; habitat unknown.
62. *Leptura canadensis* Fab. Abundant; upon flowering shrubs end of July, especially upon Spiraea; one taken upon Ash.
63. *Leptura sanguinea* Lec. Very rare; June, habits unknown.
64. *Leptura chrysocoma* Kirby. Rare; probably infests Hickory and Bitternut.
65. *Leptura proxima* Say. Abundant; occurs upon dead Hickory.
66. *Leptura biforis* Newm. One specimen in Mr. Simpson's collection.
67. *Leptura vittata* Germ. Abundant; flowering shrubs in June.
68. *Leptura pubera* Say. Also rather common in June.
69. *Leptura sphaericollis* Say. Only one specimen.
70. *Leptura mutabilis* Newm. Abundant; form with pale elytra the less common
71. *Psenocerus supernotatus* Say. Common; bred by Dr. Fletcher from Virginia Creeper.
72. *Monohammus titillator* Fab. Not common; formerly taken upon young Pines at Hull quarries.
73. *Monohammus scutellatus* Say. Abundant; destructive to Pine logs and timber.
74. *Monohammus confusor* Kirby. Abundant; the largest and most destructive of our Pine-borers, doing great damage to logs and timber; attacks living as well as dead trees.
75. *Monohammus niarmorator* Kirby. Only one male captured here; more common further up the river where there is more Red Pine.
76. *Dorcheschema nigrum* Say. Abundant; upon felled Hickory or old trees in June.
77. *Goes pulverulenta* Hald. Rare; beaten from injured Hickory in July.

78. *Goes oculata* Lec. Two specimens taken on felled Hickory.
79. *Acanthoderes diciptens* Hald. Not common.
80. *Leptostylus aculiferus* Say. Two specimens; upon Butternut.
81. *Leptostylus parvus* Lec. Very rare; place of capture not recorded.
82. *Leptostylus sexguttatus* Say. *Leptostylus commixtus* Hald. of former list. Rare. Probably from Hickory.
83. *Leptostylus perplexus* Hald? One specimen; determination doubtful.
84. *Leptostylus macula* Say. Common; June and July; most frequently on Hickory and Butternut, but has been also taken on Maple and Poplar.
85. *Leptostylus collaris* Hald. One specimen; probably from Hickory.
86. *Liopus alpha* Say. *Liopus cinereus* Lec. of former list is now included in this species. Common; on Hickory in midsummer.
87. *Liopus punctatus* Lec. Two specimens; accidental captures.
88. *Lepturges symmetricus* Hald. *Lepturges angulatus* Lec. of former list. No record of habits.
89. *Lepturges signatus* Lec. Very rare. No record of habits.
90. *Lepturges querci* Fitch. *Lepturges facetus* Say of former list belongs to this species. Common; usually on Hickory, one from Willow.
91. *Hyperplatys aspersus* Say. Common; upon Hickory, June and July.
92. *Hyperplatys maculatus* Hald. Common; with preceding, and is probably only a form of *aspersus*.
93. *Graphisurus fasciatus* Deg. Abundant; infests Hickory and Maple.
94. *Acanthocinus obsoleteus* Oliv. Also common; occurs with preceding.
95. *Hoplosia nublia* Lec. Rare; June, no record of infestations.
96. *Pogonocherus penicellatus* Lec. Several specimens taken on fences and tree boxes in the city; also one upon dead Pine.
97. *Pogonocherus inixtus* Hald. Not common; no record of infestation.
98. *Eupogonius tomentosus* Hald. One specimen.
99. *Eupogonius vestitus* Say. Two specimens; taken also by Mr. Simpson.
100. *Eupogonius subarmatus* Lec. Rare; on Scented Raspberry and on Ash.
101. *Saperda calcarata* Say. Rare; a destructive borer in Poplars.
102. *Saperda mutica* Say. Rare; on Willow; one pair June and one pair July.
103. *Saperda candida* Fab. Not common; occurs upon Hawthorn, Shad-bush and wild Plum.
104. *Saperda vestita* Say. Abundant; a borer in Basswood.
105. *Saperda discoidea* Fab. Common; June to August on fallen and dead Hickory.
106. *Saperda tridentata* Oliv. Abundant; infests principally the Elm, but also the Maple.
107. *Saperda lateralis* Fab. Two specimens; accidental captures.

108. *Saperda puncticollis* Say. Rare; bores in stems of Virginia Creeper.
 109. *Saperda mœsta* Lec. Common; Poplars often badly disfigured by the gall-like swellings caused by the larvae infesting the branches.
 110. *Saperda concolor* Lec. One specimen. Habits not recorded.
 111. *Oberea bimaculata* Oliv. Not common; infests Raspberries. The female girdling the canes when ovipositing, and the larvæ boring in canes.
 112. *Oberea tripunctata* Swed. *Oberea amabilis* Hald. of former list. Common; upon Goldenrod and probably boring in that plant.
 113. *Tetraopes tetraophtalmus* Forst. Abundant; upon Milkweed, in the base of which the larvæ subsist.

ON REPTILIAN REMAINS FROM THE CRETACEOUS OF NORTH-WESTERN CANADA.

By LAWRENCE M. LAMBE, F.G.S.

The collection of fossils made by the writer during the summers of 1897 and 1898 from the Cretaceous rocks of the Red Deer River, in the Districts of Alberta and Assiniboia, consist principally of dinosaurian remains, but include also the remains of turtles and crocodiles as well as a few fish vertebræ and scales, leaves and silicified wood.*

The rocks exposed along the Red Deer River are those of the Belly River, Pierre and Laramie formations, but by far the larger number of fossils were secured from the Belly River beds which are especially interesting as representing a terrestrial fauna separated from that of the Laramie by the thick marine beds of the Pierre.

