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No. 5.

ADDITIONS TO THE NORTH AMERICAN AND EUROPEAN BRYOLOGY (MOSS-FLORA).

By N. CONR. KINDBERG.

Since the publication of my "European and North American Bryineæ (Mosses) described" (1897, December), I have received many mosses, collected by Prof. *John Macoun* in the Rocky Mountains, 1897, in Cape Breton, 1898, in New Brunswick and Nova Scotia (with Sable Island) 1899; by Mr. *J. M. Macoun* in Alaska; by Rev. *A. C. Waghorne* in Newfoundland; by Prof. *C. F. Baker* in Alabama and Colorado; by Mr. *C. M. G. Machado* in Portugal; by Mr. *F. A. Artaria* in Italy; by Dr. *H. V. Arnell*, Mr. *J. Persson* and Mr. *P. Larsson* in Sweden.

The results of the new discoveries in America are very interesting because of new localities for many species, described by myself as new, sometimes from a single place. Also several ones described as sterile, have been found in a fruiting state. Several species discovered in British Columbia, have since been found in other districts.

There are also some new species and varieties to be added. A species belonging to the family *Hypopterygiaceæ*, hitherto not found above the Tropic of Cancer, was collected on Queen Charlotte Islands, situated in lat. 56°^Q, off the coast of British Columbia, in the Pacific Ocean.

Some species are new both to America and Europe.

I will also propose some remarks concerning some families and genera following my treatise "Studien über die Systematik der pleurokarpischen Laubmoose," *Botan. Centralblatt*, 1899, 2 and 12.

"*Meteoriaceæ*," differing from *Hookeriaceæ* only in pendent stem, may be considered as a group (*Meteoriceæ*) of this family; but the genus *Papillaria* (not found in N. America) may consist of a proper family, *Papillariaceæ*.

"*Thuidiaceæ*" are rather a group (*Thuidiceæ*) of *Hypnaceæ*.

"*Hypnum nigrescens*, Swartz" was related by Jæger and Sauerbeck to *Papillaria*, by myself (Bot. Centralblatt, 1899, 2) to a new genus, *Tricholepis*. Its characters are:

Capsule exerted; peristome double; endostome "tricholepide" (with filiform segments). Calyptra glabrous. Leaves limbate by short cells; inner cells minute, shortish, faintly or not papillose; costa short, double. Stem pendent. "*Meteorium nigrescens* Mitten." Lesq. et James, Manual of the Mosses of N. America. It is to be placed in the family *Cryptætaceæ*.

"*Leskea tristis* Cesati," was found in Japan in fruiting state, described as *Haplohymenium Sieboldi*, by Dozy and Moikenboer, but identified by Mitten. Its name may be *Haplohymenium triste* (Cesati) Kindberg, Revue Bryol., 1899, 2, so characterized: Capsule globose; endostome wanting; lid rostrate; pedicel red. Calyptra rough and hairy. Stem without paraphyllia. Leaves crenulate by papillæ; alar cells indistinct. Dioecious. Family: *Anomodontaceæ*.

Hypopterygiaceæ. Secondary stem (as in many hepatics, viz. *Jungermania*) furnished with amphigastria. Leaves quite distichous (not subdistichous as in *Neckeraceæ*); primary stem rhizomatic (subterranean), the secondary tree-like; leaves smooth; cells subrhombic; costa simple; capsule symmetric; endostome "dicholepide stenolepide" (with carinate and narrow segments); calyptra cucullate; pedicel smooth. Pleurocarpous.

HYOPTERYGIUM, Bridel.

1. *Hypopterygium canadense*, Kindberg, Revue Bryol., 1899, 2.

Branch-leaves small, crowded and appressed, broadly ovate apiculate, dentate nearly all around, narrowly limbate by hyaline narrow cells; other cells subrhombic, about 0.02 mm.; costa short;

amphigastria rotundate dentate limbate; costa confluent with the point. The naked part of stem about 1 c.m., the upper one scarcely longer. Capsules and male plants unknown. —Rocks near Pacific Ocean r.; Amer. Canada, British Columbia, Queen Charlotte Islands, 1898 (growing together with the fern *Asplenium viride*): Dr. Newcombe, communic. Macoun.

Cryphæa pendula, Lesquereux & James. Outer peristome reddish. Alabama: C. F. Baker. *Anomodon platyphyllus*, Kindb.; *A. rostratus* (Hedwig) Schimper; Alabama: Baker. *A. subrigidulus*, Kindb., and *A. tectorum* (Al. Braun) Kindb.—Canada, Rocky Mountains: Macoun.

Fabronia Wrightii, var. *brachyphylla*, Kindb., with ovate-oblong leaves, yellow peristome and lid of capsule furnished with longish often curved point, and *F. Ravenelii*, Sulliv. Alabama: Baker.

Neckera Macounii, C. Müller & Kindberg (related to *N. obtusata* by Mitten) is generally dioecious and rarely fruiting; it is not easily (as *N. Jamesii*, Schimper) distinguished from *N. trichomanoides* in a barren state.—Newfoundland (sterile): Waghorne.

Thelia compacta, Kindb.; *Leskea polycarpa*, Ehrhart. *L. subobtusifolia*, C. M. & Kindb.; *L. Cardoti*, Kindb.—Alabama: Baker.

Leskea obscura, Hedwig. Canada: Macoun; Alabama: Baker; Europe, Italy, Argegno by Lago di Como: F. A. Artaria ("Pseudoleskea Artariæi," Thériot, Revue Bryol., 1891, 1). New to Europe. *Entodon seductrix* (Hedw.), C. M.; *E. compressus* (H.), C. M.; *E. brevisetus* (Hooker & Wilson), Kindb.; *Platygyrium repens* (Bridel), Br. Eur. Alabama: Baker. *Pseudoleskeella catenulata* (Bridel), Kindb. Canada, Rocky Mountains: Macoun. New to America. *Thuidium delicatulum* (L.), Mitten, var. *repens*, with creeping stem. N. Brunswick: Macoun. *T. Philiberti*, Limpricht, with smaller capsule than in *T. delicatulum* and allied species. N. Brunswick: J. Moser, com. Macoun. ("*T. laxifolium* (Schwægr)" is doubtful, perhaps *Eurhynchium reflexum*.)

Pylaisia intricata (Hedw.), Schimp.; *P. polyanthos* (Schreber) Br. eur.-Alabama: Baker.

Raphidostegium laxepatum (Lesq. & Jam.), Kindb. Canada, Cape Breton: Macoun. Alabama: Baker.