Taking into consideration the reptilian remains only, it is found that they represent the three orders *Chelonia*, *Crocodylia* and *Dinosauria*.

I. The following provisional enumeration may be made of the fossils from the Belly River formation:—

1. *Chelonia*—

Plastomenus coalescens, Cope. Parts of the dorsal and ventral shields.

*Vide Summary Report of the Geological Survey Department for 1898.

Also fragments of shell that may represent other species, as well as vertebræ, terminal phalanges and numerous other bones of the endoskeleton of turtles.

Besides the above, small pieces of the plastron of *P. coalescens* were collected in 1882 by Mr. R. G. McConnell from the Belly River beds of this district.

2. Crocodilia—

Portions of the rami of mandibles of a species of *Botrosaurus*, Agassiz, probably *B. ferrugosus* described by Cope from the Fort Union (Laramie) group of Colorado.

3. Dinosauria—

a. Trachodon mirabilis, Leidy. Numerous maxillæ and rami of mandibles, in some cases with the teeth particularly well preserved, as well as a large number of the principal bones of this species.

Near the mouth of Berry Creek a large horn-core, one foot long and nearly five inches in diameter at the base to which a small part of the skull remained attached, was found with parts of a maxilla holding teeth of the *Trachodon* type. The horn-core is asymmetrical, and suggests the presence of a pair of well developed horns in the species of *Trachodon* here represented, probably that of *T. mirabilis*, Leidy, which with its allies have been supposed to be hornless.

b. A maxilla with teeth, a separate tooth and a right ramus, of a species of *Triceratops*, Marsh.

c. Separate teeth and terminal phalanges of *Laelaps incrasatus*, Cope.

d. The upper part of the cranium and a number of dermal plates of a species of *Nodosaurus*, probably *N. textilis*, Marsh.

II. The more important specimens from the Laramie series consist almost entirely of dinosaurian remains and are more fragmentary and not so numerous as those from the Belly River beds:—

1. The order *Chelonia* is not represented in the collections from the Laramie of this district, but fragments of a plastron, probably referable to *Plastomennus coalescens*, Cope, were found in

1881 by Dr. G. M. Dawson in the Willow Creek (Laramie) beds of the Oldman River, Alberta.

2. No crocodilian remains were found.

3. Dinosauria—

a. Most of the dinosaurian bones are thought to belong to *Trachodon mirabilis*.

In 1881 Mr. T. C. Weston secured fragments of jaw with teeth, of *Trachodon mirabilis*, from the Laramie of the Red Deer River, and in 1882 Mr. R. G. McConnell obtained a well preserved femur, from the Laramie of Scabby Butte, Alberta, that appears to belong to the same species.

b. Other dinosaurian remains from the Laramie of the Red Deer River in the collection of the Survey are a skull of *Laelaps incrassatus*, Cope, found by Mr. J. B. Tyrrell in 1884, and another skull of the same species collected in 1889 by Mr. Weston.

From a comparison of the reptilian remains from the Belly River beds with those from the Laramie, it would appear that there are three species common to both formations, *viz.*, *Plastomenus coalescens*, Cope, *Trachodon mirabilis*, Leidy, and *Laelaps incrassatus*, Cope, also that these are the three forms most abundantly represented in the collection. Remains of *P. coalescens* seem to be not uncommon in both formations, those of *T. mirabilis* are abundant in the Belly River rocks but are not often met with in the Laramie whilst the reverse is the case with those of *L. incrassatus*.

The similarity in the vertebrate faunæ of the Belly River and Laramie formations suggested by the above comparison is also apparent in the invertebrate faunæ of the same formations, from which it may reasonably be inferred that the conditions of life following the deposition of the marine beds of the Pierre were essentially the same as those that preceded it.

THE BERMUDA OR EASTER LILY.

By H. B. SMALL.

Few people have any idea of the enormous extent to which the cultivation of the Easter Lily is carried on the islands of Bermuda. Acres upon acres are devoted to this plant alone, and its bulbs constitute one of the principal and most lucrative exports of those islands. The beautiful sight which one of the lily fields presents when in full bloom is beyond description, and the fragrance that loads the air is oppressive. For decorative purposes the buds are cut shortly before Easter before the flower opens, and carefully packed with damp moss in boxes the sides of which by means of cleats allow ventilation. These on arrival in New York are immediately distributed to the points whence applications have been received, and if too backward are forced into bloom by placing the stems in warm water. But the flowers form only a small part of the profit attending lily culture. The bulbs are shipped in enormous quantities to wholesale florists, who supply the demand for them all over the continent. This industry only commenced in 1878, when an American named Harris, making a study of the plant and its growth introduced it into Bermuda, and from the success attending its culture there, it received the name by which it is now known *Lilium Harrisii*, the development of flowers under the genial climate and adaptability of the soil making it supercede the original lily known as *L. longiflorum*.

The industry has of late years been seriously threatened by the ravages of the *Eucharis* Mite which has so deteriorated the bulbs that their sale is seriously injured. The disease is characterized by spotting and distortion of the leaves and flowers, and a stunted growth. The Department of Agriculture in Washington has made a special study of it, and in August 1897 issued a bulletin thereon. Various remedies have been tried, but so far without effect, and application was made to England last year for an expert from Kew to visit Bermuda and examine the whole condition and nature of the disease. The lily is supposed

to have been originally brought from China, and a curious legend respecting it, not generally known may prove of interest. It is as follows :—

Centuries before the Christian era, great calamities befell the Chinese Empire, and the prime minister was threatened by the Emperor with the loss of his head unless he devised a means of averting the wrath of the gods. Asserting that it had been revealed to him in a dream to make a sacrifice of men, women and fruits in a far off island where the gods made their abode, a vessel was placed at his disposal in which were collected 100 of the strongest young men and fairest maidens, together with the finest fruits. Amongst the stores was the "Bak-hap" which translated means the "Lily of the 100 fields." It was esteemed a sweet and dainty morsel, and an especial delicacy. The vessel sailed away, and this was the last the Emperor heard of his prime minister, who, however, when once on the voyage intimated to youths and maidens that instead of being sacrificed they would inhabit and populate the beautiful island he knew of, one of the islands of Japan. They willingly agreed to this, and in due course of events, by reason of the change of soil the "Bak-hap" gradually assumed greater height and strength and a more luxuriant bloom. As it improved in beauty it became less useful as an article of food, and as strong taste had developed for refinement and art in the new colony, its use as an article of food was abandoned. Hundreds of years rolled on and the island became a land of floriculture. The "Bak-hap" grew steadily in beauty and was finally exported to Europe as a new garden flower, until an American noticing its splendour secured some of bulbs, and being interested in the Bermudas introduced it there where it seems to have made its home.

ORNITHOLOGY.

Edited by W. T. MACOUN.

BIRD NOTES FOR APRIL AND MAY.

From the long list of birds which have been recorded during the past month it is very apparent that some members of THE OTTAWA FIELD NATURALISTS' CLUB have not been idle. It is unfortunate, however, that so few of us take the time, or make the opportunity, to study the habits of our birds and record observations. The members of the Club should feel grateful to the few who send their notes for publication, and who, in this way, perhaps, may cause others to learn more about birds.

It is interesting to compare the dates of arrival of birds recorded in this number with those in the June number for 1898, up to the 14th May last year, the arrival of 81 birds have been recorded and up to the 14th May this year 77 birds have been noted. On the whole, during the past month the birds have arrived on nearly the same date as last year, there being a few exceptions, however, where there was more than a week's difference; in some cases the bird having been recorded earlier and in some cases later this year.

1899.

- Apr. 13—RUBY THROATED HUMMINGBIRD, *Trochilus colubris*. Miss Harmer.
 14—BLACK DUCK, *Anas obscura*. Mr. C. H. Young.
 14—MEADOWLARK, *Sturnella magna*. Mr. C. H. Young; April 15th. Mr. W. A. D. Lees.
 15—SNOWFLAKE, *Plectrophenax nivalis*. Large flock. Mr. W. A. D. Lees.
 15—BELTED KINGFISHER, *Ceryle alcyon*. Mr. W. A. D. Lees; April 16th, Mr. Geo. R. White.
 15—WHITE-RUMPED SHRIKE, *Lanius ludovicianus excubitorides*. Miss Harmer.
 15—COW-BIRD, *Molothrus ater*. Mr. Geo. R. White; April 17th, Mr. C. H. Young.
 15—RUSTY BLACKBIRD, *Scolecophagus carolinus*. Mr. Geo. R. White.
 16—GREAT BLUE HERON, *Ardea herodias*. Mr. Young.
 16—VESPER SPARROW, *Pooecetes gramineus*. Dr. J. Fletcher. Fairly common at Experimental Farm, April 21.

- 17—AMERICAN ROUGH-LEGGED HAWK, *Archibuteo lagopus sancti-johannis*. Mr. Young.
- 18—HERMIT THRUSH, *Turdus aonalaschke pallasii*. Mr. White.
- 18—CHIPPING SPARROW, *Spizella socialis*. Mr. White ; April 19, Mr. Lees.
- 19—FLICKER, *Colaptes auratus*. Mr. Lees. Mr. White ; April 20th, Mr. Young.
- 19—WHITE-BRESTED NUTHATCH, *Sitta carolinensis*. Mr. Lees.
- 20—SAVANNAH SPARROW, *Ammodramus sandwichensis*. Mr. Lees.
- 22—WILSON'S SNIPE, *Gallinago delicata*. Mr. Lees, at Russell.
- 22—PURPLE MARTIN, *Progne subis*. Mr. Lees.
- 22—CANADA GOOSE, *Branta canadensis*. Mr. Lees. Large flocks over Experimental Farm, Mr. W. T. Macoun.
- 23—MARSH HAWK, *Circus hudsonius*, Mr. Young.
- 23—BANK SWALLOW, *Clivicola riparia*. Mr. Lees.
- 23—TREE SWALLOW, *Tachycineta bicolor*. Mr. Lees.
- 23—PILEATED WOODPECKER, *Ceophleps pileatus*. Mr. Young.
- 23—AMERICAN OSPREY, *Pandion haliaetus carolinensis*. Mr. White, Mr. Young.
- 26—LOON, *Urinator imber*. Mr. White.
- 28—BARN SWALLOW, *Chelidon erythrogaster*. Mr. W. T. Macoun ; April 29th, Mr. Lees.
- 29—AMERICAN HERRING GULL, *Larus argentatus smithsonianus*. Mr. Lees.
- 30—BROWN THRASHER, *Harporhynchus rufus*. Mr. W. T. Macoun.
- 30—HOUSE WREN, *Troglodytes aedon*. Mr. Lees.
- 30—SPOTTED SANDPIPER, *Actitis macularia*. Mr. White, Mr. Lees.
- 30—AMERICAN BITTERN, *Botaurus lentiginosus*. Mr. Lees, Mr. White.
- 30—HOODED MERGANSER, *Lophodytes cucullatus*. Mr. White.
- 30—KILLDEER, *Aegialitis vocifera*. Mr. White.
- 30—PECTORAL SANDPIPER, *Tringa maculata*. Mr. Lees.
- May 1—LEAST FLYCATCHER, *Empidonax minimus*. Mr. Lees.
- 1—WHITE-THROATED SPARROW, *Zonotrichia albicollis*. Dr. Fletcher ; May 2nd, Mr. White.
- 2—CHIMNEY SWIFT, *Chaetura pelagic*. Mr. White, Mr. Lees ; May 4th, Miss Harmer.
- 2—YELLOW WARBLER, *Dendroica aestiva*. Miss Harmer ; May 3rd, Mr. Lees.
- 3—WARBLING VIREO, *Vireo gilvus*. Mr. Lees.
- 4—WOOD THRUSH, *Turdus mustelinus*. Mr. Young.
- 4—BALTIMORE ORIOLE, *Icterus galbula*. Mr. White.
- 5—KINGBIRD, *Tyrannus tyrannus*. Mr. Young ; May 6th, Mr. White.
- 6—MYRTLE WARBLER, *Dumetia coronata*. Mr. White.