Rhynchostegium serrulatum (Hedw.), Kindb. Alabama : Baker.

Plagiothecium pseudo-latebricola, Kindb. Canada, Cape Breton : Macoun. *P. albulum* (C. M.), Kindb. Alabama : Baker.

2. *Plagiothecium denticulatum* (L.). Br. Eur. * *P. Ruthei*, Limpricht.

Capsule larger and more curved ; cilia sometimes appendiculate ; pedicel often 4 c.m. long ; leaves large, generally without point, nearly undulate when dry. Not very distinct. Europe, Sweden! "Germany" : Limpricht.

3. *Plagiothecium curvifolium*, Schliephacke; Limpricht.

Leaves somewhat small, often partly recurved, ovate-oblong with a short often curved point ; capsule not large, faintly oblique ; cilia present ; lid usually muticous. Monœcious. Resembling *P. lætum* and nearly agreeing with *P. aciculari-pungens*, C. M. & Kindb. Rocks r. ; Eur., Norway! Sweden : P. Larsson ; "Germany" : Limpricht.

4. *Calliergon subgiganteum*, Kindberg, n. sp.

Differs from *C. giganteum* in monoecious inflorescence, from *C. cordifolium* in stems or branches pinnate and leaves auricled— from both in the very short costa of the leaves, in stem-leaves generally nearly indistinct, in branch-leaves reaching to the middle. America, Canada, "Sask., Prince Albert," 1896, (fruiting) : Macoun.

5. *Calliergon subeugyrium*, Renauld et Cardot. *Hypnum*, Ren. et Card. ; *Calliergon*, Kindb. ; *C. dilatatiforme*, Kindb., in litt. ad Macoun.

Leaves broadly ovate or rotundate, obtuse, not decurrent ; cells generally sublinear, except the finally reddish alar ; costa usually short and double ; capsule arcuate, very strangled. Monœcious. Tufts often brownish or golden glossy ; stem without rhizoids. Habit of *C. molle*. "Agrees with *C. palustre* in capsule-not annulate." Rocks in water r. Amer., Canada, N. Brunswick and Cape Breton : Macoun ; Newfoundland : Waghorne.

Camptothecium acuminatum (Hedw.), Kindb. Pedicel of

capsule smooth; *Eurhynchium illecebrum* (Beauvois), Milde. Alabama: Baker.

Eurhynchium glaciale (Br. Eur.), Kindb., and *E. labradoricum* Kindb. Canada, Cape Breton: Macoun. *E. scabridum*, Lindb., new to America. Newfoundland: Waghorne.

6. *Eurhynchium lusitanicum*, Kindberg, Revue Bryol., 1898, 6 and 1899, 1.

Stem decumbent, not creeping; paraphyllia numerous; leaves subdistichous, nearly crowded, not distinctly decurrent; alar cells oblong, generally not well-defined; other cells sublinear; costa vanishing near middle or somewhat above it; stem-leaves from cordate base attenuate with longish subpiliform point, sinuolate below middle, entire above; branch-leaves oval-oblong acuminate apiculate, denticulate all around. Perichetial leaves small, narrow. Capsule small, piriform, sub-symmetric, strangulate; pedicel smooth. Monœcious. Resembles *E. megapolitanum* but peculiarly differing through the present paraphyllia. Europe, Portugal, Coimbra: C. M. G. Machado.

7. *Brachythecium cyrtophyllum*, Kindberg, in OTTAWA NATURALIST, IV, 63.

Leaves small and short, not plicate, sometimes recurved at one side, not or slightly decurrent, loosely appressed when dry. Stem-leaves round-ovate or ovate, subobtusate or short-acuminate acute, generally entire; branch-leaves ovate, longer-acuminate, denticulate all around; alar cells small, numerous, green or sometimes pellucid; upper cells narrowly rhomboidal, inner sublinear; costa vanishing near middle. Dioecious. Capsules not seen. Tufts green, faintly glossy. Resembles *B. Fendleri*, which differs in all leaves denticulate long-pointed or long-acuminate, etc. Elm logs r. Amer., Canada, Ontario: Macoun.

Brachythecium Hillebrandi, Lesquereux. Branch-leaves sub-ovate acute, slightly acuminate; alar cells hyaline, well-defined from the green ones. Alabama: Baker.

Brachythecium "fagineum" (H. Müller) was "by Spruce named *Hypnum tenuicaule*," Has not muscol. gall.; its name must therefore be changed to *Brachythecium tenuicaule*, but

"*Eurhynchium germanum*, Græbe (Limpricht)" is a much younger name.

Campylium unicostatum, C. M. & Kindb. Alabama : Baker. *C. sinuolatum*, Kindb. Capsule small, curved ; perichetial leaves costate, gradually long-acuminate, not striate. Canada, Cape Breton : Macoun ; N. Brunswick : Moser, com. Macoun ; Alabama : Baker.

Myurium Boscii (Schwægr.), Kindb. Alabama : Baker. *M. hebridarum*, Schimper (1860) was "already—1844—in Seubert, flora azorica, by Schimper named *Hypnum Hochstetteri*." Braithwaite, Brit. Mossflora, 1899, p. 68. It must be named *Myurium Hochstetteri*. Azores, San Miguel : Machado.

Hypnum fluviatile, Swartz. Alabama and Wisconsin : Baker. *H. Bambergeri*, Schimper. Canada : Macoun. *H. vernicosum*, Lindb., may be considered as a proper species.

8. *Hypnum exannulatum*, Guembel. **H. pseudo-lycopodioides*, Kindberg, n. subsp. (n. sp. ?).

Agrees with *H. exannulatum* in leaves long decurrent and their large hyaline alar cells ; but leaves are shortish and entire with generally obtusate acumen ; costa thicker ; capsules not seen ; resembles in habit *Calliergon ochraceum*, but stem-leaves are plicate, as in *Hypnum lycopodioides*. Amer., Canada, Cape Breton : Macoun.

9. *Hypnum polycarpon*, Blandow ; Limpricht.

Differs from *H. Kneiffii* in leaves generally striate, with shortish acumen ; cells narrow. Eur. r. Italy, Como : Artaria ; "Germany" : Limpricht.

Hypnum Sendtneri, Schimper in part ; Boulay. It may be accepted as a proper species. England (fruiting) : G. A. Holt.

Hypnum plicatile (Mitten), Lesq. & Jam. * *H. revolutum* (Mitten), Lindb., with large capsule and broad paraphyllia and sometimes at insertion pale leaves (as in *H. plicatile*). Colorado (fruiting) : Baker.

Hypnum Renauldi, Kindb. Alabama : Baker. In this species cilia of endostome are variable, either smooth or appendiculate, as in *H. curvifolium* and *H. Lindbergii*. In the figure of *H. curvi-*

folium in Sullivan's *Icones cilia* are smooth but described as appendiculate.

Hypnum fertile, Sendtner. Canada : Macoun ; Sweden, Oroust : P. Larsson.

10. *Hypnum imponentiforme*, Kindb. N. sp.

Stem green, irregularly divided ; branches complanate ; paraphyllia broad ; leaves not recurved, entire, short-acuminate, not striate ; those of stem ovate-oblong, the other ones longer ; insertion pale yellow ; cells sublinear except the distinct hyaline but not numerous alar. Dioecious. Capsules not seen. Resembling *H. pratense* in habit, but allied to *H. imponens*. Turfy soil r. Eur., Italy, near Como, 1897 : F. A. Artaria.

11. *Hypnum pseudo-circinnale*, Kindberg N. sp.

Differs from *H. circinnale* : Leaves yellow at insertion, not striped ; alar cells hyaline ; stem-leaves tapering to a longer acumen ; capsule cylindrical, nearly straight ; teeth pale yellow ; stem with few rhizoids. Logs r. Amer., Canada, N. Brunswick : Macoun.

12. *Hypnum recurvatum*, Lindberg & Arnell ; *Stereodon*, Ldb. & Arn. ; *Hypnum*, Kindb.

Differs from *H. dovrense* : Leaves more gradually acuminate, sometimes more recurved, often denticulate at acumen ; alar cells more distinct. Monoecious. Stem more regularly pinnate ; tufts green or yellowish, not glossy ; capsule small. Eur. r., "Finland" ; Brotherus. Asia, Siberia : Arnell.

Fontinalis disticha, Hooker & Wilson. Alabama : Baker. *F. microphylla*, Schimper ; Limpricht and *F. baltica*, Klinggraeff ; Germany : Lützow com. Warnstorf. *F. gigantea*, Sulliv., and *F. seriata*, L. db. (fruiting). Canada, Cape Breton : Macoun.

Cutharinea angustata, Bridel. Alabama : Baker. *C. Hausknechtii* (Juratzka & Milde), Brotherus. Canada, Cape Breton and Prince Edward Island : Macoun. England, Surrey : E. F. Shepherd, com. Waghorne.

Fissidens Ravenelii, Sulliv. Canada, Owen Sound : Macoun. *F. subbasilaris*, Hedw. Alabama : Baker.

13. *Fissidens rufulus*, Bryol. Eur. * *F. Warnstorffii*, Fleischer (as species).

Leaves loosely disposed, less opaque, with paler, often hyaline borders; capsules not seen. In water r. Eur., Italy: Fleischer, com. Warnstorff.

"*Leucobryum*" *Leanum* (Sulliv.), Kindb., appertains to *Campylopus*, agreeing in capsule and calyptra, not described by Sullivant & Lesquereux, or to *Brothera* C. Mueller.

Dicranum fulvum, Hooker. N. Brunswick (fruiting): Moser, com. Macoun. *D. Scottii*, Turner. Spitzbergen: com. Mr. K. Johansson. *D. subulifolium*, Kindb. N. Brunswick: Macoun. *D. pachyneuron* (Molendo), Kindb.; capsule as in *D. longifolium*. Italy, Como (fruiting): Artaria. *D. consobrinum*, Renauld & Cardot. Canada, Ontario and Nova Scotia, Sable Island: Macoun. *D. scopariiforme*, Kindb. Canada, not r.: Macoun; Colorado: Baker. *D. pallidum*, Bruch & Schimper. Alabama: Baker. *D. undulifolium*, C. M. & Kindb.; capsule smooth. Canada (fruiting): Macoun. *D. Roellii*, Kindb. Canada, Vancouver Island: Macoun. *D. majus*, Smith, var. *undulascens*, Kindb., Oefversigt of K. V. A. (Roy. Swed. Acad. of Sciences) foerhandl. 1899 n. 10; leaves often undulate. Sweden, near Rostock in Dalsland! *D. camptophyllum*, Kindb., var. with smaller capsules and porose leaf-cells. Canada, Rocky Mountains: Macoun. *D. longirostre* (Weber & Mohr). Canada, Cape Breton: Macoun. *D. molle*, Wilson. Canada, Labrador: A. P. Low, com. Macoun. *D. algidum*, * *D. subspadiceum*, Kindb.; capsule sulcate. Canada: Macoun. *D. crispulum*, C. M. & Kindb.; capsule sometimes strumose; Canada, Cape Breton: Macoun. *D. rhabdocarpum*, Sulliv.; capsule erect and nearly straight. Colorado (fruiting): Baker. *D. groenlundicum*, Bridel. Canada, Labrador: A. P. Low, com. Macoun.

Dicranella cerviculatula, Kindb.; capsule generally erect-symmetric. Canada, Cape Breton: Macoun.

Grimmia prolifera, C. M. & Kindb.; stem not always proliferous. Alaska: J. M. Macoun. *G. robustifolia*, Kindb. Canada, N. Scotia: Macoun. *G. pulvinata* (L.), Smith, var. *cana*. Alabarna: Baker.

14. *Grimmia* (Pseudo-Racomitrium, sect. Trichophylloideæ) *subcurvula*, Kindberg, K. V. A. foerh. (Transactions of Roy. Swed. Acad. of Sciences) 1899 n. 10.

Resembling *G. pulvinata* in capsule smooth, pedicel curved and inflorescence monoecious, also in rectangular cells at the angles of leaves. Differs in: leaves somewhat longer, broadly ovate-lanceolate; inner cells distinctly sinuous; hairpoint short; tufts low, about 1 c.m., blackish when dry, small and not pulvinate. Schistose rocks r. Eur., Sweden, near Rostock in Dalsland!

15. *Grimmia pilifera*, Beauvois. * *G. longidens*, Philibert, Revue Bryol., 1898.

Differs principally in "monoecious inflorescence." Rocks r. Eur., "Switzerland, Culmann": Philibert, l. c.

16. *Grimmia subflaccida*, Kindberg. N. sp.

Agrees with the European *G. flaccida* (Notaris) Lindb., not found in America, in brittle orange peristome and channelled ovate-lanceolate entire leaves with not distinctly sinuous cells; differs in leaves smaller, recurved nearly all around, mucous or with short rough hairpoint; also in capsule narrower. Lid and calyptra not seen. Rocks r. Amer., Canada, N. Brunswick: Macoun.