- 6—CLIFF SWALLOW, *Petrochelidon lunifrons*. Mr. White.
 6—WOOD DUCK, *Aix sponsa*. Mr. White.
 7—GREATER YELLOW-LEGS, *Totanus melanoleucus*. Mr. White.
 7—MALLARD, *Anas boschas*. Mr. White.
 11—BLACK-BILLED CUCKOO, *Coccyzus erythrophthalmus*. Mr. White.
 11—CATBIRD, *Galeoscoptes carolinensis*. Mr. White.
 11—WHITE-CROWNED SPARROW, *Zonotrichia leucophrys*. Miss Harmer.
 11—CRESTED FLYCATCHER, *Myiarchus crinitus*. Mr. White; May 13th,
 Mr. Lees.
 12—SCARLET Tanager, *Piranga erythromelas*. Mr. White.
 13—BOBOLINK, *Dolichonyx oryzivorus*. Mr. Lees.
 13—BLACK AND WHITE WARBLER, *Mniotilta varia*. Mr. Lees.
 13—AMERICAN REDSTART, *Setophaga ruticilla*. Mr. Lees.
 13—OVEN-BIRD, *Seiurus aurocapillus*. Ms. Lees.
 13—AMERICAN PIPIT, *Anthus pensilvanicus*. [Mr. Lees; May 14th, Mr.
 White.
 13—SWAMP SPARROW, *Melospiza georgiana*. Mr. Lees.
 13—RED-EYED VIREO, *Vireo olivaceus*. Mr. Lees; May 14th, Mr. White.
 13—RED-HEADED WOODPECKER, *Melanerpes erythrocephalus*. Mr. Lees.
 14—CHESNUT-SIDED WARBLER, *Dendroica pensylvanica*. Mr. White.
 14—ROSE-BREASTED GROSBEAK, *Habia ludoviciana*. Mr. White.
 14—BLUE-HEADED VIREO, *Vireo solitarius*. Mr. White.

BOTANICAL NOTES.

Edited by DR. JAMES FLETCHER.

RIBES CILIOSUM.—I have received from Mr. C. D. Moggridge of Belle Meade Farm, Hazelmere, B. C., specimens of the flowering shoots of the above named Ribes, which has been kindly named for me by Prof. Macoun. This is a very rare plant, as far as we yet know, in British Columbia. It was described in the "Flora of Northwest America" by Thos. Howell, Vol. 1, page 208; Apr. 1st. 1898. Prof. Macoun has had specimens of this species for sometime in the Herbarium of the National Museum, collected by Mr. J. M. Macoun in 1889 at Burnaby Lake, B. C., and had them separated as an undescribed species until Mr. Howell's description appeared. The following interesting particulars about the habitat of *Ribes ciliosum* are

given by Mr. Moggridge. "I am sending you by this mail a bunch of cuttings and some rooted layers of the Ribes you ask for. The layers will give you a fair idea of the way the plant spreads. I only know of one locality where it grows near here, and that is only a few square yards in extent. I am watching over it carefully. The plant grows on a small island, just above flood level, apparently almost smothered by Salmon-berry (*Rubus spectabilis*), the Red-berried Elder, etc., which cover the ground. It does not attempt to grow to the light. I have not seen it more than 2 or 3 feet from the ground. Its long straggling branches trail along as near to the soil as they can get, sometimes running under ground for a couple of feet, where they take root, and then emerging again start new bushes. The small clusters of dark brown, wide-open flowers with very short tubes are broader than deep and borne on very short foot-stalks. They grow on last year's wood, a shoot about six inches long from a bud on the older wood. The cuttings I send are from the terminal shoots which are much stronger. The berries, of which I have only found a few, look like an undersized red currant but are very acrid in taste. The leaves are heart-shaped, nearly two inches across with three large lobes and sometimes the lower large lobes are divided in the middle, the leaves are sharply toothed and the petioles are fringed with a few long bristles. There are about six or eight flowers in each raceme."

The habit of this western currant is apparently very similar to that of *Ribes prostratum* and may possibly have been confounded with that species in British Columbia. J. F.