Racomitrium micropus, Kindb. Canada, N. Scotia: Macoun.

"*Grimmia calyptrata*, Hooker," was already (1867) by Hampe, in Bryol. Mittheil aus dem Herbarium, p. 5, related to *Cosci-nodon*, but named *C. Hookeri*.

Brachystelium incurvum (Schwægr.), C. M. Alabama: Baker. *B. incurvum*, * *B. glyphomitrioides* (Balsamo & Notaris), C. M. Italy: Artaria.

Barbula nitida (Lindb.), Juratzka. Sweden, near Rostock in Dalsland! New to Sweden. *B. Solmsii*, Schimper, var. with percurrent costa of leaves. Portugal, Coimbra: Machado. *B. Vahlîi* Schultz. Italy: Fleischer, com. Warnstorf. *B. macrostegia* (*Trichostomum*, Sulliv.) was by Mitten, Musci Austro-Amer., p. 45, named *Rhamphidium macrostegium* and related to *Dicranaceæ*.

Didymodon trachyneuron, Kindb.; capsule cylindrical; lid conic acute. Canada, Owen Sound (fruiting): Macoun.

17. *Didymodon azoricus*, Cardot.—*Trichostomum*, Cardot. Mosses of the Azores and of Madeira, in report of the Missouri Bot. Garden, 1897; *Didymodon*, Kindb.

Plants very small; stem 2-3 mm. Differs from *D. triumphans*: leaves larger; costa not excurrent; capsule oblong; pedicel pale red. Portugal, Coimbra: Machado. New to Europe.

18. *Didymodon crispulus* (Bruch), Wilson. * *D. mucronatus*, Cardot, as proper species.—*Trichostomum*, Cardot, moss. of the Azores; *Didymodon*, Kindb.

Stem 5-7 mm. high; leaves sublinear-oblong: capsule (not described by Cardot) subcylindric; lid rostellate; pedicel pale red. Portugal, Coimbra, 1868; Machado. New to Europe.

Weisia rutilans (Hedw.), Lindb. * *W. Ganderi*, Juratzka. Sweden, Nacka, near Stockholm: J. Persson.

19. *Weisia Perssoni*, Kindb., in Botan. Notiser, 1898.

Differs from *W. viridula*: leaves not involute; capsule constricted to a very small mouth; pedicel short. (Peristome is present.) Rocks r. Eur., Sweden, Scania (Skaone) near Kullaberg 1898: Apothecary J. Persson.

Encalypta alpina, Smith. Canada, Rocky Mts.: Macoun.

Orthotrichum Bolanderi, Sulliv., and *O. Watsoni*, James. Canada, Rocky Mts.: Macoun. *O. Kingii*, Lesquer. Colorado: Baker. *O. affine*, Schrader; * *O. sublimbatum*, Kindberg, new name (" *O. subulatum*, C. M. & Kindb.," not "*O. subulatum* Mitten," Musci Austro-Amer.) var. *sublaeve*, Kindb., with nearly smooth leaves. Canada, Cape Breton: Macoun. *O. psilocarpum*, James, and *O. diaphanum* (Gmelin), Schrader. Alabama: Baker. *O. cupulatum*, Hoffman. Colorado: Baker.

Zygodon Mougeotii, Br. Eur. Canada: Macoun. *Z. Sullivantii*, C. M.; leaves recurved. Canada, Cape Breton: Macoun. New to Canada.

20. *Anœctangium canadense*, Kindberg; n. sp. " *A. Hornschuchii*," Austin in Herb. Macoun; "*Zygodon cæspitosus* (Mitt.)," Kindb. Eur. and N. Amer. Bryineæ, p. 316.

Leaves small, channelled, involute, smooth and (also at base) entire, from broad base abruptly acuminate; only lowest basal

cells narrow; costa scarcely excurrent; tufts dense, rusty-red with green branch-tops, about 5 cm. high; capsules not seen. Amer., Vancouver Island, 1875: Macoun.

Cinclidium Macounii, Kindb. Canada, "Sask., Prince Albert" 1896: Macoun.

Bartramia viridissima, Bridel, and *B. circinnulata*, C. M. & Kindb. Alaska, St. Paul's Island: J. M. Macoun.

Philonotis Arnellii, Husnot. Sweden, near Uddevalla (fruiting): P. Larsson. Not before found in fruiting state.

Funaria serrata, Beauvois, and *Physcomitrium Langloisii*, Ren. & Card. Alabama: Baker.

Timmia megapolitana, Hedwig; sheath of leaves (as in *T. norvegica*) papillose at back. Norway, in Dovrefjeld, fruiting! New to Scandinavian countries.

21. *Timmia austriaca*, Hedwig; **T. comata*, Lindberg.

Agrees with *T. austriaca* also in sheath of leaves smooth at back, as in *T. arctica* and *T. bavarica*; differs from *T. austriaca* in smaller leaves and short stem. Eur., "Finland": Brotherus; (Asia, Siberia: Arnell).

Mnium hymenophylloides Hübener. Canada, Cape Breton: Macoun. *M. rostratum*, Schrader, is usually synœcious. *M. cuspidatum* (Schreber), Leysser, var. *pachyphyllum*, Kindb.; leaves crowded, short-decurrent, crisped when dry; stolons wanting. Alabama: Baker. *M. ciliare* (Greville), Lindb.; distinct from *M. affine* in leaves with ciliiform teeth, inner leaf-cells rotundate. Canada, Cape Breton: Macoun. New to Canada. *M. rugicum*, Laurer. Newfoundland: Waghorne. *M. spinosum* (Voit), Schwægr. Canada: Macoun. Colorado: Baker. *M. spinulosum*, Br. Eur.; **M. macrociliare*, C. M. & Kindb. Alabama: Baker.

Bryum Ferchetii, Funck, and **B. suecicum*, Kindb. Sweden, Dalsland! *B. Duvalii*, Voit. Alaska: J. M. Macoun. *B. Reyeri*, Breidler; allied to *B. alpinum* (not to *B. ventricosum*); leaves indistinctly limbate. Austria: Breidler, com. Warnstorf. *B. fuscum* Lindb. Sweden: J. Persson. *B. occidentale*, Sulliv.; spores nearly 0.02 mm.—*B. gemmuligerum*, Kindb. Canada, Ottawa, clay bank: Macoun. *B. meescoides*, Kindb. Newfoundland: Waghorne. Eur., "Norway": Dixon, *Revue Bryol.*, 1899.

B. lacustre, Blandow (" *B. maritimum*, Bomanson," Arnell). Sweden, Gestrikland: Arnell. *B. inowoltoni*, Barnes; leaves ovate or ovate-lanceolate; tufts not always tomentose. N. Scotia, Sable Island, Macoun. *B. globosum*, Lindberg. Newfoundland (forma monoica: Waghorne. New to America. *B. Graefii*, Schliephacke (*B. grandiflorum*, Arnell). Sweden: Arnell. *B. lapponicum*, Kaurin; tufts sometimes 3 c.m. high. Sweden, Gestrikland: Arnell. *B. (Webera) Lescurii*, Sullivant. Alabama: Baker. *B. (Webera) carneum* L. Vancouver Island: Macoun.

Bryum "*atropurpureum*," Schimper, not Wahlenberg, is to be named *B. bicolor*, Dickson.

22. *Bryum Donii*, Greville; * *B. humile*, Kindberg, *Revue Bryol.*, 1898, 6.

Stem not very distinct, with small buds; leaves smaller, nearly entire, narrowly limbate and not distinctly recurved; capsule smallish, brown or blackish, not shining; pedicel 1.5 c.m. Dioecious. Eur., Portugal, Coimbra; Machado.

23. *Bryum microstegioides*, Kindberg. N. sp.

Differs from *B. submicrostegium*: leaves short-acuminate; capsule with large lid; endostomial membrane very low; cilia short, smooth. Amer., Alaska, Pribyloff Islands, 1891: Palmer.

24. *Bryum (Webera) pseudo-carneum*, Kindberg. N. sp.

Differs from *B. carneum* in leaves shorter, ovate-oblong, and long-decurrent; costa percurrent. Capsules not seen. Sandy soil. Amer., Canada, N. Scotia, Sable Island: Macoun.

25. *Bryum (Webera) atropurpureum*, Wahlenberg, H. Lindberg, *acta societ. pro fauna et flora fennica*, t. xvi, n. 2, 1899.

Differs from *B. carneum* principally in stomata of capsule superficial and generally narrower leaf-cells. Amer., Brit. Columbia, Revelstoke and Cascade Mountains: Macoun. New to America. Eur., "Sweden, Norway, Finland, Russia, Germany": H. Lindberg, l. c.

Andreaea nivalis, Hooker. Greenland: com. Macoun, 1899. New to America.

Ephemerum Ruthei, Schimper. Germany: Ruthe, com. Warnstorf.

Linköeping, Sweden, March, 1900.

ROYAL SOCIETY OF CANADA.

POPULAR SCIENCE LECTURE, 1900.

One of the most enjoyable features of the annual meeting of the Royal Society of Canada this year was the Popular Science Lecture delivered on the evening of May 31st by Dr. Leland O. Howard, the United States Entomologist, of Washington. The lecturer is so well known as a leading and accurate authority on practical entomology that it is unnecessary to refer to that feature of the lecture. Few of our members, however, had previously had the privilege of meeting Dr. Howard and hearing him speak. For over an hour the large audience which filled the lecture hall of the Normal School was charmed with the masterly way in which the subject was presented and the beautiful slides with which it was illustrated were explained. Dr. Howard is a fluent and easy speaker, and from his perfect acquaintance with his subject he was able to convince his hearers of the importance of a knowledge of the life-histories of common insects and the bearing of this knowledge in many unthought-of ways, upon the ordinary affairs of every-day life.

In introducing his subject the lecturer spoke of the wide commercial distribution of injurious insects, which, in these modern days of rapid ocean voyages, is becoming so pronounced that quarantine services are being established in different countries in the endeavour to bar out injurious insects from abroad. As an example, he described briefly the recent carriage of the San José Scale upon nursery stock and fruits to many different quarters of the world, and mentioned the legislation which had been effected in different countries from this incitive. It was his purpose, however, he said, not to dwell so much upon this aspect of economic entomology, as to show the good which could be accomplished by well planned introductions of beneficial insects from one country to another. He told once more the well-known story of the introduction of the Lady-bird beetle *Novius cardinalis* from Australia by the United States Department of Agriculture, and the resulting saving of the citrous crops of California which had been threatened with extinction by the White or Fluted Scale, an insect which had

been previously accidentally introduced from the same country. He showed how more recently the same insect had been introduced into the Hawaiian Islands, Egypt, Cape Colony and Portugal with equally beneficial results. He described other importations of beneficial insects into the United States, and dwelt at some length upon his recent introduction and establishment in California of *Blastophaga grossorum*, the well-known fertilizer of the Smyrna fig crop in oriental regions.

He then took up briefly the subject of insects as carriers of disease, reviewing the many instances in which the function of insects in this direction has been recently proved. He dwelt more especially on the relations between mosquitoes and malaria, indicating comparatively the biology of *Culex* and that of *Anopheles*, showing for the first time a series of pictures illustrating a complete life-round of *Anopheles quadrimaculatus*. He also spoke at some length on the carriage of typhoid germs and the germs of other diseases of the alimentary tract by flies, showing a number of illustrations of dipterous insects reared from human excreta.

Dr. Howard closed his address with the exhibition of a number of slides relating to protective resemblance and protective mimicry, many of which were entirely new.

The chair was taken by the Patron of the Club, His Excellency the Governor-General of Canada, who at the end of the lecture spoke in highly appreciative terms of the manner in which so much useful information had been presented to the audience. A hearty vote of thanks was proposed by the Hon. Sidney Fisher, the Minister of Agriculture, who complimented the audience on having had an opportunity of hearing Dr. Howard's delightful lecture. He reminded them of the great losses suffered every year by farmers from the attacks made upon their crops and live stock by injurious insects. He was much pleased to notice the growing appreciation of the science of economic entomology among all classes. The yearly losses among farm crops were enormous. For instance, it had been estimated that the annual loss in the United States of America alone footed up the astonishing amount of \$300,000,000, while in Canada the loss has been placed at not less than ten per cent. of every crop that is grown. It is, however, now well known that much of this loss can be pre-

vented by following the practical advice given by such men as the lecturer of the evening. He felt proud that Canada in no way lagged behind other countries in the prosecution and application of these studies. The Dominion Entomologist was doing excellent work, highly appreciated both at home and abroad.