ELEOCHARIS MACOUNII.—While collecting Potamogetons in Johnson's Lake near North Wakefield in September, 1894, I found on the border of a marsh near that lake an Eleocharis unknown to me growing in company with *E. obtusa* and *E. intermedia*. It has recently been described as a new species by Mr. M. L. Fernald.* As pointed out by Mr. Fernald this plant in its dark elongated heads more nearly resembles the European *E. carniolica* than the American *E. intermedia*. He thus describes it: Annual: culms slender, weak, the longest 2 or 2.5

cm. long: heads elliptic-lanceolate, about 1 cm. long, more densely flowered than in *E. intermedia*, the ovate-lanceolate or oblong-lanceolate acutish or blunt scales dark brown: achene much compressed, obscurely triangular in cross-section, obovate, less elongated than that of *E. intermedia*; the deltoid-conical tubercle nearly as broad and one-half as high as the body of the achene.

J. M. M.

* Proceeding of the American Academy of Arts and Sciences Vol. XXXIV, p. 487.

LYCOPODIUM INUNDATUM.—On the wet bank near the junction of the Canada Atlantic Railway and the Rockland Branch at South Indian, May 9th, 1899. An addition to the local flora and not before recorded in Eastern Ontario. J. M.

SYMPLOCARPUS FOETIDUS.—Abundant in a swamp about one mile from Osgoode. Collected by Mr. R. H. Cowley early in May. Not before collected in the Ottawa District.

TRILLIUM GRANDIFLORUM.—On May 13th, Mrs. A. E. Barlow collected a monstrosity of this species with four leaves, four sepals, four petals, eight stamens and four pistils. Two stems rose from the one rootstalk, each bearing exceptionally large flowers with the above characters). The plant is preserved in the herbarium of the Geological Survey.

A GUIDE TO WILD FLOWERS.

While in England almost every educated man and woman and nearly every child outside large cities knows the names of the common flowers of wood and roadside, meadow and field, in America such knowledge has been until very lately comparatively rare. A dozen or so of spring species are familiar to everyone and a like number of the more conspicuous and common summer flowers are pretty well known, but a general acquaintance with even two or three hundred species is quite enough to secure from the multitude the title of "botanist." There are many reasons for this lamentable ignorance but chief among them has been the lack of popular books on flowers. An

entirely unfounded but very general belief that special scientific training is essential before one may begin the study of plants has deterred many a lover of flowers from attempting to learn the names of species with which he has been familiar from childhood.

In recent years, however, several books of a more or less popular character have been published and their effect is already noticeable in the increased interest that is being taken in the study of flowers. Mrs. Trail's "Plant Life in Canada" was one of the first, as it is still one of the best, books of this kind published in America. It is, however, more a record of the author's own observations, than an aid to the study of plants and has perhaps for that reason not had so large a sale as its literary quality and the information it contains merit. "How to know the Wild Flowers," by Mrs. Dana, and a more recent book by the same author "How to know Ferns" have had a large sale in Ottawa and are doing much to popularize Botany.

The latest and most attractive book on flowers is Miss Lounsberry's "A Guide to Wild Flowers" illustrated with sixty-four coloured and one hundred black-and-white plates. In Mrs. Dana's book the usual general key to genera gives place to an artificial arrangement by means of which flowers of one colour are grouped together in of their date of blooming ; Miss Lounsberry has adopted a new arrangement and has divided the species included in her book into eight groups according to their habitat. Plants growing in water are first described, then those growing in mud and so on until the uplands are reached. Though some difficulty must have been experienced in determining the group into which some species of general distribution should be put, the author seems, to have been able to place each species just where one would expect to find it and the arrangement she has adopted will enable many who know nothing of botany to name the common plants met with in their rambles.

As should be the case with books of this kind, the common English names are given first in heavy type, then follows the Latin name, below which comes in a single line the family, colour,

odour, range and time of bloom. A brief technical description of the plant is followed by general descriptive notes, which cannot fail to interest every lover of flowers. The special feature of the book, however, is the beautiful coloured plants, which make it the most attractive book of its kind published at a small price. Mrs. Rowan, by whom the drawings were made, is apparently more of an artist than a botanist and while all the illustrations are artistically drawn and beautifully coloured all are not equally true to nature; nor are the drawings in black-and-white always as accurate as one could wish. It is perhaps too much to expect perfection in a book of this kind and its merits far outweigh its inaccuracies. As it will be used principally by those who will be satisfied to learn the English names of the plants they see the adoption of the nomenclature and arrangement of Britton and Brown's *Flora* detracts little from the work, though for a popular book the names and arrangement of Gray's *Manual* would have been preferable, if for no other reason than that they are more familiar.

J. M. M.

AFTERNOON LECTURES.

During April and May a course of popular lectures on scientific subjects was delivered in the Assembly Room of the Normal School by members of the Club. The attendance at all these lectures was large, an evidence that there is no lack of interest in Ottawa in subjects of this kind.

1. APRIL, 10th—"POINTS OF INTEREST IN THE GEOLOGY OF OTTAWA" by Dr. H. M. Ami.—In dealing with his subject Dr. Ami referred to the various geological formations to be found in this district and pointed out the various places where each formation could be studied to advantage—what were the mineral characters of each, the nature, origin, and mode of formation or deposition of each series together with the various fossil organic remains or extinct types of animal life which were to be found in great profusion in many of the sedimentary strata of Ottawa. The speaker

practically took his audience to a series of excursions about Ottawa and pointed out by means of maps, charts, diagrams, photographs and specimens the most salient and important geological features to be observed and studied.

2. APRIL 17th—"THE STUDY OF BIRDS," by Mr. A. G. Kingston.—The lecturer directed attention to the recognized value of all nature studies in inducing a healthy natural growth in three directions—the memory, the reason, the sentimental faculties. In respect of influence upon the latter especially, he claimed that Field Ornithology was easily first of all branches of Natural History.