Dr. Fletcher, the Dominion Entomologist, in seconding the vote of thanks, considered it an honour to have an opportunity of expressing his opinion, not only of the lecture of the evening, but of the splendid work which Dr. Howard had been doing for so many years. He drew attention to some of the triumphs in Applied Entomology in which that gentleman had taken an active part, mentioning, among other things, the discovery of practical remedies for some of the worst enemies of the farmer and fruit grower, the improvement of machinery for the distribution of insecticides and many other kindred subjects. He felt very happy this evening on account of the honour which was being paid his dear and particular friend, Dr. Howard, as well as the science of Entomology, and which was well attested by the presence of His Excellency the Governor-General, the Hon. Minister of Agriculture, and the large audience now before him, as well as by the rapt attention which was paid to every word uttered by the lecturer and the hearty and frequent applause.

The skilful manipulation of the lantern by Mr. J. P. Dunne was favourably commented upon by Dr. Howard.

THE BILLINGS MEMORIAL.

A PORTRAIT TO BE PLACED IN THE GEOLOGICAL SURVEY DEPARTMENT.

Under the auspices of the Ottawa Field-Naturalists' Club last fall a movement was inaugurated with the object of perpetuating, in some visible and tangible manner, the memory of one of Canada's greatest sons, Elkanah Billings, who departed this life some 24 years ago. Elkanah Billings, well known in old Bytown and in Ottawa's earliest days as a barrister, was an ardent naturalist and geologist. He published the "Canadian Naturalist and Geologist" for several years, first in Ottawa, but later in Montreal, whither Sir William Logan had induced him to go and join him in investigating the geological resources of old Canada (Québec

and Ontario). For twenty years Mr. Billings laboured in the Survey, and by his good work achieved for Canada as well as for himself a reputation in the scientific world of which the greatest might be proud. The name of Billings in the field of geology and especially in the domain of palæontology is a household word and one synonymous with accuracy of observation and description. He possessed in a high degree an analytic as well as a synthetic mind. He has left behind him monuments of imperishable fame in the species and genera he described. Except for the many fine collections now exhibited in the show-cases of the National Museum on Sussex street, which, as has been frequently pointed out, run the daily risk of being destroyed by fire, there is nothing to recall his memory in our midst.

As an outcome of a suggestion made by the President of the Ottawa Field-Naturalists' Club a committee was appointed with the object of having a suitable portrait of the late Mr. Billings painted. Mr. Charles E. Moss, R.C.A., has been requested to paint this portrait. He has just returned from Montreal, where he found an excellent likeness of Billings hanging in the rooms of the Natural History Society of Montreal which that society has generously placed at the disposal of the artist, and has given Mr. Moss every facility possible for the completion of his work. Many of Mr. Billings's old friends are still living, and the geologists of Ottawa and Canada are joining hands in doing honour to such an eminent scientist. It is the intention to present the portrait to the Geological Survey Department to be placed in the Museum in a suitable spot not distant from the numerous collections on which he devoted so much care, time and study with such glorious results. Billings's works are constantly quoted to-day in Europe as well as in America, and as Canadians we are justly proud of him. Among the Canadians on the committee appointed by the Club are the names of Sir James Grant, Dr. J. F. Whiteaves, Mr. B. E. Walker (Toronto), Prof. John Macoun, Dr. James Fletcher, Mr. W. J. Wilson and Dr. H. M. Ami (convener).

With a view of enlisting the co-operation of all the friends and numerous admirers of the late Mr. Billings and giving all an opportunity of taking part in this memorial the committee have thought it desirable to announce that all subscriptions, however small, will be accepted. When the list is complete, the names of the subscribers will be published in THE OTTAWA NATURALIST. Contributions may be sent in to any member of the committee. It is expected that the presentation will take place in the near future.

NOTES ON THE PERIODICAL APPEARANCE OF ANTS
IN A CHIMNEY AND ON AN UNUSUAL SITE FOR A
HUMBLE-BEE'S NEST.

By HENRY S. POOLE, F.G.S., Stellarton, N.S.

(Read before Nova Scotian Institute of Science, Feb. 12, 1900.)

For many years, possibly fifteen, a flight of ants has annually tumbled down a chimney in the office of the Acadia Coal Co. at Stellarton, N.S., generally on August 24th, sometimes a day or two later, and occasionally a few ants again appear as late as the middle of September. Fires are used in the chimney each winter. A tinned roof has been put on the office since the ants first were seen, and the top of the chimney has been thoroughly repaired by masons without finding a nest. The habitat selected seems unusual, and so far has not led to the similar adoption by colonies of other chimneys in the same building.

In a grove of young fir trees, about eight feet from the ground, I noticed one autumn a large Robin's nest in unusually good repair. On pulling down the tree top the nest was found to be full, with a dome-shaped cover. It was occupied by Humblebees and a small comb with larvæ in it. Such a situation for a Humble-bee's nest, I am told, has been seen before, but apparently it is unusual.

IN MEMORIAM.

It is with deep regret that we have to record the death of one of our members who for many years has been an active field-botanist in the little-worked island of Newfoundland, the Rev. ARTHUR C. WAGHORNE, late of the Bay of Islands, Nfld. Owing to ill-health, Mr. Waghorne resigned his charge this spring and died recently at Gordon Town, in Jamaica.

"Mr. Waghorne came to Newfoundland over twenty-five years ago. . . . He was a man of strong personality, devoutly attached to his Church and her interests, and was an ardent student of Botany, especially that of this country. His contributions to this science have made his name well and widely known outside of this island, many plants peculiar to it bearing his name."—St. John's *Evening Telegram*.

CONCHOLOGY.

ON AN ADDITION TO THE MOLLUSCAN FAUNA OF CANADA.

By BRYANT WALKER, Detroit, Mich., U.S.A.

While examining recently a suite of *Gastrodonta multidentata*, Say, from Ottawa, received several years ago from Mr. Gilbert Heron, I was surprised to find a single well marked specimen of *Gastrodonta lamellidens* Pils. This little species was described in 1898 from specimens collected in 1897 in the Great Smoky Mountains of Tennessee. It was then supposed to be peculiar to the southern Appalachians. But recently specimens have been recorded from Deering, N.H., and Greenwich and Litchfield, N.Y. This new find extends its range far to the north and west of any previous records. It is very rare, even in Tennessee. For the benefit of those who are not familiar with it, it may be stated that in size and shape it is very similar to *G. multidentata*, but instead of having two or three radiating rows of separate teeth on the internal base of the shell, there are two or three long, radiating, somewhat flexuose lamellæ similarly situated.