The appliances and qualities requisite for the intending student of this subject were then enumerated. The lecturer deprecated the making by the ordinary student of a large collection of bird-skins, but advised that more attention should be paid to the manners and habits of the living bird as seen in the field. For a first season's work he thought it would be wise for a beginner to confine himself entirely to the land birds, of which there were on the Ottawa list, (excluding casual or accidental visitants) about 125 species.

The student having furnished himself with a good descriptive hand-book, should mark therein all species known to occur in this district. Practical instructions were then given for noting the important characters of a bird as they appear to an observer in the field; and a field key to the families was placed upon the black-board, by the use of which in conjunction with the descriptive hand-book the lecturer believed it possible to identify almost any of the land birds of the district. It was then pointed out that identification of species was not to be regarded as an end in itself but only as an opening of acquaintanceship with each bird, to be followed by gaining a knowledge of its habits, song, migration, and many an interesting problem so to be opened up.

Space does not permit the inclusion of the Field Key to the families in this report but it is intended to publish it in the next number of the Naturalist.

3. APRIL, 24th.—“ENTOMOLOGY,” by Dr. James Fletcher, Dominion Entomologist.—The speaker without preliminary introduction went right to the heart of his subject by asking and answering shortly what is Entomology? What is an insect? He deprecated the indiscriminate use of the word “bug” as generally used because although all bugs were insects all insects were by no means bugs. Insects are amongst the most familiar of natural objects. They are met with in all climates and in one or other form at all seasons of the year. It was estimated that they comprised four-fifths of the animal kingdom; no less than 200,000 species being found in collections. Their place in the classification of the animal kingdom was noted and the differences between the members of the seven great orders explained. This old classification of the insects was recommended for beginners and the derivation of the names used explained. Diagrams illustrating the different kinds of insects were shown. An earnest plea was made for a more extensive study of insects on account of the utility of the knowledge obtained, first as a means of preventing the great losses which annually occurred among crops, then as a useful means of training the mind in habits of accuracy, of observation and precision of description and, lastly, as an unfailing and constant source of intellectual pleasure. It was advised to study a few things well—e.g. a single order or even a single insect, rather than to aim at amassing a large collection, the thorough study of which was rendered impossible by the shortness of the average life of man. Beginners were encouraged to make use of the leaders of the club. The delight of rearing even one of our commonest butterflies from the egg through the larval stages to the chrysalis and then to the perfect insect were graphically described and all present were urged to make at least one trial during the coming season. The speaker felt sure that if this were done many who had previously seen no particular beauties in insects would be surprised at the amount of pleasure they would derive and the unexpected beauties they would discern in the exquisite perfection of every smallest part of every insect they examined.

The address began at quarter past four and ended punctually at 5:15.

4. MAY, 1st.—“SHELLS,” by F. R. Latchford.—The place in nature occupied by shells and their builders, was pointed out, and the classes indicated in which shells have been divided by naturalists. The number, diversity and beauty of the different families were alluded to, and special reference was made to the land and fresh water species found in Canada—particularly those occurring within the sphere of the Club’s operations. The best collecting grounds in the vicinity of Ottawa were specified. The sand bars of Duck Island were mentioned as one of the most remarkable stations in Canada for many species of *Union* of unusual size or beauty. Instructions were given as to the best means of collecting, and the best methods of cleaning, classifying and preserving shells when collected. A comparison was made of the different localities around Ottawa in which shells abound, the great diversity which exists between the shells in stations apparently alike in character, and an earnest plea urged for an increased interest in the study of shells here and in other parts of Canada. In the discussion which followed, Mr. Latchford stated that he would be glad to place a collection of Canadian shells in the Normal school, if facilities were afforded for displaying them to the students.

5. MAY, 8th.—“BOTANY,” by Mr. R. B. White.—In his opening remarks the lecturer emphasized the fact that although there is a universal love for flowers few know anything about them. This he attributed to the imaginary difficulty of learning the proper names; until the plant itself is known no attempt should be made to memorize names—when the plants are known the names will soon follow. The study of plants was valuable in that it cultivated observation and reflection, enabled us to better understand the world we live in and added greatly to the pleasure of life.

After briefly outlining the natural system of classification by means of which plants are divided into families, orders and genera the lecturer told how plants should be studied. He

recommended that some elementary book on Botany be carefully read and that the beginner, instead of labouriously attempting to analyse a plant and determine its name by means of a key, select first a number of species with which he is acquainted and then compare them with the descriptions in the book used looking up the meaning of every word not understood. By this means anyone would in a short time become familiar with all the descriptive botanical terms in common use. Representatives of some of the large orders were then analysed in the way suggested.

The importance of ample field notes was emphasised and the uses of note-books and analysis books explained. The preparation of specimens for the herbarium was also described. The lecturer explained that the methods suggested by him were not intended to take the place of more complete botanical studies when such were possible and recommended that the preliminary work should be followed by the study of physiology and morphology.

6. MAY, 15th.—“ZOOLOGY,” by Prof. John Macoun and Mr. W. S. Odell.—Prof. Macoun confined his remarks to a general outlining of the scope which zoological studies should cover pointing out that apart from Ornithology and Entomology comparatively little original work had been done by local students. He showed that the smaller mammals, fish and reptiles of the Ottawa region, as well as nearly all the lower forms of animal life, were yet to be worked up. Mr. Odell dealt principally with such small animals as could be well studied in a small aquarium illustrating his remarks with a very beautiful series of coloured drawings of the species described. A small aquarium for student's use could easily be made from the half-gallon or larger fruit jars in ordinary use. For use in larger aquaria he recommended the following plants: *Anacharis Canadensis*, *Ceratophyllum demersum*, *Myriophyllum*, *Proserpinaca*, *Ranunculus aquatilis*, *Callitriche*, *Chara*, *Nitella*, *Fontinalis* and *Lemna*. The manner in which many familiar forms of animals found in ponds and streams propagate was also described.