In the Ottawa specimen referred to, these lamellæ appear to be more slender and rather more bent than in specimens from the original locality. It is quite possible that this species is more widely extended than has been supposed, but has been hitherto overlooked from its great similarity to *G. multidentata*. It is very desirable that collectors should carefully examine their suites of that species for specimens of *lamellidens*. Any new localities should be reported at once for publication in the proceedings of this society.

BOTANY.

BOTANICAL CLUB OF CANADA—Annual Report for the year May 20th, 1898, to May 20th, 1899, issued as part of vol. v, Trans. Roy. Soc. Can., 2nd series, 1899-1900 (35 pages). Distributed March 31st, 1900, by Dr. A. H. MacKay, General Secretary-Treasurer.

This report contains a sketch of the history of "Phenological Observations in Canada." It also indicates the progress of botanical research, points out the results obtained in Newfound-

land, as well as in Labrador, Prince Edward Island and Nova Scotia. This is followed by "Observations in a Wild Garden," by Dr. G. U. Hay, of St. John, New Brunswick, besides notes on work done in Ontario. Prof. Macoun's researches in the "*Cryptogamic Flora of Ottawa*," published in THE OTTAWA NATURALIST, Mr. James M. Macoun's "*Contributions from the Herbarium of the Geological Survey of Canada*," have been published in "The Canadian Record of Science" and in THE OTTAWA NATURALIST.

Full descriptions of the new species of Ottawa Violets were given, with excellent plates, in THE OTTAWA NATURALIST of January, 1899, No. 10, Vol. xii, and reference is also made to *Viola Watsoni*, Green, from Prince Edward Island, and another new species from British Columbia, besides notes on the genus *Antennaria* and *Fragaria*.

From Alberta, Assiniboia and British Columbia reports are also sent in. The Teachers of the Department of Public Instruction in Nova Scotia, of which Dr. A. H. MacKay is Superintendent, have been most active in recording phenological observations, from which excellent results were recorded.

The officers of the Botanical Club of Canada are then added.

President—John Macoun, M.A., F.L.S., F.R.S.C., Ottawa.

General Secretary-Treasurer—A. H. MacKay, LL.D., Halifax.

Secretaries for the several Provinces—

Newfoundland, Rev. A. C. Waghorne, Bay of Islands.

Prince Edward Island, Principal John MacSwain, Charlottetown.

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Alberta, T. N. Willing, Esq., Olds.

Saskatchewan, Rev. C. W. Bryden, Willoughby.

British Columbia (mainland), J. K. Henry, B.A., High School, Vancouver.

Vancouver Island, A. J. Pineo, B.A., High School, Victoria.

OTTAWA NORMAL SCHOOL—BOTANICAL COMPETITION

THE PREMIER'S PRIZE.—Some months ago the Honourable G. W. Ross, Premier of the Province of Ontario, informed the President of the Ottawa Field-Naturalists' Club that he would be glad to offer for competition among the students of the Ottawa Normal School a Medal or prize in books for the best work done in connection with the Ottawa Field-Naturalists' Club. Later, a second prize was offered by the President of the Club for the same object and the Normal School authorities were apprised of the same. The work selected was in the form of collections of plants from the Ottawa District, to be obtained, pressed, named and classified, according to the requirements of the Science Master of the Provincial Normal School and in accordance with the wishes of the Club.

Accordingly, a large series of collections (over ninety) were sent in for competition and the Council of the Club appointed Professor John Macoun, Dr. James Fletcher and Dr. H. M. Ami, as Judges in the said competition.

From the report made to the Normal School authorities by the Committee of Judges, it appears that the collections were both excellent and numerous and the competition was very keen. The neatness and care with which a large number of these were prepared showed clearly that more than a passing acquaintance with the plants mounted, prepared and classified was obtained by the great bulk of the contestants.

In reporting the result of the competition to Council, the Judges expressed the great satisfaction they had experienced while examining these collections. In this connection, the following notes may not be out of place :—

The collection which the judges consider gave on the whole the best indication of excellence in preparation, care, accuracy in determination, &c., was that of Miss Elma Cannon, of Athens, Ont., and to this lady was awarded the Ross prize.

The next best collection was that of Miss Mary E. Robson, of Grey County, Ont., and to this lady was awarded the President's prize, which consisted of a copy of the recently issued beautiful work entitled "Nature's Garden," by Neltje Blanchan.

It would be unfair not to mention a number of other collections which were sent in and exhibited such a degree of excellence as to be worthy of honourable mention in this competition; they were those of Messrs. J. A. Graham, F. H. Breckenridge and Elmer Bolton; and those of the Misses L. Mabel Graham, M. VanAlstyne, and M. M. Mackenzie. Also those of Miss Reilly, Messrs Byrnes, M. E. Watson, F. Shannon, J. W. Gibson, C. Ramsay, C. McLennan. F. C. Thompson.

The thanks of the Committee of Council are due Mr. J. H. Putman, Science Master, for his valuable assistance in the matter of the preliminary examination and arrangement of the collections to be judged.

As stated above these collections showed plainly that great care had been taken by the students in working up the collections many of which were so nearly equal in excellence that a scale of marks had to be prepared and the individual specimens in the different collections compared before the prizes could be awarded.

The Committee beg to thank Dr. Ross and to congratulate him on the success of his effort as shown by the very evident interest he has called forth in the study of Botany, as well as the Science Master of the Normal School on the enthusiasm he has instilled into his students.

BOOK NOTICES.

REVISION OF AMERICAN VOLES OF THE GENUS *MICROTUS*. North American Fauna, No. 17. By Vernon Bailey. Washington, D.C., U.S.

Mr. Vernon Bailey, Chief Field-Naturalist of the Division of Biological Survey of the United States Department of Agriculture, has just published under the above title a complete synopsis of the interesting genus *Microtus*, which he has prepared under the direction of Dr. C. Hart Merriam, and which work includes the species from British North America as well as those of the United States.

The American Voles or Meadow Mice burrow in the ground and from their burrows make little smooth trails to their feeding grounds. Their bulky nests of grass and soft plant fibres are found either underground or on the surface of the ground under

snow, logs or dense vegetation. "These nests are the sleeping-places of the old and the nurseries of the young. They are kept surprisingly clean and fresh, and new ones are frequently made. The food of Meadow Mice consists mainly of green vegetation, roots and bark."

As to their economic status, Mr. Bailey says: "Too small and too numerous to be successfully destroyed by traps, guns or poison, they prove one of the most difficult enemies with which the farmer has to contend." "With a stroke of their chisel-like teeth they fell the stalks of wheat and oats and eat the tender parts, together with some of the grain. In shocks of corn and wheat the grain is often completely devoured."

The following are the British-American species, and they are described and illustrated in the publication:

1. *Microtus Acadicus*, Bangs. Digby, N.S.
2. *Microtus Drummondi* (Aud. and Bach.). Rocky Mountains, vicinity of Jasper House, Alta.
3. *Microtus enixus*, Bangs. Hamilton Inlet, Labrador.
4. *Microtus fontigenus*, Bangs. Lake Edward, Que.
5. *Microtus labradorius*, Bailey. Fort Chimo, Ungava, Labrador.
6. *Microtus Macfarlani*, Merriam. Fort Anderson (north of Great Bear Lake), Mackenzie.
7. *Microtus Richardsoni* (DeKay). Near foot of Rocky Mountains, vicinity of Jasper House, Alta.
8. *Microtus serpens*, Merriam. Agassiz, B. C.
9. *Microtus terrænovæ* (Bangs). Codroy, Nfld.
10. *Microtus tetramerus* (Rhoads). Beacon Hill Park, Victoria, B. C.
11. *Microtus xanthognathus* (Leach). Hudson Bay.

Mr. Bailey subdivides the genus *Microtus*, which comprises in all seventy species, into nine subgenera. The above Canadian species Nos. 1, 2, 3, 4, 5, 6, 9, 10, and 11 come under the subgenus *Microtus*, No. 7 under the subgenus *Arvicola* and No. 8 under the subgenus *Chilotus*.

ON THE OCCURRENCE OF A SPECIES OF WHITTLESEYA IN THE RIVERSDALE FORMATION (EO-CARBONIFEROUS) OF THE HARRINGTON RIVER ALONG THE BOUNDARY LINE BETWEEN COLCHESTER AND CUMBERLAND COUNTIES, NOVA SCOTIA, CANADA.

By H. M. AMI, of the Geological Survey of Canada, Ottawa.

During the collecting season of 1895-6-7-8-9, the writer has spent a portion of his time in making a palæontological survey of the various rock-formations in critical localities comprised in the counties of Pictou, Antigonish, Colchester, Cumberland, Hants and King's, in Nova Scotia, for the Geological Survey Department, with a view of ascertaining the field-relations and succession of the faunas and floras entombed in them and determining their position in the column of Palæozoic sediments. Much of the work has been in the direction of defining the precise geological horizon of the so-called Devonian rocks of Union and Riversdale as described by Mr. Hugh Fletcher,* which series or formation of rocks also correspond to those described by Dr. R. W. Ellis † in his "Report on the geological formations of Eastern Albert and Westmoreland Counties, New Brunswick, and a portion of Cumberland and Colchester Counties, Nova Scotia, embracing the Spring Hill Basin and the Carboniferous System north of the Cobequid Mountains," in which he describes as doubtfully Lower Carboniferous, and probably Devonian, rocks having the same geological relations as those "rocks of Union and Riversdale" referred to above.

Rocks of this formation in Nova Scotia had been referred by Sir William Dawson to the Carboniferous (Millstone Grit); and my best endeavours were directed to the finding of evidence to prove the age to which these rock formations were to be referred; whilst in doing so, I have kept constantly in view the discovery of Devonian types. In the summary reports of the Department for the past three years, brief results, as obtained from season to season, have been published, in which it will be seen that the rocks in question are now referred to the Carboniferous System, from the definite and irresistible flood of internal evidence which has accrued and been obtained from them.

In a paper "On the Sub-divisions of the Carboniferous System in Canada, with special reference to the position of the Union and

* Annual Rep. Geol. and Nat. Hist. Survey of Canada, Vol. 2, p. 65 P; 1887. Montreal.

† Annual Rep. Geol. and Nat. Hist. Survey of Canada, Vol. 1. p. 51 E. etc. 1886. Montreal.

Riversdale formations of Nova Scotia, referred to the Devonian System by some Canadian geologists," * the writer presented some of the evidence obtained in the field, which went to show clearly, we believe, that the fauna and flora found entombed in the Riversdale formation, had in every respect a Carboniferous facies and consequently could not be referred to the Devonian System, but to the Carboniferous.

Along the banks of the Harrington River, near Lower Five Islands, forming the boundary line between Colchester and Cumberland Counties in Nova Scotia in strata consisting of sandstones, siliceous and carbaceous shales, the writer obtained in 1897 and 1898 quite an assemblage of plant remains which have been forwarded to Mr. Robert Kidston, who refers them to a decided Carboniferous horizon. The animal remains have been submitted to a preliminary examination and all the forms noticed also indicate a Carboniferous age.

From the 1898 collections a number of remains of an interesting form have been recently selected which shew clearly the occurrence of a species of the genus *Whittleseya*, defined by Newberry in 1874. †

All the North American species of *Whittleseya* (*W. elegans*, *W. integrifolia*, *W. undulata*, *W. microphylla*,) have been discovered from the Coal Measures of the United States. As far as the writer is aware this is the first time that the genus has been discovered in Nova Scotian strata and the present note, or brief paper is to place it on record and express the view that the Harrington River strata, from which the interesting specimens of *Whittleseya* were obtained, afford additional proof of their Carboniferous age.

The following plants were determined by Mr. Kidston and were found associated with the species of *Whittleseya* by the writer :—

1. *Asterophyllites acicularis*, Dawson (= *Calamocladus equisetiformis*, Schlotheim). 2. *Sphenopteris marginata*, Dawson. 3. *Alethopteris dilatata*, Dawson. 4. *Alethopteris splendens*, Dawson. 5. *Alethopteris Harttii*, Dawson. 6. *Alethopteris discrepans*, Dawson. 7. *Aneimites Acadica*, Dawson. 8. *Cardiocarpum cornutum*, Dawson. 9. *Psilophyton?* *glabrum*, Dawson.

Another species of *Whittleseya* has been noticed by the writer from his collections made at West Bay, near Parrsborough, in Cumberland County. The latter were associated with fossil insects and *Anthracomyæ*, all of which have also a decided Carboniferous facies. It will thus be seen that the evidence is cumulative, which has been gathered, and goes to prove that the strata from which it was obtained cannot be referred to the Devonian System.

* Trans. Nov. Scotian Inst. Sc., Vol. X, Session 1899-1900, pp. 167-178, Halifax.

† Proc. Cleveland Acad. Sciences, p. 43.

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