7. MAY, 22nd.—“PLANTING AND CARE OF FOREST TREES,” by Sir Henri Joli de Lotbinière.—The seventh and last lecture of the course was very appropriately of a somewhat more practical kind than those which preceded it. The lecturer showed that the wasteful destruction of Canadian forests was in very great measure due to the fact that the forests had from the earliest times been considered an enemy by the settler and that it was only in very recent years that the farmer had begun to learn that successful cultivation of the soil depended upon an abundance of trees in his neighbourhood. By means of a fine series of specimens and photographs he showed how rapidly some of our most valuable trees grow and how they should be pruned and cared for if the best results were to be obtained. The photographs showing the effects of good and bad pruning were exceptionally fine and illustrated the methods of tree culture and preservation followed on the lecturer's own estate.

SUB-EXCURSIONS.

Owing to the lateness of the season and the inclemency of the weather on two of the days upon which sub-excursions were to be held, they were this year not quite so satisfactory as usual, as regards results, though the attendance on all fine days was exceptionally large. The snow still lay deep in the woods at the time of the first excursion to Rockcliffe, April 15th, though the rocky ridge was bare. No plants were found in flower and no insects seen. A comparison of the results of the sub-excursion held one day later in 1898 will show how late the present spring was in opening. Large and interesting collections of fossils were made at this and other sub-excursions and a comparative list of these will appear in an early number of THE NATURALIST. Such bird notes as were worthy of record have been, or will be, printed in the monthly Ornithological Notes.

APRIL 22nd.—The sub-excursion to the Beaver Meadow west of Hull at this date was hardly more successful than that held a week previous though the day was fine and the attend-

ance large. No insects were collected and the only flowers seen were *Hepatica triloba* and *H. acutiloba*. The catkins of *Alnus incana* and *Salix discolor* were well developed. One specimen of *Peziza coccinea* was collected. Miss Halkett secured a fine specimen of the Red-bellied Snake (*Storeria occipitomaculata*).

APRIL 29th.—BEECHWOOD.—There was a large attendance at this sub-excursion, many of those present collecting at Beechwood their first spring flowers. Before returning to the city Prof. Macoun delivered an address on the plants found during the afternoon, drawing special attention to the catkin-bearing trees and shrubs. Both species of *Hepatica* were found, *Trilliums* white and red, the Wild Ginger, the large-flowered Bellwort, Blue Cohosh, *Claytonia Caroliniana*, *Dentaria laciniata*, *D. diphylla* and a few others. One of the striking objects collected was the beautiful Scarlet Cup (*Peziza coccinea*). Dr. Fletcher spoke of the few insects seen. These were very few, a single specimen of the Spring Azure (*Lycana neglecta*) and one of the oil beetles (*Meloe niger*), which it was explained laid its eggs on flowers and the larvæ (called triungulins) on hatching remained there until the flowers were visited by a bee when they attached themselves to the latter and were carried by it to its nest where they lived as parasites. Specimens of the Tree Frog (*Hyla versicolor*) and Viscid Salamander (*Plethodon glutinosus*) were found by Mr. A. Halkett.

MAY 6th.—AYLMER.—Over 150 members of the club and their friends attended this excursion. Flowers of several kinds were abundant and the Trailing Arbutus was seen growing for the first time by many who before knew it only by name. The botanical leaders not reaching the place of rendezvous at the specified time Dr. Fletcher was requested to speak on the plants collected. Among the more interesting of those exhibited were *Sanguinaria Canadensis*, *Shepherdia Canadensis*, *Epigæa repens*, *Amelanchier Canadensis*, *Waldsteinia fragarioides*, *Vaccinium Pennsylvanicum*, *Corydalis aurea*, *Antennaria Canadensis* and *Viola Muhlenbergii*. Dr. Fletcher also spoke on insects. Few were collected, the season being still backward. A few species

had, however, rewarded the entomologists, *Thecla Niphon*, freshly emerged, was seen on a pine tree, *Pieris oleracea-hiemalis* and *Lycæna Lucia* were also exhibited. Mr. Halkett described the zoological specimens collected. Chief among these was a Salamander—the Red Triton (*Spelerpes ruber*) found by Mr. Halkett himself, a very fine Green Snake (*Cyclophis vernalis*) by someone unknown and a Garter Snake *Eutenia sirtalis ordinata* by Mr. Oswald Ingall. The proposed excursions to Rockcliffe and the Beaver Meadows, May 13th and 20th, were not made, both days being wet. The first general excursion to Chelsea, May 27th, was postponed for the same reason.

ORIOLES FEEDING ON TENT CATERPILLARS.—On the 23rd. of May whilst enjoying a walk in the Mountain Park at Montreal my attention was arrested by a Baltimore Oriole not more than a dozen paces from me and I stood admiring the brilliant colouring of his plumage for a few moments. My interest in his movements became deeper, however, when I saw him station himself beside a bunch of tent caterpillars whose webs were to be seen on the bushes and small trees in all directions. The bird made a hasty meal off the caterpillars, eating one after another until his appetite was apparently quite satisfied. The caterpillars were large, about an inch in length and nearly a dozen were destroyed in this way to form our benefactor's mid-day meal.—LAWRENCE LAMB.

COPRINUS COMATUS.—The Shaggy Mushroom is seldom found in this vicinity in the spring, but owing to the heavy May rains it has appeared on the newly made ground on the west side of the canal, quite close to Sapper's Bridge. This is one of the best mushrooms, is easily digested and may be eaten in any quantity. J.M.

METEOROLOGICAL OBSERVATIONS FOR OTTAWA, 1898.

Contributed by Dr. R. F. Stupart, Director of the Meteorological Service, Toronto, Ont.

Frequency of the Different Winds from Observations at 8 a.m., 3 and 8 p.m., Daily, Ottawa, 1898.

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm
January	9	11	9	14	5	6	13	26	0
February	10	3	7	21	6	8	9	20	0
March	4	4	7	25	7	11	11	22	2
April	17	15	7	15	5	6	11	13	1
May	12	10	5	20	10	13	8	13	2
June	6	7	12	8	5	11	17	15	9
July	19	3	8	12	6	14	20	10	1
August	21	8	8	12	5	12	7	20	0
September	13	5	6	7	6	11	24	18	0
October	11	12	7	28	5	11	9	10	0
November	4	11	9	8	18	7	15	17	1
December	11	13	10	2	14	20	9	10	4
Year	137	102	95	172	92	130	153	194	20

January 30—Coldest day of year, mean temperature—19°.9.

February 16—Stormiest day of year, mean velocity of wind 24.4 miles per hour.

“ 20-22—Heaviest snow storm of year, depth of fall 24 inches.

April 4—Last measurable snow. Some flakes on 5-6.

May 6—Last frost of season.

“ 12—First thunder of year.

July 20—Warmest day of year, mean temperature 79°.75.

Sept. 30—Last thunder of year.

October 9—First recorded frost of season.

“ 22—Heaviest rain storm of year, depth 1.12 inches.

“ 27—Earthquake shock at 1.03 a. m.

Nov. 10—First measurable snow, 4 in. fell, flakes on Oct. 27.

Dec. 12—First record below zero—7°.6.

Abstract of Meteorological Observations at Ottawa for the Year 1898.

	MONTH.												YEAR.
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
Average height of barometer at 32° and reduced to sea level	30.020	30.096	30.149	29.981	29.914	29.932	29.995	29.927	29.889	30.079	30.049	29.961	30.008
Highest barometer	30.490	30.483	30.603	30.328	30.230	30.320	30.440	30.255	3.192	30.462	30.463	30.636	30.676
Lowest barometer	29.273	29.569	29.339	29.575	29.550	29.279	29.669	29.635	1.154	29.489	29.461	29.304	29.273
Monthly and annual ranges	1.217	0.914	1.264	0.753	0.686	1.047	0.783	0.629	1.338	0.973	1.002	1.352	1.363
Average temperature of air (Fah.)	10.63	18.97	33.65	43.30	57.32	66.21	69.72	67.50	61.02	46.62	32.69	17.81	43.79
Difference from average	+0.63	+6.97	+13.25	+3.26	+2.42	+1.11	+0.22	+2.60	+3.52	+2.62	+1.09	+0.81	+3.21
Highest temperature	39.0	43.0	57.0	71.0	82.8	86.9	95.0	85.0	90.0	77.0	60.0	40.7	95.0
Lowest temperature	-24.6	-20.5	-1.2	12.3	32.9	45.1	41.0	42.4	33.2	26.0	6.5	-23.3	-24.6
Monthly and annual ranges	63.6	63.5	58.2	58.7	49.9	41.8	54.0	42.4	56.8	51.0	53.5	64.0	119.6
Average maximum temperature	20.44	26.85	42.36	54.92	67.74	76.80	82.96	77.52	72.28	54.10	40.15	26.39	53.54
Average minimum temperature	0.83	11.10	24.95	31.81	46.91	55.62	58.22	57.49	49.77	39.15	25.23	9.23	34.19
Average daily range	19.61	15.75	17.41	23.11	20.83	21.18	24.74	20.03	22.51	14.95	14.92	17.16	19.35
Average pressure of vapour	0.071	0.099	0.168	0.189	0.339	0.482	0.525	0.509	0.428	0.270	0.165	0.100	0.279
Average humidity of the air	81	81	80	61	65	69	63	74	74	79	82	86	75
Average temperature of dew point	11.0	18.2	30.1	48.3	58.0	63.4	59.5	54.7	42.3	29.7	18.4	39.5	29.5
Amount of rain in inches	0.66	0.90	2.13	0.55	2.46	2.24	2.87	3.22	3.48	5.68	0.36	0.41	24.96
Difference from average	+0.10	+0.26	+1.33	-0.87	0.00	-0.72	-0.34	+0.07	+0.95	+3.21	-1.31	-0.34	+2.40
Number of days of rain	3	1	8	3	13	9	10	15	16	13	5	4	100
Amount of snow in inches	36.4	34.3	.....	2.0	.....	.....	.....	.....	.....	.....	.....	.....	110.6
Difference from average	+11.7	+12.7	-17.8	-2.2	.....	.....	.....	.....	.....	.....	.....	.....	+5.3
Number of days of snow	12	11	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	10
Percentage of sky clouded	61	71	46	44	66	63	50	62	57	64	67	77	61
Number of days completely clouded	10	13	5	1	1	1	1	1	3	10	9	16	71
Average velocity of wind (miles).	6.2	8.7	6.6	7.5	6.2	5.0	5.6	6.1	6.1	7.5	8.8	9.5	7.0
Number of auroras	0	0	0	0	0	1	1	0	2	0	0	0	4
Number of thunder storms	0	0	0	0	3	3	7	3	3	0	0	0	19
Number of fogs	1	1	2	0	0	0	0	0	0	0	5	0	10
Number of days without rain or snow	11	10	20	21	17	18	19	15	11	16	15	9	182

Days of rain or snow only reckoned when 0.01 inch or over fell.

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